



VALIDATION REPORT

“GUANGDONG PINGHAI POWER PLANT PHASE I PROJECT” IN CHINA

REPORT No. 2009-1413

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VALIDATION REPORT

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Summary:

Project Name: Guangdong Pinghai Power Plant Phase I Project

Country: China

Methodology: ACM0013

Version: 04

GHG reducing Measure/Technology: Grid connected fossil fuel fired power plants using ultra supercritical technology

ER estimate: 656 490 tCO₂e per annum (average)

Size

☒ Large Scale

☐ Small Scale

Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the project activity "Guangdong Pinghai Power Plant Phase I Project" in China, as described in the PDD, version 04 of 30 June 2011, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0013, version 04. Hence DNV requests the registration of the project as a CDM project activity.

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Report title: "Guangdong Pinghai Power Plant Phase I Project" in China			
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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CSPG	China Southern Power Grid
DNA	Designated National Authority
DNV	Det Norske Veritas
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IETA	International Emissions Trading Association
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquid Natural Gas
LoA	Letter of Approval
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NCV	Net Calorific Value
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PPA	Power Purchase Agreement
RMB	Renminbi, Chinese currency (yuan)
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added tax



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity “Guangdong Pinghai Power Plant Phase I Project” in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is China and the Annex I Party is United Kingdom of Great Britain and Northern Ireland. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA from China confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0013, version 04 “Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology”.

By generating electricity using a less GHG intensive technology to displace electricity from the grid, which is mainly composed of the fossil fuel power plants, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The emission reductions from the project are estimated to be on the average 656 490 tCO₂e per year over the selected 10 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

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

In summary, it is DNV’s opinion that the project activity “Guangdong Pinghai Power Plant Phase I Project” in China, as described in the PDD, version 04 dated 30 June 2011, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0013, version 04. Hence, DNV requests the registration of the project as a CDM project activity.

Beijing and Oslo, 20 October 2011

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Michael Lehmann
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2 INTRODUCTION

Upper Horn Investments Co., Ltd has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the “Guangdong Pinghai Power Plant Phase I Project” in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0013 version 04 /24/. The validation was based on the recommendations in the Validation and Verification Manual version 1.2 /23/.

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



3 METHODOLOGY

The validation consisted of the following three phases:

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

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

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

3.1.1 Documentation provided by the project participants

- /1/ EcoSecurities International Limited: *CDM-PDD for project activity "Guangdong Pinghai Power Plant Phase I Project" in China*, GSP version 01 dated 20 July 2009 and final updated version 04 dated 30 June 2011.
- /2/ EcoSecurities International Limited: *LCOE, CER calculation and sensitivity analysis spreadsheet for project activity "Guangdong Pinghai Power Plant Phase I Project" in China*, Version 01 dated 5 June 2009 and version 04 dated 30 June 2011.
- /3/ Electric Power Design Institute of Guangdong Province: *Feasibility Study Report of (FSR) for project activity "Guangdong Pinghai Power Plant Phase I Project" in China* dated April 2008 and approved by National Development Reform Commission (NDRC), People's Republic of China dated 7 October 2008.
- /4/ South China Institute of Environmental Science (SCIES): *EIA for project activity "Guangdong Pinghai Power Plant Phase I Project" in China* dated November 2007 and approved by Ministry of Environmental Protection dated 24 April 2008
- /5/ Power purchase agreement (PPA) between Guangdong Huizhou Pinghai Power Station Co., Ltd. and SCPG, dated 15 April 2010
- /6/ *The construction contract for Guangdong Pinghai Power Plant Phase I Project* signed between Guangdong Huizhou Pinghai Power Station Co., Ltd and Guangdong Power Engineering Corporation in November 2008.
- /7/ *The construction starting permit for Guangdong Pinghai Power Plant Phase I Project* issued by the Supervision Party- Guangdong Tianan Project Management Co., Ltd. dated 22 December 2008.
- /8/ *The purchase contract of the boilers, steam turbines and generators for Guangdong Pinghai Power Plant Phase I Project* signed between Guangdong Huizhou Pinghai Power Station Co., Ltd and Shanghai Electric Group Co., Ltd dated 24 October 2008.
- /9/ *The training contract for Guangdong Pinghai Power Plant Phase I Project* signed between Guangdong Huizhou Pinghai Power Station Co., Ltd and Guangdong Shajiao C Power Station dated 19 June 2009.
- /10/ CDM Emission Reductions Purchase Agreement (ERPA) *for Guangdong Pinghai Power Plant Phase I Project* signed between Guangdong Huizhou Pinghai Power Station Co., Ltd. and EcoSecurities Group PLC., dated 20 October 2008.
- /11/ Notification to EB from EcoSecurities International Limited for seeking CDM status

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- for Guangdong Pinghai Power Plant Phase I Project dated 1 December 2008.
- /12/ The CDM training records by EcoSecurities International Limited dated 8 September 2009.
- /13/ 107 copies of answered questionnaire for the stakeholder comments by project owner during period of July 2009.
- /14/ The statistic of natural grid
http://www.sgcc.com.cn/dlgx/dwtj/default_3.shtml
- /15/ Electric Industry Ministry, Security Management Regulation for Grid-connected Nuclear Power Plant dated 28 April 1997
http://www.jssafety.gov.cn/text_safety/falvfagui/3bwgz/07/03.html
- /16/ Chen Hao, The analysis of peak load within Guangdong Grid
<http://www.bjx.com.cn/files/wx/gddl/2001-2/2.htm>
- /17/ China Electric Power Press: "Referenced Cost Index of Power Engineering and Design 2007, published in March 2008
- /18/ Guangdong Heyuan USC project:
<http://www.sec.com.cn/news/detail.aspx?id=41277>
- /19/ Guangdong Heyuan USC project is applying CDM registration:
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2571.pdf>
- /20/ The notice on the 60th CDM meeting issued by DNA of China dated 4 March 2009.
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2171.pdf>

3.1.2 Letters of approval

- /21/ NDRC (DNA of China): *Letter of approval* for Guangdong Pinghai Power Plant Phase I Project dated 9 April 2009.
- /22/ Department of Energy and Climate Change of U.K. (DNA of Annex I Party): *Letter of approval* for Guangdong Pinghai Power Plant Phase I Project, dated 4 August 2010.

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

- /23/ CDM Executive Board: *Validation and Verification Manual*. Version 1.2, EB55.
http://cdm.unfccc.int/Reference/Manuals/accr_man01.pdf
- /24/ CDM Executive Board: *Baseline and monitoring methodology ACM0013*, "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" version 04, EB56.
- /25/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 5.2.
- /26/ IPCC: *Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual*.
- /27/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 2.2.
- /28/ CDM Executive Board: *"Guidelines for completing the project design document and*

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the proposed new baseline and monitoring methodologies”, version 7, adopted at EB41.

- /29/ CDM Executive Board: *Guidelines on the assessment of investment analysis, version 3.1, EB51 Annex 58.*

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

- /30/ NDRC: The utilization policy of natural gas dated 30 August 2007.
<http://www.ndrc.gov.cn/zcfb/zcfbtz/2007tongzhi/W020070904363743792492.pdf>
- /31/ NDRC: China Energy Conservation Technology Policy Outline (2006)
<http://www.jnjp.org/zc/showarticle.asp?articleid=334&page=1>
- /32/ Both of 600MW supercritical and subcritical units can provide the service of base load and peak load
http://www.cec.gov.cn/info/NewsDetail.jsp?news_id=8645
- /33/ China Statistic Press: China Energy Statistical Yearbook, 2005-2009.
- /34/ China Electric Press: China Electric Power Yearbook, 2005-2009.
- /35/ NDRC: the grid boundary and EF for each power grid of China for the year 2008, dated 2 July 2009:
http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm
- /36/ NDRC: The emission factor of new grid connected fossil fuel fired power plants using a less GHG intensive technology (ACM0013) for the year 2009 dated September 2009:
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2330.pdf>
- /37/ Hydro power sector development analysis and investment forecast report:
http://www.chinacir.com.cn/report/report_5_32925.shtml
- /38/ State Power Information Network: Nuclear power plant cannot be operated as peak load.
http://www.sp.com.cn/kjzl/xjstj/200209/t20020927_119.htm
- /39/ State Power Information Network: electricity supplied by Three Gorge hydro power plant has distinct seasonality:
http://www.sgcc.com.cn/dlgx/dwtj/default_3.shtml
- /40/ People's Bank of China: Average long term loan base interest from 2002 to 2007
www.boc.com
- /41/ China Coal Market Network: China coal price static
http://www.cctd.com.cn/jsp/info/view.jsp?name=sjzx_jgcx_gif.htm
- /42/ The Letter of intent for coal supplying between Guangdong Electric Power Fuel Company and Inner Mongolia Yitai Group Co.,Ltd dated 3 Nov 2005
- /43/ China Cement Network: Transfer of new cycle technology for thermal power industry
<http://www.chinacements.com/news/2009/3-18/C102121892.htm>
- /44/ Financial Office of Guangdong Province: Qualification certificate for Guangdong Zhongtian Accountant Firm, 13 October 2008.
- /45/ Guangdong Zhongtian Accountant Firm: Financial Audit Report for Guangdong



- Pinghai Power Plant Phase I Project 2010, dated 25 January 2011.
- /46/ Website by Guangdong Huizhou Pinghai Power Station Co., Ltd. to confirm that project developer has experience in coal-fired, hydro, wind, LNG, nuclear power generation plants and 600MW sub critical and super critical power plants:
<http://www.gdyd.com/yuedian/About/>
<http://www.gdyd.com/news/movement/201105/35780.html>
<http://www.gdyd.com/yuedian/Member/Holdings-1/201001/6928.html>.
- /47/ Website of CEC confirming that the 2*600 coal fire power plant can still provide the similar service for both base load and peak load:
http://www.cec.gov.cn/info/NewsDetail.jsp?news_id=8645
- /48/ Dongfang Electric Corporation: Gross energy efficiency of 41% at optimum load of the 600MW supercritical power generation technology
- /49/ *Notice of National Council Issued about the Power System of Organization Reform Programme* (National issued [2002] No. 5) issued by State Council in 2002.

Main changes between the PDD GSP version 01 dated 20 July 2009 and final version 04 dated 30 June 2011:

1. The methodology used in the final version PDD has been updated into version 4.
2. Due to the change of emission reduction calculation algorithm in ACM0013 version 04, the calculation of annual estimated emission reduction in the final version of PDD was revised accordingly.
3. The investment cost was added into the sensitivity analysis in the PDD final version 04 dated 30 June 2011.
4. The monitoring plan has been updated according to the validation findings in the PDD final version 04 dated 30 June 2011.

3.2 Follow-up interviews with project stakeholders

DNV performed site visit and follow up interview for Guangdong Pinghai Power Plant Phase I Project on 10 September 2009. Representatives of the project owner, Guangdong Huizhou Pinghai Power Station Co., Ltd., and the CERs buyer, EcoSecurities International Limited were interviewed to resolve the issues identified during the desk review of the PDD /1/.

Table below provides the information regarding the issues discussed during the site visits:

	Date	Name	Organization	Topic
/50/	2009-09-10	Liu Feng Lai Haisheng Li Guanmu Zeng Wu An Na	Guangdong Huizhou Pinghai Power Station Co., Ltd (Project owner)	<ul style="list-style-type: none"> ➤ Project background information. ➤ Project technology, operation, maintenance and monitoring capability. ➤ Project additionality and proof of CDM consideration. ➤ Project monitoring and management plan. ➤ Project approval status (incl. EIA approval, CDM project approval status)



/51/	2009-09-10	Yang Yi Zhou Jiangbo	EcoSecurities International Limited (CER buyer)	<ul style="list-style-type: none"> ➤ Stakeholder consultation process ➤ Baseline determination of the project ➤ Applicability of selected methodology ACM0013 ➤ Issues related to the additionality ➤ Common practice analysis ➤ Emission reductions calculation ➤ Emission reduction monitoring plan and project management
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3.3 Resolution of outstanding issues

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

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

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "Guangdong Pinghai Power Plant Phase I Project" in China is enclosed in Appendix A to this report.

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

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

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

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

The validation protocol in Appendix B is based on the project design as documented and described in the PDD, version 04 dated 30 June 2011, and Table 3 of the validation protocol will as applicable describe any changes made to this version of the PDD as a result of CARs and CLs raised by DNV.



The findings of the validation of the project design as documented and described in earlier version(s) of the PDD are described in the initial validation protocol included in Appendix B to this report.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities				
Requirement	Reference		Conclusion	
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.		This is either acceptable based on evidence provided (OK) or a corrective action request (CAR) if a requirement is not met.	

Validation Protocol Table 2: Requirement Checklist				
Checklist question	Reference	Means of verification (MoV)	Assessment by DNV	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	Gives reference to documents where the answer to the checklist question or item is found.	Means of verification (MoV) are document review (DR) , interview (I) or any other follow-up actions (e.g., on site visit and telephone or email interviews) and cross-checking (CC) with available information relating to projects or technologies similar to the proposed CDM project activity under validation.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A corrective action request (CAR) is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A forward action request (FAR) during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/or clarification requests	Ref. to checklist question in table 2	Response by project participants	Validation conclusion
The CARs and/or CLs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusions of the CARs and/or CLs.

Validation Protocol Table 4: Forward Action Requests		
Forward action request	Ref. to checklist question in table 2	Response by project participants
The FARs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by project participants on how forward action request will be addressed prior to first verification.

Figure 1: Validation protocol tables



3.4 Internal quality control

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

3.5 Validation team

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>							
				Administrative	Desk review	Site visit / Interviews	Reporting	TA1.1 competence	MG competence	Financial expertise	Technical review
Contract manager	Li	Lei	China	✓							
Team leader (CDM validator)	Tang	Zhiang	China		✓		✓		✓	✓	
Validator	Huang	Peng	China		✓	✓	✓				
Validator	Lai	Chee Keong	China		✓						
Validator	Dong	Nan	China		✓	✓	✓				
Validator	Li	Lei	China		✓		✓				
Assessor under Training	Hou	Baojun	China		✓		✓	✓			
Technical reviewer(draft, applicant)	Brinks	Hendrik	Norway								✓
Technical Reviewer (Final)	Kakaraparthi	Venkata Raman	India					✓	✓		✓

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



4 VALIDATION FINDINGS

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

During the validation, 3 CARs and 11 CLs were raised. These CARs/CLs have been satisfactorily addressed by the project proponent and hence been closed. The CARs/CLs raised and the responses provided by the project proponent have been detailed in Appendix A/B. No FAR was identified.

The validation report was revised to address concerns raised in the requests for review by three CDM Executive Board members.

The final validation findings relate to the project design as documented and described in the PDD, version 04 dated 30 June 2011.

4.1 Participation requirements

The project participants are Guangdong Huizhou Pinghai Power Station Co., Ltd of China and EcoSecurities International Limited of United Kingdom of Great Britain and Northern Ireland. The host Party (China) and the Annex I Party (United Kingdom of Great Britain and Northern Ireland) meet all relevant participation requirements. Both Parties fulfill the requirements for participating in the CDM. Both have ratified the Kyoto Protocol and have established their respective DNAs as per the participation requirements for CDM under the Kyoto Protocol.

A letter of approval (LoA) /21/ was issued by the DNA of China on 9 April 2009, authorizing Guangdong Huizhou Pinghai Power Station Co., Ltd as project participant and confirming that the project assists in achieving sustainable development.

A letter of approval (LoA) was issued by the DNA of United Kingdom of Great Britain and Northern Ireland /22/ on 4 August 2010, authorizing EcoSecurities International Limited as project participant.

DNV received these letters from the project participants directly and considers the provided letters as authentic according to the para 45-48 of VVM version 1.2 /23/.

The project does not involve public funding, and the validation did not reveal any information that indicates the project can be seen as a diversion of official development assistance (ODA) funding towards China.

4.2 Project design

The Guangdong Pinghai Power Plant Phase I Project applies the technology of ultra-supercritical coal-fired power generation, which is a high efficiency coal-fired power generation technology. The project activity is the implementation and operation of two ultra-supercritical coal-fired power generation units with the total capacity of 2×1000 MW. The boilers are designed to work under a pressure superheated steam outlet of 27.56 MPa (a) and the temperature of superheated steam outlet of 605°C, and the steam turbines are designed to work under pressure before main throttle valve of 26.25 MPa(a) and temperature before main throttle valve of 600°C /8/. The proposed project is located in Pinghai Town, Huidong County, Huizhou City of Guangdong Province. The objective of the project is to generate and sell



electricity to the South China Power Grid (SCPG), which covers Guangdong, Guangxi, Yunnan, and Guizhou Provinces.

The project's system boundaries are clearly defined as the SCPG, which is in line with the delineation of the grid boundaries regulated by the DNA of China /35/.

The starting date of the project activity is determined to be 24 October 2008, which was verified to be the date of placing the purchase contract for boilers, turbines and generators /8/. The contract for civil works was placed in November 2008 /6/ and the construction start permit was in December 2008 /7/. 24 October 2008, being the first financial commitment date, has been rightly considered as the start date.

The expected operational lifetime of the project activity is 20 years according to FSR /3/. A fixed crediting period of 10 years has been chosen for the project, starting from 1 July 2011 or the date of registration of the CDM project activity, whichever is later. It is expected that the project will achieve an *ex-ante* estimated average annual emission reduction of 656 490 tCO₂/year over the ten-year crediting period of the project.

DNV considers the project description to be complete and accurate.

4.3 Application of selected baseline and monitoring methodology

The project correctly applies the approved consolidated baseline methodology ACM0013 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" version 04 /24/. The applied baseline methodology is justified as it has been demonstrated that the proposed project activity fulfils the following criteria:

- 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 /3/. According to the Referenced Cost Index of Power Engineering and Design published by China Power Engineering Consulting Group Corporation /17/, the coal consumption per kWh of the ultra-supercritical power plant is 10gce less than that of the supercritical power plant which is the most commonly used for new built power plants. The project activity is the construction and operation of a new coal-fired grid-connected electricity generation plant that uses ultra-supercritical technology to achieve higher efficiency in coal-based electricity generation in China.
- DNV has checked the approved FSR and confirmed that coal will be used as main fuel in the project power plant. In addition to this main fossil fuel category, small amounts of diesel will be used for start-up or auxiliary purposes. Thus diesel only comprise of 0.2% total fuel used annually based on the data of FSR /3/ and letter of intent for coal supply /42/.
- The project activity does not include the construction and operation of a co-generation power plant /3/.
- Data on fuel consumption and electricity generation of recently constructed power plants is available. Data on coal consumption and electricity generation of recently



constructed power plants is available as in baseline emission calculation /36/.

- According to China Energy Statistics Yearbook 2005~2007 and China Electric Power Yearbook 2005~2007, the share of power generation from coal-fired power plants within SCPG are 59.3%, 67.5% and 69.2% from 2004 to 2006 /33//34/, which are greater than 50% for the past three years. DNV confirms that these are the latest 3 years data available prior to the project start in year 2008.

DNV has concluded that the application of the baseline methodology ACM0013 version 04 is transparent and conservative.

4.4 Project boundary

The project's system boundaries are defined as the project site and the system boundary for the electricity grid includes all power plants connected physically to the SCPG, including Guangdong, Guangxi, Yunnan and Guizhou Power Grid /35/. There are no significant transmission constraints between the power plants of the SCPG. The selected sources and gases are justified for the project activity.

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0013 (version 04).

4.5 Baseline determination

The following alternatives are identified and DNV considers the list of realistic and credible alternatives to be complete:

- (1) The project activity not implemented as a CDM project. This is a plausible and eligible baseline scenario, i.e. 2*1000 MW ultra-super critical power generation using coal without considering CDM. Alternative (1) 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
 - (2a) Power generation using the same fossil fuel category as in the project activity, but technologies other than that used in the project activity.

In accordance with the ACM0013, version 04, page 3, 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. baseload power). According to Referenced Cost Index of Power Engineering and Design 2007 published by China Power Engineering Consulting Group Corporation in April 2007 /17/ in China the typical technologies using coal for power generation include 2*600 MW supercritical and subcritical coal-fired power plants, meanwhile the 2*1000MW supercritical and subcritical coal-fired power plants both are not common practice in China. Both the 600 MW supercritical and subcritical unit alternatives can provide base and peak load services as the proposed project /32/.



Also according to the FSR /3/ and PPA /5/ between the PP and the grid company SCPG, the proposed project will deliver the service of both base load and peak load. It means according to the requirement of the grid company, the proposed project shall sometimes act as base load and sometimes as peak load. The 2*600 MW plant has a lower capacity than the proposed projects, but as per ACM0013, version 04, page 8, the plant has a comparable size (the range from 50% to 150% of the rated capacity of the project plant) to the proposed projects and it can still provide similar services for both base load and peak load /46/.

Therefore the 2*600 MW supercritical and subcritical coal-fired power plants are the two possible alternatives of the proposed project.

- (2b) Power generation using fossil fuel categories other than that used in the project activity. Alternative (2b) mainly includes oil-fired and natural gas-fired power plants. Oil-fired power plants are banned in electric power system according to China Energy Conservation Technology Policy Outline (2006) /31/, thus oil-fired power generation is not a possible scenario. Natural gas power plants are excluded since it can only provide peak service with SCPG /30/, thus cannot provide the similar services as the Project. Alternative 2b is excluded.

- (2c) Other power generation technologies, such as renewable power generation. Other power generation technologies mainly include nuclear power, hydro power, wind power, solar power, biomass and others. Nuclear power is not a plausible scenario as it delivers outputs and services of a base load plant, whereas the proposed project has essential function of a peak load plant /38/. As per ACM0013, version 04, page 8, peak load is defined as a load factor of less than 3000 hours per year. DNV checked the China Electric Yearbook 2009 page 704 /34/ and found that the natural gas plants connected to the SCPG all had annual operating hours below 3000 hours (2 680, 2 498 and 2 805). Thus DNV confirm that the exclusion of the alternative of natural gas power plants based on base/peak load service is reasonable.

Power generation from hydro, wind and solar, biomass and other sources are not plausible scenarios, as Guangdong Province has barely such energy sources, and such power plants have the small capacity and seasonal differences, which cannot provide similar base and peak load services as the project /37/. Furthermore, DNV verified China Power Year Book 2007 to confirm that in SCPG the total installed capacity and electricity generation using renewable energy except hydro energy and nuclear energy is 386.9 MW and 877 GWh respectively, which are much smaller than the expected amounts from the proposed project. Alternative 2c is excluded.

- (2d) Import of electricity from connected grids, including the possibility of new interconnections. The import of electricity to SCPG is mainly from Three Gorge (Central China Grid) /3/. However, electricity supplied by Three Gorge hydro power plant has distinct seasonality, extremely unbalanced output in a year and gathered power generation in flood season /39/. In dry seasons it is difficult to guarantee normal supply from Three Gorges hydro power plant /39/. Therefore, alternative (2d) cannot provide similar services as the proposed project and is excluded.

VALIDATION REPORT

As required by the ACM0013, version 04, page5, in the case Option II (Investment comparison analysis) is applied in Sub-step 2b, it should be demonstrated that the baseline alternative is available to the project participant(s).

The PP demonstrated that the baseline alternative is available to the project participant as the project developer Guangdong Huizhou Pinghai Power Station Co., Ltd. has experience in coal-fired, hydro, wind, LNG, nuclear power generation plants and 600MW sub critical and super critical power plants /46/. Hence, all the alternatives are available to the PP.

Hence, the following alternatives are realistic and credible baseline alternatives:

- The project activity not implemented as a CDM project
- 2*600 MW super-critical coal-fired power plant
- 2*600 MW sub-critical coal-fired power plant

The economically most attractive baseline scenario alternative among the three alternatives as stated above has been identified using the levelized cost of power generation as the financial indicator.

As per ACM0013 version 04, “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), however they should deliver similar services (e.g. peak vs. base load power)”. The three alternatives can supply the similar service, i.e. both peak and base load services and the 2*600 MW super-critical and sub-critical coal-fired power plants are common industrial practices in China of the similar capacity comparing with the proposed project /3/.

It has been demonstrated that the levelized cost of power generation in a similar capacity coal based sub-critical power plant and super critical power plants are 0.3131 RMB/kWh and 0.3111 RMB/kWh respectively when compared to 0.3144 RMB/kWh /2/ for a ultra super-critical power plant (the proposed project). Since the levelised cost of generation in a super critical plant is the least among the three alternatives, this is identified as the baseline option.

DNV has checked and assessed all the documents during the validation process. In our opinion, these data adequately reflect the actual situation for the following reasons:

(1) DNV has verified that the data used for calculating the levelized cost for the proposed project, the sub-critical coal based power plant and the super critical coal based power plant to have been sourced from the data from the FSR approved by NDRC /3/,,which can be regarded as an independent and recognized source.

(2) The Feasibility Study Report of the project was prepared by Guangdong Electric Power Design Institute in April 2008 and approved by National Development and Reform Commission in 7 October 2008 /3/. The starting date of the proposed project is 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit /6//7//8/. Given this short period of time between the approval of the FSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed. It is thus reasonable to assume that the FSR have been the basis of the decision to proceed with the investment in the project.

(3) DNV has cross checked the input values used in the calculation of the levelized electricity

VALIDATION REPORT

generation cost (LCOE) of proposed project and coal fired power generation technologies in the PDD against third-party or publicly available sources as follows (the input values used in the calculation of LCOE of proposed project refer to the additionality analysis):

1) The unit investment cost

The unit investment costs used for calculation LCOE of 2*600 MW sub-critical coal-fired power plant and super-critical coal-fired power plant are 3 559 RMB/kW and 3 724 RMB/kW respectively, and are sourced from the approved FSR /3/. DNV has checked the “Referenced Cost Index of Power Engineering and Design 2007” published by China Power Engineering Consulting Group Corporation, which is a authoritative power design book in China and the publication updated every year /17/, and confirms that the unit investment costs for 600 MW sub-critical coal-fired power plant and super-critical coal-fired power plant used in the levelized cost analysis are reasonable for the industrial common practice in China. The investment cost of the project at 7 994 million RMB is sourced from the FSR. DNV has verified the Financial Audit Report for Guangdong Pinghai Power Plant Phase I Project 2010 issued by Guangdong Zhongtian Accountant Firm on 25 January 2011 /45/, which is the qualified financial entity /44/. In the financial audit report, it showed that the Guangdong Pinghai Power Plant Phase I Project has not been totally completed and the actual investment till the end of 2010 has occupied 88.19% of the total investment assumed in the FSR. Furthermore, DNV also checked the investment statics of China power plants by China State Electricity Regulatory Commission published in 2007 (pp.8, <http://www.serc.gov.cn/opencms/export/serc/zwgk/jggg/news/20070927.pdf>). The unit investment for 1000MW ultra super-critical power plant, 600MW super-critical power plant and 300/600MW sub-critical power plant were 4 008, 3 750 and 3 858 respectively. Hence, DNV considers the value of total investment assumed in FSR as reasonable.

In addition, DNV has also verified the reasonableness of the unit cost/KWh of the project at 3 997 RMB/KW, by comparing the cost/KW of a similar registered project (# 3288 registered in December 2010) at 4522 RMB/KW.

2) Discount rate

The discount rate used in for calculation of the LCOE is 7%, which was sourced from the approved FSR /3/. DNV has checked the average long term loan base interest from 2002 to 2007 which was published on the website of the People's Bank of China /40/ and considered that the discount rate used in the levelized cost analysis is appropriate. Since the same discount rate is used in the LCOE calculation of the three alternatives, the long term base rate of 7% is considered appropriate.

3) Annual operation hours

The annual operation hours used for calculation of the LCOE of the proposed project, a 600 MW subcritical coal-fired power plant and a 600 MW super-critical coal-fired power plant are all 5500 hours /17/ which is sourced from the approved FSR. Besides, the same value is also stated in the Referenced Cost Index of Power Engineering and Design 2007 for the three technologies above. Furthermore, this can even be crosschecked with the annually average operation hours of thermal power plant in China from 2004 to 2007, which is about 4500



hours to 5500 hours /34/. Finally, according to the Grid Connection Agreement from the grid company (China South Grid), the operating hour for the proposed project is defined as 5500 hours. Therefore, the annual operation hours (5500 hours) used for calculation LCOE are considered to be reasonable. The same number of operating hours is considered for the registered project # 3288.

4) Fuel consumption and fuel price

The coal consumption for the proposed project is 283 kg SCE/MWh, the coal consumption for 600 MW super-critical coal-fired power plant is 293 kg SCE/MWh, and the coal consumption for 600 MW sub-critical coal-fired power plant is considered at 299 kg SCE/MWh. DNV confirmed that the values above were from the approved FSR /3/. DNV has also checked the Referenced Cost Index of Power Engineering and Design 2007 and confirmed the data is reasonable /17/. The coal consumption efficiency for 600 MW sub-critical coal-fired power plant is considered at 41.13% /17/. This efficiency is higher than the efficiency range of large capacity sub-critical coal-fired power plant about 38%~40% which is local industry common practice /43/. Thus DNV determined it a conservative approach. Based on the analysis above DNV confirmed that the assumed coal consumption for the proposed project, the 600 MW sub-critical coal-fired power plant and the 600 MW super-critical coal-fired power plant were all reasonable.

The coal prices in the levelized cost analysis for the proposed project, the 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are all 700 RMB/tSCE. DNV confirmed that the value was from the approved FSR /3/. DNV has checked the Referenced Cost Index of Power Engineering and Design 2007 and confirmed it reasonable and appropriate /17/. Furthermore, DNV checked the average China coal price in 2007 (<http://www.coal-china.com/article.asp?id=8576>) and 2008 (<http://www.coal-china.com/article.asp?id=8577>) of 636 RMB/5800 kcal or 767 RMB/tSCE. Thus the coal price of 700 RMB/tSCE should be reasonable. Also considering the fact that the same price is being used in all the three cases, it does not have much impact.

5) O&M cost

According to the FSR, the O&M cost for a coal consumption power plant includes: material expenditure, water expenditure, desulphurization expenditure, waste expenditure, denitrification, salary and welfare, repair expenditure, insurance expenditure and other expenditure /3/. DNV checked the FSR and confirm that all the portions in the O&M cost were from the approved FSR /3/. Besides that DNV has checked the Referenced Cost Index of Power Engineering and Design 2007 /17/ and the registered project # 3288, which is the only one registered ACM0013 project in China and then confirmed that all data in the O&M cost is reasonable. Furthermore, since O&M cost only takes less than 20% of the total cost, it does not have much impact.

6) Sale of the ash

The potential revenue from the sale of ash only represents a small part of the O&M costs, thus it was excluded in the FSR /3/. However for the purpose of responding to the request for review by three CDM Executive Board members, the design institute calculated the potential revenue from the sale of the ash as 45.8325, 29.052 and 28.458 million RMB for the proposed project, a 600 MW subcritical coal-fired power plant and a 600 MW super-critical coal-fired



power plant respectively. Thus the potential revenue only represents 2% of the O&M costs. Even when including this potential revenue in the LCOE calculation, the LCOEs for the proposed project, a 600 MW subcritical coal-fired power plant and a 600 MW super-critical coal-fired power plant can be calculated as 0.3141, 0.3068 and 0.3087 RMB/kWh, respectively, which means that the 600 MW super-critical coal-fired power plant is still the baseline.

In addition, based on its sectoral competence, DNV was able to confirm that the input parameters used in the levelized cost analysis are appropriate and reasonable.

The sensitivity analysis on the levelized cost applying a $\pm 10\%$ variation of the parameters of total investment, fuel price and load factor also demonstrate that the levelized cost of ultra super-critical do not touch the levelized cost of super-critical coal-fired power generation and sub-critical coal fired power generation.

The results of the sensitivity analysis show that only if the fuel price increases by 47%, or the load factor increases by 155%, or the investment decreases by 55%, the proposed project LCOE would reach the baseline alternative LCOE. DNV has checked the China coal price statics for recent years and can confirm that it's not realistic for the fuel price to increase by 47% /41/. It is impossible for the load factor to increase by 155% even if the proposed project operates all through the year /3/. The investment cost of the project at 7 994 million RMB is sourced from the FSR. DNV has verified the Financial Audit Report for Guangdong Pinghai Power Plant Phase I Project 2010 issued by Guangdong Zhongtian Accountant Firm on 25 January 2011 /45/, which is the qualified financial entity /44/. In the financial audit report, it showed that the Guangdong Pinghai Power Plant Phase I Project has not been totally completed and the actual investment till the end of 2010 has occupied 88.19% of the total investment assumed in the FSR. Hence, DNV considers the value of total investment assumed in FSR as reasonable.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario are correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.

4.6 Additionality

The additionality of the project has been established using the "*Tool for the demonstration and assessment of additionality*" version 5.2 /25/ approved by the CDM-EB.

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

The starting date of the project activity is determined to be 24 October 2008, which was verified to be the date of placing the purchase contract for boilers, turbines and generators /8/. The construction contract for the proposed project was signed in November 2008 /6/ and the construction start permit was in December 2008 /7/.



The FSR was completed by Guangdong Electric Power Design Institute in April 2008 and approved by NDRC on 7 October 2008 /3/. DNV has verified the approved FSR which considered CDM for the project and contains a section on CDM application. This also indicates that CDM was seriously considered for the project. The ERPA between the project developer and EcoSecurities was signed on 20 October 2008 /10/, just prior to the project starting date of 24 October 2008. The signing of the ERPA also demonstrates that CDM was seriously considered for the project activity. Also since the project start date is after 2 August 2008, according to EB guidelines version 01 dated 02 August 2008, on 1 December 2008, the notification was sent to UNFCCC from EcoSecurities International Limited on the intention of seeking CDM status for Guangdong Pinghai Power Plant Phase I Project /11/. DNV also verified the notice on the 60th CDM meeting issued by DNA of China dated 4 March 2009 to confirm that the proposed project applied for the LoA of China at the 60th CDM meeting on 17 March 2009 /20/. The project participants started the global stakeholder consultation from 6 August 2009, which was 9 months after the starting date.

After one month global stakeholder consultation, on 10 September 2009 DNV performed site visit and follow up interview for Guangdong Pinghai Power Plant Phase I Project.

According to para 104(c) of VVM 1.2, it is of DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM. The continued actions to secure CDM status in parallel with the physical implementation of the project is found satisfactory.

4.6.2 Identification of alternatives to the project activity

The alternatives have been identified in the section 4.5 of this report, the following alternatives are realistic and credible baseline alternatives:

- The project activity not implemented as a CDM project
- 2*600 MW super-critical coal-fired power plant
- 2*600 MW sub-critical coal-fired power plant.

The 2*600 MW super-critical coal-fired power plant was finally concluded as the baseline scenario under the analysis in the section 4.5 of this report.

4.6.3 Investment analysis

The investment comparison analysis has been applied according to the “Tool for the demonstration and assessment of additionality”, version 05.2. As analyzed in detail in the section 4.5, the levelized cost of power generation for the proposed project is higher than the 2*600 MW supercritical and subcritical coal-fired power plants and this conclusion would not change even taking the sensitivity analysis into account.

It has been demonstrated that the levelized cost of power generation in a coal based sub-critical power plant and super critical power plants of similar size as the project plant are 0.3131 RMB/kWh and 0.3111 RMB/kWh respectively when compared to 0.3144 RMB/kWh /2/ for an ultra super-critical power plant (the proposed project). The higher levelized cost of generation in the project plant indicates that the project faces investment barrier when compared to the baseline scenario of a super critical power plant.

A sensitivity analysis has been carried out for parameters contributing more than 20% to revenues or costs to check the robustness of the financial analysis in the section 4.5. Reasonable variations of the fuel price, load factor, and investment were checked by



calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correlation.

The LCOE calculation and sensitivity analysis spreadsheet over 20 operation years was provided in a spreadsheet /2/. The calculations were verified and found to be correct by DNV.

4.6.4 Common practice analysis

According to the description in additionality tool version 05.2, only the similar projects those are operational and not developed as the CDM activities.

Projects are considered to be similar, if they are within the same grid of SCPG, rely on a broadly similar technology of ultra supercritical power generation, and are of the similar scale ($\pm 50\%$). DNV has checked NDRC's internal statics and determine that there's only one ultra supercritical coal-fired power plants named Guangdong Heyuan USC project in SCPG /18/, which is operational, and in the process of CDM development /19/. DNV also observes that there is a similar project that is only registered as a CDM project using ACM0013 (UNFCCC # 3288), which also demonstrates that an ultra super critical power plant without CDM revenues is not a common practice.

From the above, it was shown that this project is less financially attractive than other comparable options for generating electricity and does not constitute a common practice.

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

4.7 Monitoring

The monitoring methodology selected complies with the requirements of ACM0013 version 04 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" /24/. The selected monitoring methodology is applicable for the project. The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions. All the relevant data records will be kept for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later.

4.7.1 Parameters determined ex-ante

To identify the lower emission factor among the two options as the baseline emission factor, the emission factor of the technology and fuel type identified as the most likely baseline scenario under "Identification of the baseline scenario" (option 1) of 0.8457 tCO₂/MWh, the average emissions intensity of all power plants *j*, corresponding to the power plants whose performance is among the top 15 % of their category, using data from the most recent year prior to the start of the project activity for which they are available (option 2) of 0.8769 tCO₂/MWh were estimated *ex-ante* based on the most recent information available at the time the PDD was submitted for validation /36/. DNV has verified the calculation of the option 1 and option 2 as stated in section 4.8 of this report and confirmed it consistent with the requirements of ACM0013 version 04 /24/.

This emission factor will be fixed ex-ante for the first crediting period according to the



ACM0013 version 04 /24/.

4.7.2 Parameters monitored ex-post

The following are the main data and parameters to be monitored in accordance with ACM0013 version 04 /24/:

- 1) $EG_{PJ,y}$ – Total Net electricity supplied to the grid by the project plant and fed into the grid in the year y
- 2) $FC_{p,y}$ – Quantity of coal consumed by the project plant in year y
- 3) $FC_{q,y}$ – Quantity of diesel consumed by the project plant in year y
- 4) $FF_{i,y}$ – Quantity of coal combusted in the project plant in year y
- 5) $NCV_{i,yy}$ - Weighted average net calorific value of coal in year y
- 6) $NCV_{p,y}$ – Weighted average net calorific value of coal in year y
- 7) $NCV_{q,y}$ – Weighted average net calorific value of diesel in year y

The $EG_{PJ,y}$ will be measured by the electricity meters continuously and recorded monthly. All electricity meters will be installed, maintained and calibrated regularly as per local industry practices. The electricity meters are with an accuracy of no less than 0.5s. The electricity meters shall be calibrated by the officially accredited entities periodically as per the relevant national calibration standards. All the records will be cross checked against the sales receipt.

The $FC_{p,y}$ and $FF_{i,y}$ will be measured and recorded whenever the coal be feed to the boiler continuously. The records will be cross-checked by the annual energy balance that is based on purchased quantities and stock changes and also with the purchase invoices from the financial records.

The $FC_{q,y}$ will be measured and recorded whenever the diesel be transported to the project plant continuously. The records will be cross-checked by the annual energy balance that is based on purchased quantities and stock changes and also with the purchase invoices from the financial records.

The $NCV_{i,yy}$ and $NCV_{p,y}$ should be measured in line with national or international fuel standards. This value should be obtained for coal delivery, from which weighted average annual values should be calculated. The value will be verified if the values within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories should have ISO17025 accreditation or justify that they can comply with similar quality standards.

The $NCV_{q,y}$ will be measured considering the IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.

4.7.3 Management system and quality assurance

Staff involved in the CDM project will receive some relevant training either from the contracted consultant, or the relevant Chinese authorized company /9/. The personnel training plan and records /12/ including responsibilities and authorities for project management,



procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and training, were verified.

The project's monitoring plan includes:

- Responsibility,
- Key definitions,
- Installation and Calibration of Meters & Metering,
- Monitoring,
- Quality Assurance and Quality Control
- Disposal of urgency
- Data management system
- Verification and Monitoring Results

Detailed procedures have been elaborated. These will be maintained and implemented to enable subsequent verification of emission reductions.

The application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.

4.8 Estimation of GHG emissions

The GHG emission reduction calculations are in accordance with the formulae given in the baseline and monitoring methodology ACM0013 version 04 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" /24/, as follows:

4.8.1 Baseline emissions

In line with the methodology, the emission factor of the first crediting period is determined as the least of the following two options:

Option 1: The emission factor of the technology and fuel type identified as the most likely baseline scenario under "Identification of the baseline scenario" (2*600MW super critical coal-fired power plant) section above; and

Option 2: The average emissions intensity of all power plants j , corresponding to the power plants whose performance is among the top 15 % of their category, using data from the reference year.

According to the ACM0013 version 04, the reference year is the most recent year prior to the date of submission of the PDD for validation of the project activity, for which the required data from the power plants to be included in the sample group for the emissions benchmark (as per guidance in the baseline emissions section hereunder) is available. In any case, the *reference year* v cannot begin more than 2 years prior to the date of submission of the PDD for validation of the project activity. For the baseline calculation, the reference year is 2007.

Option 1

$$EF_{BL,CO_2} = 3.6 \cdot \frac{MIN(EF_{FF,BL,CO_2}; EF_{FF,CO_2})}{\eta_{BL}} = 3.6 \cdot \frac{MIN(0.0895; 0.0895)}{38.10\%} = 0.8457 tCO_2 / MWh$$



$\eta_{BL} = 38.10\%$, which is sourced from the grid boundary and EF for each power grid of China for the year 2008 published by NDRC on 2 July 2009 /35/. It 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 Data from the NDRC /35/. Considering the energy efficiency used in the baseline determination is 41.98%, the power plant self use rate of 5.5% sourced from Referenced Cost Index of Power Engineering and Design 2007 /17/ and the average line loss rate of 6.76% in SCPG in 2007 /34/, the net energy efficiency can be calculated as 37% which is lower than the 38.10% adopted in the PDD. Thus the η_{BL} of 38.10% is a relatively conservative approach.

Furthermore, DNV also checked the gross energy efficiency of 41% at optimum load of the 600MW supercritical power generation technology provided by a manufacturer of Dongfang Electric Corporation who built the first 600MW supercritical power generation set in China /48/.

However as required by the ACM0013, version 04, page 10, the efficiency should be determined as the efficiency at optimum load as a conservative approach. Thus the PP adopted an even higher 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 Data from the NDRC /36/.

DNV has verified the data source and the calculation process and thus can confirm that the adoption of 38.10% in the emission factor calculation is considered to be appropriate and conservative.

Option 2

According to ACM0013, the average emissions intensity of all power plants j , corresponding to the power plants whose performance is among the top 15 % of their category, using data from the reference year. For determination of the top 15% performer power plants j , the following step-wise approach is used:

Step 1: Definition of similar plants to the project activity

The sample group of similar power plants consist of all power plants (except for cogeneration power plants)

- That use the same fossil fuel category (coal) as the project activity, This should include power plants which use small amounts of fuels within another fossil fuel category than the main fuel for start-up or auxiliary purposes, but these other fuels shall not comprise more than 3% of the total fuel used annually by the sample power plant on an energy basis;
- That have been constructed in the previous five years, where the last year of this 5 years period should be the reference year v ;
- That have a comparable size to the project activity, defined as the range from 50% to 150% of the rated capacity of the project plant;
- That are operated in the same load category, i.e. 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) as the project activity; and
- That have operated (supplied electricity to the grid) in the reference year v .

Step 2: Definition of the geographical area



The geographical area to identify similar power plants should be chosen in a manner that the total number of power plants “N” in the sample group comprises at least 10 plants. As a default, the grid* to which the project plant will be connected should be used. If the number of similar plants, as defined in Step 1, within the grid boundary is less than 10, the geographical area should be extended to the country. If the number of similar plants is still less than 10, the geographical area should be extended by including all neighboring non-Annex I countries. If the number remains to be less than 10, all non-Annex I countries in the continent should be considered.

If the necessary data on power plants of the sample group in the relevant geographical area are not available, or if there are less than 10 similar power plants in all non-Annex I countries in the continent, then data from power plants annex I or OECD countries can be used instead for the remaining plants required to complete the sample group.

Step 3: Identification of the sample group

Identify all power plants n that are to be included in the sample group. Determine the total number “N” of all identified power plants that use the same fuel as the project plant and any technology available within the geographical area, as defined in Step 2 above.

The sample group should also include all power plants within the geographical area registered as CDM project activities, which meet the criteria defined in Step 1 above.

Step 4: Determination of the plant efficiencies

Calculate the operational efficiency of each power plant n identified in the previous step. The most recent one-year data available shall be used. The operational efficiency of each power plant n in the sample group is calculated as follows:

$$\eta_{n,v} = 3.6 \cdot \frac{EG_{n,v}}{FC_{n,v} \times NCV_{n,v}} \quad (6)$$

Where:

$\eta_{n,v}$	Operational efficiency of the power plant n in the reference year v
$EG_{n,v}$	Net electricity generated and delivered to the grid by the power plant n in the most recent year prior to the start of the project activity for which data are available (MWh)
$FC_{n,v}$	Quantity of fuel consumed in the power plant n in reference year v
$NCV_{n,v}$	Average net calorific value of the fuel type fired in power plant n in reference year v
3.6	Unit conversion factor from GJ to MWh
n	All power plants in the defined geographical area that have a similar size, are operated at similar load and use a fuel type within the same fuel categorys as the project activity

* The grid boundary is defined as per the latest version of the “Tool to calculate the emission factor for an electricity system” approved by the Board



Step 5: Identification of the top 15% performer plants j

Sort the sample group of N plants from the power plants in a decreasing order of the operational efficiency. Identify the top performer plants j as the plants with the 1st to J th highest operational efficiency, where the J (the total number of plants j) is calculated as the product of N (the total number of plants n identified in step 3) and 15%, rounded down if it is decimal. If the generation of all identified plants j (the top performers) is less than 15% of the total generation of all plants n (the whole sample group), then the number of plants j included in the top performer group should be enlarged until the group represents at least 15% of total generation of all plants n .

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

Based on the steps above, P. R. China is divided into regional electricity systems which are defined by the DNA of P. R. China /35/. The project is located in Guangdong which belongs to the South China Power Grid (SCPG). Therefore, the choice of geographical area is the area the SCPG covered. To get the applicable value for the advanced coal-fired power plant which has a rated capacity of 1000 MW and is connected to SCPG, the net energy efficiency was calculated by the NDRC based on the data of the top 15% performing coal-fired power plants of which the capacity is between 500 MW and 1500 MW within the geological area covered by SCPG. The reference year applied in the calculation is the year 2007. Finally, the result of Option 2 is 0.8769 tCO₂/MWh.

In accordance with ACM0013, version 04, page 9 required, all steps should be documented transparently, including a list of the plants identified in Steps 3 and 5, as well as relevant data on the fuel consumption and electricity generation of all identified power plants. However because of the coal-fired power unit data was not public available in China and only available to the central government, NDRC, the DNA of China has calculated the emission factor as per the steps above in ACM0013, version 04, and the list of the plants identified in Steps 3 and 5 (top 15% coal-fired power plants in SCPG) 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 NDRC's office but not allowed to be published. DNV has performed the emission factor calculation process in accordance with option 2 in NDRC's office. DNV confirmed that all steps were documented transparently, including a list of the plants identified in Steps 3 and 5. DNV also confirmed that the fuel consumption of all identified power plants is based on first-hand measurements of the actual quantity of fuel consumed by each power plant, not based on second-hand calculations or estimations.

The lower emission factor among the two options is 0.8457 tCO₂/MWh (option 1). Thus the EF_{BL,CO2} = 0.8457 tCO₂/MWh.

Therefore, the baseline emissions are calculated as

$$\begin{aligned} EG_{PJ,main_FF,y} &= EG_{PJ,y} \times (FC_{p,y} \times NCV_{p,y}) / (FC_{q,y} \times NCV_{q,y} + FC_{q,y} \times NCV_{q,y}) \\ &= 10,439,000 \times (3,993,982 \times 22.81) / (3,993,982 \times 22.81 + 4,317 \times 43.30) \\ &= 10,417,624.9434 \text{ MWh} \end{aligned}$$



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$$BE_y = EG_{PJ,main_FF,y} \times EF_{BL,CO_2} = 10,417,624.9434 \times 0.8457 = 8,810,185 \text{ tCO}_2$$

The $EG_{PJ,y}$, $FC_{p,y}$, $FC_{q,y}$ and $FC_{q,y}$ are from the FSR. The $NCV_{p,y}$ and $NCV_{q,y}$ are from the letter of intent for coal supply /42/, and the $NCV_{q,y}$ is from the IPCC 2006 /26/.

4.8.2 Project emissions

$$PE_y = FF_{i,y} \times NCV_{i,y} \times EF_{FF,CO_2} = 3,993,982 \times 22.81 \times 0.0895 = 8,153,695 \text{ tCO}_2$$

$FF_{i,y}$ is sourced from the FSR of the project /3/. $NCV_{i,y}$ is sourced from the Letter of intent for coal supply /42/ and $EF_{FF,CO_2,y}$ is sourced from IPCC 2006 /26/.

4.8.3 Leakage

No leakage emissions are to be considered for the Project according to ACM0013, version 04 /24/.

4.8.4 Emission reductions

$$ER_y = BE_y - PE_y = 8810185 - 8153695 = 656490 \text{ tCO}_2$$

The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV. The main change from PDD version 1 to version 4 is the methodology employed was updated from ACM0013 version 2.1 to version 04. Thus the emission reduction calculation was updated accordingly as per the requirements of the new version of methodology.

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

4.9 Environmental impacts

An Environmental Impact Assessment (EIA) has been conducted according to the “Law of the People’s Republic of China on Environmental Impact Assessment” /4/. The potential environmental impacts have been sufficiently identified.

No significant environmental impacts are expected from the project activity. The Ministry of Environmental Protection approved the project activity on 24 April 2008 /4/.

4.10 Comments by local stakeholders

Besides the stakeholder consultation process stipulated in the Chinese EIA regulation, the project developer has conducted an additional stakeholder consultations in July 2009 /13/. Local stakeholders from local residents and local government were invited through a questionnaire to provide comments on the project. In the survey, the Project Developer put the notice at the gate of the Pinghai Town Government Office and Guangdong Huizhou Pinghai Power Station Co., Ltd., with technical description of the Project as well as a brief explanation of how the project activity mitigates climate change. 110 questionnaires were distributed to local stakeholders, which covered 9 villages (90 copies questionnaires) and 1 community (10 copies questionnaires) near the plant, the staffs at Pinghai Power plant (5 copies questionnaires) and the offices (5 copies questionnaires) at local government, and 107 questionnaires were returned /13/. A summary of comments is provided and has been verified by DNV/1//13/. The survey shows that the proposed project receives support from the local



people.

4.11 Comments by Parties, stakeholders and NGOs

The PDD of 20 July 2009 was made publicly available on UNFCCC's CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/0QKQVR1MOJ5J5VFLB5UJ4Y14X3WO86/view.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 6 August 2009 to 4 September 2009.

No comments were received.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	CAR-1 OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	CAR-1 OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	CAR-1 OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	CAR-1 OK
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK

Requirement	Reference	Conclusion
that would have occurred in the absence of the registered CDM project activity.		
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	CAR-3 OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity					
A.1 Title of the project activity (VVM para 55-57)					
A.1.1 Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	<input checked="" type="checkbox"/> Clearly identifiable title of the project activity <input checked="" type="checkbox"/> Version number of the PDD is included <input checked="" type="checkbox"/> Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	<input checked="" type="checkbox"/> Yes		OK
A.2 Description of the project activity (VVM para 58-64)					
A.2.1 How was the design of the project assessed?	/1/ /3/ /4/	DR	<i>What type is the project?</i> <input type="checkbox"/> Project in existing facility or utilizing existing equipment(s) <input type="checkbox"/> Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO ₂ e per year. In this case, a site visit must be performed. <input type="checkbox"/> Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO ₂ e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<input type="checkbox"/> The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO ₂ e per year. In this case, DOE may not conduct a physical site visit as appropriate. <input checked="" type="checkbox"/> Greenfield project <i>How was the design of the project assessed?</i> <input checked="" type="checkbox"/> Physical site inspection <input checked="" type="checkbox"/> Reviewing available designs and feasibility studies		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	The project is a greenfield project. The validation team has verified that at the time of the validation start date and at the time of site visit in September 2009, the project was still under the construction period.		OK
A.2.3 If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO ₂ e per year), justify the sampling through a statistical analysis:	/1/	DR	Not applicable. This is a large scale project with only one site, and a site visit was performed.		OK
A.2.4 Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/ /6/ /7/ /8/ /35/	DR	The project applies the technology of ultra-supercritical coal-fired power generation, which is a high efficiency coal-fired power generation technology. The project is to install and operate two ultra-supercritical coal-fired power generation units with the total capacity of 2×1000 MW. The boilers are		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>designed to work under a pressure superheated steam outlet of 27.56 MPa(a) and the temperature of superheated steam outlet of 605°C, and the steam turbines are designed to work under pressure before main throttle valve of 26.25 MPa(a) and temperature before main throttle valve of 600°C.</p> <p>The project's system boundaries are clearly defined as the SCPG, which is in line with the delineation of the grid boundaries regulated by DNA of China.</p> <p>The starting date of the project activity is determined to be 24 October 2008, which is the earliest financial commitment to the projects as it is the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit. The expected operational lifetime of the project activity is 20 years according to FSR. A fixed crediting period of 10 years has been chosen for the project, starting from 1 July 2011 or the date of registration of the CDM project activity, whichever is later. It is expected that the project will achieve an <i>ex-ante</i> estimated average annual emission reduction of 673 245 tCO₂/y and 6 732 450 tCO₂ over the ten-year crediting period of the project.</p>		
A.2.5 Does the project activity involve alteration of	/1/	DR	This is a new build thermal power project		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?			and does not involve alteration of existing installations.		
A.2.6 Does the project design engineering reflect current good practices?	/1/ /3/ /8/	DR	The proposed power facility applies the technology of ultra-supercritical coal-fired power generation, which is a high efficiency coal-fired power generation technology. The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology need to be addressed.	CL-1	OK
A.2.7 Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/ /3/ /8/	DR	Based on DNV's sector expertise, DNV's review of the equipment purchase contracts and the approved PDR, DNV confirms that the proposed project reflects current good practice.		OK
A.3 Participation requirements (VVM para 51-54, 125-127)					
A.3.1 Do all participating Parties fulfil the participation requirements as follows:	/1/ /21/ /22/	DR	LoA from United Kingdom of Great Britain and Northern Ireland has not been obtained.	CAR-1 CAR-1	OK
	China (host)		U.K.	Country Y	
a) Party has ratified the Kyoto Protocol	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
b) Party has designated a Designated National Authority	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c) The assigned amount has been determined	<input checked="" type="checkbox"/> N/A		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A.3.2 Do the letters of approval meet the following requirements?	/1/ /21/ /22/	DR	LoA from United Kingdom of Great Britain and Northern Ireland has not been obtained.	CAR+	OK
			China (host) County X Country Y		
a) LoA confirms that Party has ratified the Kyoto Protocol	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
b) LoA confirms that participation is voluntary	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	NA	NA		
d) The LoA refers to the precise project activity title in the PDD	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
e) The LoA is unconditional with respect to (a) to (d) above	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
f) The LoA is issued by the respective Party's DNA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
g) The LoA was received directly by the DNA or the PP	<input type="checkbox"/> DNA <input checked="" type="checkbox"/> PP	<input type="checkbox"/> DNA <input checked="" type="checkbox"/> PP	<input type="checkbox"/> DNA <input type="checkbox"/> PP		
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic	DNV does not doubt the authenticity of the letters.				
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/ /21/ /22/	DR	LoA from United Kingdom of Great Britain and Northern Ireland has not been obtained.	CAR+	OK
A.4 Technical description of the project activity (VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/	DR	Yes. Guangdong Pinghai Power Plant Phase I Project will be implemented in Pinghai Town, Huidong County, Huizhou City of		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Guangdong Province, in the People's Republic of China, with its geographical coordinates east longitude of 114°44'20", and north latitude of 22°36'53".		
A.5 Public funding of the project activity					
A.5.1 In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/ /21/	DR	The validation did not reveal any information indicating that the project can be seen as a diversion of official development assistance (ODA) funding towards China.		OK
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/ /24/	DR	The PDD needs to apply the latest version of methodology ACM0013 version 3 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology".		OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/ /24/	DR	NA		OK
B.2 Applicability of methodology (and tools) (VVM para 65-76)					
B.2.1 How was it validated that project complies with	/1/	DR	Yes, according to the approved FSR, the		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
<p>the following applicability criteria: insert applicability criteria 1?</p> <p>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 (A possible project activity could be, e.g. the construction and operation of a supercritical coal fired power plant) than what would otherwise be used with the given fossil fuel.</p>	/3/ /17/		<p>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 technology¹ than what would otherwise be used with the given fossil fuel. According to the Referenced Cost Index of Power Engineering and Design published by China Power Engineering Consulting Group Corporation, the coal consumption per kWh of the ultra-supercritical power plant is 10gce less than that of the supercritical power plant which is the most commonly used for the new built power plant. So the project activity is the construction and operation of a new coal-fired grid-connected electricity generation plant that uses ultra-supercritical technology to achieve higher efficiency in coal-based electricity generation in China. The project complies with criteria 1.</p>		
<p>B.2.2 How was it validated that project complies with the following applicability criteria: insert applicability criteria 2?</p> <p>The project activity does not include the construction and operation of a co-generation power plant.</p>	/1/ /3/	DR	<p>According to the approved FSR and as verified during the site visit, the project activity does not include the construction and operation of a co-generation power plant. The project complies with criteria 2.</p>		OK
<p>B.2.3 How was it validated that project complies with the following applicability criteria: insert applicability criteria 3?</p> <p>Data on fuel consumption and electricity generation of</p>	/1/ /2/ /3/	DR	<p>Data on fuel consumption and electricity generation of recently constructed power plants is available. Data on coal consumption and electricity generation of recently</p>		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
recently constructed power plants are available?			constructed power plants is available as in baseline emission calculation. China NDRC calculated the emission factor of new grid connected fossil fuel fired power plants using a less GHG intensive technology based on above data. The project complies with criteria 3.		
B.2.4 How was it validated that project complies with the following applicability criteria: insert applicability criteria 4? The identified baseline fuel 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. ² 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%.	/1/ /3/ /33/ /34/	DR	According to China Energy Statistics Yearbook 2005~2007 and China Electric Power Yearbook 2005~2007, the share of power generation from coal-fired power plants within SCPC are 59.3%, 67.5% and 69.2% from 2004 to 2006, which are greater than 50% for the past three years. The project complies with criteria 4.		OK
B.2.5 Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/ /3/ /24/	DR	Yes. The selected baseline is according to the Methodology ACM0013 version 3.		OK
B.3 Project boundary (VVM para 78-80)					
B.3.1 What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/ /3/ /35/	DR I CC	Yes. According to the definition of project boundary in methodology, the spatial extent of the project boundary includes the power plant at the project site and all power plants considered for the calculation of the baseline		OK

² For the purpose of demonstrating compliance with the applicability condition the geographical area has to be limited by the physical borders of the host country and cannot be extended to neighboring non-Annex I countries, even if such an extended geographical area is used for the calculation of a benchmark emission factor.

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			CO ₂ emission factor, therefore the SCPG which the proposed project is connected to is defined as system boundary which consists of the following provincial power grid: Guangdong, Guangxi, Yunnan and Guizhou.		
B.3.2 Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/ /3/ /35/	DR	The major emission source of Guangdong Pinghai Power Plant Phase I Project is CO ₂ and this is in line with the approved methodology ACM0013. The project boundary is defined as the site of the project activity and all power plants connected physically to the SCPG. And this boundary covers all possible sources linked to the project activity. It can be verified with the grid boundary published by NDRC on 2 July 2009.		OK
B.3.3 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/ /3/	DR	There is no other emission sources not foreseen by the methodologies involved in Guangdong Pinghai Power Plant Phase I Project. And there is also no other sources contribute more than 1% of the estimated emission reductions of the project.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4 Baseline scenario determination (VVM para 81-88, 105-107) <i>Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.</i>					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/ /24/	DR CC	<p>The construction of 2*600 MW supercritical coal-fired power plant is selected as the most economically attractive alternative, and then the baseline scenario.</p> <p>As alternatives to provide equivalent service as the proposed project activity, the choices of 2*600 MW supercritical and subcritical coal-fired power plants need to be justified. Besides, whether the baseline alternative is available to the project participant or not needs to be demonstrated.</p>	CL2 CL3	OK
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/ /3/ /14/ /15/ /16/ /17/ /30/ /31/	DR	<p>Baseline scenarios, which have been considered following the guidelines provided in ACM0013 are as follows:</p> <p>Step 1 Identify plausible baseline scenarios</p> <p>According to the FSR of the proposed Project, it is to operate as base load and also has the capacity of peak regulation capacity. The following baseline scenario alternatives</p>		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/32/ /24/ /37/ /39/		<p>are provided.</p> <p>(1) The project activity not implemented as a CDM project</p> <p>Scenario (1) is a plausible baseline scenario which can deliver similar services as the proposed project.</p> <p>(2) The construction of one or several other power plant instead of the proposed project activity</p> <p>a) Power generation using the same fossil fuel type as in the project activity, but technologies other than that used in the project activity;</p> <p>Scenario (2a) is a plausible baseline scenario which can deliver similar services as the proposed project. The typical technologies using coal providing similar service as the proposed Project are mainly two types, supercritical technology and subcritical technology. Therefore the 2*600 MW supercritical and subcritical coal-fired power plants are the two possible alternatives of the proposed project.</p> <p>As alternatives to provide equivalent service as the proposed project activity, the choices of 2*600 MW for supercritical and subcritical coal-fired power plants should be justified.</p> <p>b) Power generation using fossil fuel types</p>		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>other than that used in the project activity;</p> <p>Power generation using fossil fuel other than coal mainly includes oil-fired and natural gas-fired power plants. Construction of new oil-fired power plants is prohibited in electric power system according to China Energy Conservation Technology Policy Outline (2006), thus oil-fired power generation is not a possible scenario.</p> <p>The electricity generation of natural gas is mainly for peak load according the utilization policy of natural gas issued by NDRC on 30 August 2007, whereas the project is both base load and peak load. Therefore it can not be considered a scenario to provide equivalent service. Based on the fact that natural gas power plants apply for CDM, this alternative is furthermore not considered financial attractive.</p> <p>c) Other power generation technologies, such as renewable power generation;</p> <p>Other power generation technologies mainly include nuclear power, hydro power, wind power, solar power, biomass and others.</p> <p>The Security Management Regulation for Grid-connected Nuclear Power Plant was verified to confirm that nuclear power plant can not provide peak load service.</p> <p>Hydro power generation has seasonal</p>		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>differences and can not provide similar services as the proposed project.</p> <p>For the power plants using other renewable energy such as wind energy, solar energy, biomass and others, based on the data from China Power Year Book 2008, in SCPG the total installed capacity and electricity generation using renewable energy except hydro energy and nuclear energy is only 250 MW and 390 GWh, respectively, which are much smaller than the expected ones from the proposed Project.</p> <p>(3) Import of electricity from connected grids, including the possibility of new interconnections</p> <p>FSR was verified to confirm that the import of electricity to SCPG is mainly from Three Gorge and Sichuan Grid (Central China Grid). However, electricity supplied by Sichuan Grid and Three Gorges Hydro power plant is chiefly from hydropower which has distinct seasonality, and the electricity supplied from Three Gorges Hydro power plant to SCPG in 2008 are respectively 1.97×10^8 kWh in January, 0 in February, 3.54×10^8 kWh in March, 7.85×10^8 kWh in April, 0 in May, 21.80×10^8 kWh in June, 22.60×10^8 kWh in July, 21.80×10^8 kWh in August, 21.93×10^8 kWh in September, 10.69×10^8 kWh in October, 13.42×10^8 kWh</p>	CL-4	

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>in November, and 1.28×10^8 kWh in December . Therefore in dry seasons, it is difficult to guarantee normal supply from Sichuan Grid and Three Gorges Hydro power plant .</p> <p>Step 2 Identify the economically most attractive baseline scenario alternative</p> <p>As section B.4.4</p> <p>In sensitivity analysis, PP need give the reason that $\pm 10\%$ are the reasonable variations.</p>		
B.4.3 What is the baseline scenario?	/1/	DR	Refer to B.4.4.	CL2	OK
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	Yes, the determination of the baseline scenario is in accordance with the guidance in the methodology.		OK
B.4.5 Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	No conservative assumptions were required in the determination of the project activity.		OK
B.4.6 Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. All relevant national and sectoral policies, regulations and department rules and disciplines are considered such as the energy conservation law and the utilization policy of natural gas by central government.		OK
B.4.7 Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Refer to B.4.4.	CL2	OK
B.4.8 Is the baseline determination adequately documented in the PDD? <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related 	/1/	DR	<p>The baseline scenario has been determined according to the methodology ACM0013 version 04.</p> <p>Refer to B.4.3, B.4.4, Pending according to</p>	CL2 CL4	OK

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document to be submitted for registration. The data are properly referenced. <ul style="list-style-type: none"> All documentation is relevant as well as correctly quoted and interpreted. Assumptions and data can be deemed reasonable Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 			CL-2 CL-4 above.		
B.5 Additionality determination (VVM para 94-121)					
B.5.1 What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /25/	DR	The project additionality is demonstrated by applying the “Tool for the demonstration and assessment of additionality “ version 05.2		OK
B.5.2 Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/ /25/	DR	Pending according to CL-2 above.	CL-2	OK
B.5.3 Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /25/	DR	Pending according to CL-2 above.	CL-2	OK
B.5.4 What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/ /25/	DR	The project additionality is based on investment analysis.		OK
Prior consideration of CDM (VVM para 98-103)					
B.5.5 What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /3/ /6/ /7/ /8/ /10/	DR	The starting date of the project activity is determined to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit. The FSR was prepared by Guangdong		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/11/ /20/ /25/		Electric Power Design Institute in April 2008 and approved by NDRC on 7 October 2008. On 1 December 2008, the notification was sent to EB from EcoSecurities International Limited for seeking CDM status for Guangdong Pinghai Power Plant Phase I Project. The ERPA between the project developer and EcoSecurities was signed on the 20 October 2008. DNV also verified the notice on the 60 th CDM meeting issued by DNA of China dated 4 March 2009 to confirm that the proposed project applied for the LoA of China at the 60 th CDM meeting on 17 March 2009. This shows that CDM was seriously considered in the decision to proceed with the project activity. The continued actions to secure CDM status in parallel with the physical implementation of the project is found satisfactory.		
B.5.6 If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/ /6/ /7/ /8/ /1/ /2/ /25/	DR	The starting date of the project activity is determined to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit, which is after 2 August 2008. On 1 December 2008 (within 6 months later than the starting date of the project activity), the notification was sent to UNFCCC from EcoSecurities International Limited for		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			seeking CDM status for Guangdong Pinghai Power Plant Phase I Project. DNV also verified the notice on the 60 th CDM meeting issued by DNA of China dated 4 March 2009 to confirm that the proposed project applied for the LoA of China at the 60 th CDM meeting on 17 March 2009 (within 6 months later than the starting date of the project activity).		
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7 What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/ /25/	DR	NA		OK
B.5.8 When did the construction of the project activity start?	/1/ /25/	DR	NA		OK
B.5.9 When was the project commissioned?	/1/ /25/	DR	NA		OK
B.5.10 Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/ /25/	DR	NA		OK
Investment analysis (VVM para 108-114) <i>The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.</i>					
B.5.11 Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/ /2/	DR CC	Yes. The project activity apart from CDM still generates revenues through the sales of the electricity, which has been reflected in		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/3/		the PDD.		
B.5.12 Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/ /2/ /3/	DR	The baseline (Construction of 2*600 MW supercritical coal-fired power plant) involves investment. This is reflected in the PDD.		OK
B.5.13 Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/ /2/ /3/	DR	The choice of investment comparison is correct. The choice is in line with methodology ACM0013 and correct.		OK
B.5.14 Is the discount rate the latest available at the time of decision?	/1/ /2/ /25/	DR I	The discount rate used in for calculation LCOE is 7%, which was sourced from the FSR. Justifications for the following parameters in the financial analysis are requested: fuel price, other expenditure, waste expenditure (including an explanation of what type of waste, as the fuel consumption is less for the project than the other alternatives), employee number of the project. Contracts for the investments of the project and if signed a power purchase agreement are requested. Furthermore, a justification for the discount rate chosen is requested.	CL5	OK
B.5.15 What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/ /2/	DR I	The financial indicator is LCOE on project basis and before tax. No benchmark is applicable.		OK
B.5.16 Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	NA		OK
B.5.17 Does the income tax calculation take	/1/	DR	NA		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?					
B.5.18 Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/ /2/ /3/	DR	The time period of the investment analysis and operating time of the project is 20+1 (1 year for construction). This value applies to both the project itself and the baseline alternatives. Since the PDD aims to calculate the LCOE, so the salvage value and working capital return do not applicable to this kind of approach.		OK
B.5.19 When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/ /2/ /3/	DR	Yes. The PDR was completed in April 2008 and approved on 7 October 2008 and thus about 4 months prior to decision to proceed with the project activity start date, which was the date the project owner signed The purchase contract of the boilers, steam turbines and generators on 24 October 2008. Given this relatively short period of time between approval of the PDR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed. It is thus reasonable to assume that the PDR has been the basis of the decision to proceed with the investment in the project.		OK
B.5.20 How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM	/1/ /2/ /3/	DR	<input type="checkbox"/> The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
paragraph 95.	/17/ /21/ /34/		<p>activity for implementation approval</p> <p><input checked="" type="checkbox"/> The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)</p> <p><input type="checkbox"/> Other approach.</p> <p>Annex 11 of CDM EB's 48th meeting report gives a guideline for validation of plant load factor for renewable energy. One option is to use plant load factor provided to the government while applying the project activity for implementation approval.</p> <p>As per the approved FSR, the annual operation hours of the project is 5 500 hours.</p> <p>The annual operation hours used for calculation LCOE of 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 5 000 hours which was sourced from the FSR.</p> <p>However the project participants are requested to justify the operating hours (i.e. load factor) of the baseline scenarios. Since the proposed project is more efficient than existing power plants in the grid, why is not a higher load factor assumed than for the other alternatives.</p>	CL-6	

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.21 How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /2/ /3/	DR	NA		OK
B.5.22 How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /2/ /3/	DR	<input checked="" type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants Please refer to section B.4.4.		OK
B.5.23 How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /2/ /3/	DR	<input checked="" type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants Please refer to section B.4.4.		OK
B.5.24 Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used	/1/ /2/ /3/	DR	<input checked="" type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public		OK

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for cross-checking in accordance with VVM paragraph 95.			announcements and annual financial reports related to the project and the project participants Please refer to section B.4.4.		
B.5.25 Was the financial calculation spreadsheet verified and found to be correct?	/1/ /2/	DR	The financial calculation spreadsheet was verified and found to be correct		OK
B.5.26 Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/ /2/	DR	The project participants are requested to include investment costs in the sensitivity analysis.	CL-7	OK
B.5.27 Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/ /2/	DR	In financial sensitivity analysis, justification and further clarification is sought on the usage of +/- 10% assure the reasonable variations. Latest EB guidelines on financial analysis should be followed and complied with.	CL-4	OK
B.5.28 Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/ /2/	DR	Same as above	CL-4	OK
Barrier analysis (VVM para 115-118)					
B.5.29 Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	NA		OK
B.5.30 How were the <u>investment barriers</u> assessed to be real? Are the investment barriers	/1/	DR	NA		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
substantiated by a source independent of the project participants?					
B.5.31 How does CDM alleviate the investment barriers?	/1/	DR	NA		OK
B.5.32 Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	NA		OK
B.5.33 How were the <u>technological barriers</u> assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	NA		OK
B.5.34 How does CDM alleviate the technological barriers?	/1/	DR	NA		OK
B.5.35 Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	NA		OK
B.5.36 How were the <u>barriers due to prevailing practise</u> assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	NA		OK
B.5.37 How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	NA		OK
B.5.38 Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	NA		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.39 How were the <u>other barriers</u> assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	NA		OK
B.5.40 How does CDM alleviate the other barriers?	/1/	DR	NA		OK
B.5.41 Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	NA		OK
Common practice analysis (VVM para 119-121)					
B.5.42 What is the geographical scope of the common practice analysis? Is this justified?	/1/ /24/ /25/	DR	As per ACM0013 version 3, projects are considered to be similar, if they are within the same grid of SCPG.		OK
B.5.43 What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/ /24/ /25/	DR	As per ACM0013 version 3, the scope of technology is defined as broadly similar technology of ultra supercritical power generation, and the scope of size is the similar scale ($\pm 50\%$).		OK
B.5.44 What is the data source(s) used for the common practice analysis?	/1/ /25/	DR	Weblink in the PDD was accessed and verified.		OK
B.5.45 How many similar non-CDM-projects exist in the region within the scope?	/1/ /25/	DR	None.		OK
B.5.46 How were possible essential distinctions between the project activity and similar activities assessed?	/1/ /25/	DR	NA		OK
B.5.47 What is the conclusion of the common practice analysis?	/1/ /25/	DR	This project is not financially attractive and does not constitute a common practice.		OK

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Conclusion					
B.5.48 What is the conclusion with regard to the additionality of the project activity?	/1/ /25/	DR	This will be concluded after CL 2 CL 3 CL 4 CL 5 CL 6 CL 7 are resolved.	CL 2 CL 3 CL 4 CL 5 CL 6 CL 7	OK
B.6 Calculations of GHG emission reductions					
Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1 How was the CO ₂ emission factor of the fossil fuel type that has been identified as the most likely baseline scenario verified?	/1/ /24/	DR	The parameter of EF _{Coal,BL,CO2} needs to be sourced from IPCC default values of the fuel type used in the project plant 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.	CAR 2	OK
B.6.2 How was the energy efficiency of the power generation technology that has been identified as the most likely baseline scenario verified?	/1/ /24/	DR	The methodology requires for the baseline emissions to use an emission factor that is the minimum of the top 15% of the power plants in the region with the same fuel and “the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario”. The latter is however in the PDD not done consistently between the baseline determination and the emission reduction calculation. The efficiency used in the baseline determination, originated from the FSR, is higher and the	CAR 3	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			gap in efficiency between the baseline and the project is expanded from 1.48% in the baseline determination to 3.14% in the emission factor calculation. The emission factor therefore needs to be clarified.		
B.6.3 How was the amount of fuel consumed by power plant <i>j</i> or <i>n</i> in the most recent year prior to the start of the project activity for which data are available verified?	/1/ /36/ /24/	DR	The evidence and a list of the plants identified in option 2 were onsite validated by DNV in NDRC.		OK
B.6.4 How was the average net electricity generated and delivered to the grid by power plant <i>j</i> or <i>n</i> in the most recent year prior to the start of the project activity for which data are available verified?	/1/ /36/ /24/	DR	As B.6.3 above.		OK
B.6.5 How was the CO ₂ emission factor for fossil fuel use in the project and the baseline (tCO ₂ /GJ) verified?	/1/ /24/	DR	The parameter of EF _{FF,CO2} needs to be sourced from IPCC default values of the fuel type used in the project plant 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.	CAR-2	OK
B.6.6 How was the net electricity generated and delivered to the grid by power plant <i>j</i> or <i>n</i> in the most recent year prior to the start of the project activity for which data are available verified?	/1/ /36/ /24/	DR	As B.6.3 above.		OK
Baseline emissions (VVM para 89-93)					
B.6.7 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/	DR	Pending as CAR 2 and CAR 3. Besides the methodology requires “Use preferably well documented and reliable regional or national average values. If such	CAR-2 CAR-3 CL-8	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			data is not available, IPCC default values may be used". The project participants are request to justify whether regional or national average values are available.		
B.6.8 Have conservative assumptions been used when calculating the baseline emissions?	/1/ /2/ /36/ /24/	DR	Pending as CAR 2 and CAR 3.	CAR-2 CAR-3	OK
B.6.9 Are uncertainties in the baseline emission estimates properly addressed?	/1/ /2/ /24/	DR	No significant uncertainties can be addressed for the project.		OK
Project emissions (VVM para 89-93)					
B.6.10 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/ /24/	DR	Pending as CAR 2 and CAR 3. It is not clear from the PDD what the choice of geographical area for the top 15% coal-fired power plants. This is requested to be included along with evidence and a list of the plants identified in steps 3 and 5.	CAR-2 CAR-3 CL-9	OK
B.6.11 Have conservative assumptions been used when calculating the project emissions?	/1/ /2/ /24/	DR	Pending as CAR 2 and CAR 3.	CAR-2 CAR-3	OK
B.6.12 Are uncertainties in the project emission estimates properly addressed?	/1/	DR	No significant uncertainties can be addressed for the project.		OK
Leakage (VVM para 89-93)					
B.6.13 Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	No leakage emissions are to be considered for the Project according to ACM0013, Version 3.		OK
B.6.14 Have conservative assumptions been used	/1/	DR	NA		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
when calculating the leakage emissions?					
B.6.15 Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	NA		OK
Emission Reductions (VVM para 89-93)					
B.6.16 Algorithms and/or formulae used to determine emission reductions: <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced All documentation is correctly quoted and interpreted. All values used can be deemed reasonable in the context of the project activity The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 	/1/ /4/ /27/	DR	a. Yes. The EIA was approved by Ministry of Environmental Protection dated 24 April 2008, and FSR was approved by National Development Reform Commission (NDRC), People's Republic of China dated 7 October 2008, and all other document used to determine emission reductions can be verified, the data can be deemed reasonable. The data are properly referenced b. Yes, according to the reference list, all documents used to determine emission reductions were correctly quoted and interpreted. c. Yes. All values used can be deemed reasonable in the context of the project activity d. The description of baseline emission in the PDD needs to be updated according to the approved ACM0013 version 3.0.		OK
B.7 Monitoring plan (VVM para 122-124)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ /24/	DR	The storage period of the monitored data should be stated. The monitoring frequency of the quantity of	CL-10 CL-11	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			coal consumed, NCV coal need to be stated. The accuracy of the measuring equipment need to be stated.		
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/ /24/	DR	Yes. The following parameters are supposed to be monitored: 1. The net electricity supplied to the grid by the project plant and fed into the grid in year y; 2. The quantity of coal combusted in the project plant in year y 3. The weighted average net calorific value of coal in year y		OK
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/ /24/	DR	It is clearly set that the net electricity supplied to the grid by the project plant and fed into the grid in year y will monitored by electricity meter(s). The quantity of coal combusted in the project plant in year y will be measured and recorded whenever the coal be feed to the boiler. The weighted average net calorific value of coal in year y will provided by the fuel supplier in invoices.		OK
B.7.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/ /24/	DR	See above CL 11 .	CL 11	OK
B.7.5 In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed	/1/ /24/	DR	The electricity meters shall be calibrated by the officially accredited entities periodically as per the relevant national calibration		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
appropriate? Describe each relevant parameter.			standards.		
B.7.6 Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /24/	DR	See above CL-11 .	CL-11	OK
B.7.7 Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /24/	DR	See above CL-11 .	CL-11	OK
Ability of project participants to implement monitoring plan					
B.7.8 How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/ /24/	DR	It was assessed during the site visit that the monitoring arrangements described in the monitoring plan are feasible within the project design.		OK
B.7.9 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/ /24/	DR	Pending above CL-10 .	CL-10	OK
B.7.10 Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/ /24/	DR	Yes. Staff involved in the CDM project will receive some relevant training either from the contracted consultant, or the relevant Chinese authorized company. The personnel training plan and records including responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and training, were verified.		OK
B.7.11 Will all monitored data required for verification and issuance be kept for two years after the	/1/ /24/	DR	Pending above CL-10 .	CL-10	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?					
Monitoring of sustainable development indicators/ environmental impacts					
B.7.12 Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	Neither ACM0013 nor the Chinese DNA requires collection and archiving of relevant data concerning environmental, social and economic impacts. However the environmental impacts will be monitored by local environmental authority.		OK
B.7.13 Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	The indicators of environmental impacts will be stipulated by local environmental authority.		OK
B.7.14 Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Yes. This will be on local authority decision.		OK
C Duration of the project activity / crediting period					
C.1.1 Start date of project activity (VVM para 99-100, 104)					
C.1.2 How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/ /6/ /7/ /8/	DR	The starting date of the project activity is determined to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit.		OK
C.1.3 Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	The expected operational lifetime sourced from PDR and crosscheck with other		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			authorized sources from third party.		
C.1.4 Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	A fixed crediting period (10 years) is selected.		OK
D Environmental Impacts (VVM para 131-133)					
D.1.1 Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /4/	DR	Yes. The project has been approved by Ministry of Environmental Protection dated 24 April 2008. There are no special conditions that need monitoring according to the approval of EIA for the project.		OK
D.1.2 Does the project comply with environmental legislation in the host country?	/1/ /4/	DR	Yes. The project complies with Chinese environmental legislation as EIA was approved by local authority.		OK
D.1.3 Will the project create any adverse environmental effects?	/1/ /4/	DR	There are no significant adverse environmental effects for the project according to the EIA.		OK
D.1.4 Have identified environmental impacts been addressed in the project design?	/1/ /4/	DR	Yes. The identified environmental impacts have been addressed in the project design.		OK
D.1.5 Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /4/	DR	Yes. The impacts are properly described, including the impacts on noise, air, water and solid, ecosystem environment and socio-Economic impact.		OK
D.1.6 Are transboundary environmental impacts considered in the analysis?	/1/ /4/		There are no trans-boundary environmental impacts foreseen for the project.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
E Stakeholder Comments (VVM para 128-130)					
E.1.1 Have relevant stakeholders been consulted?	/1/ /13/	DR	Yes, besides the stakeholder consultation process stipulated in the Chinese EIA regulation, the project developer has conducted an additional stakeholder consultations in July 2009. The evidences for stakeholder consultation process have been received. 110 questionnaires were sent to the stakeholders by the project developer with 97.3% return. The stakeholders covered 9 villages and 1 community near the plant, the staffs at Pinghai Power plant and the offices at local government.		OK
E.1.2 Have appropriate media been used to invite comments by local stakeholders?	/1/ /13/	DR	Yes, local stakeholders from local residents and local government were invited through a questionnaire to provide comments on the project.		OK
E.1.3 If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /13/	DR	Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations.		OK
E.1.4 Is a summary of the stakeholder comments received provided?	/1/ /13/	DR	Yes. A summary of comments is provided and has been verified by DNV. The survey shows that the proposed project receives support from the local people.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
E.1.5 Has due account been taken of any stakeholder comments received?	/1/ /13/	DR	All the local villagers, residents and representative organizations participating in the survey are all supportive of the development of the proposed project. There has been no need to modify the project design according to the comments received.		OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1: LoA from United Kingdom of Great Britain and Northern Ireland should be provided.	A.3.1 A.3.2 A.3.3	The LoA from Annex I Party is issued by U.K. government, and provided to DOE, please check.	The DNA of U.K issued the LoA on 4 August 2010 and authorized EcoSecurities International Limited as project participant. DNV received LoA directly and considers the provided letter as authentic. CAR 1 is closed.
CAR 2: The parameters of EF_{FF,CO_2} and EF_{Coal,BL,CO_2} needs to be sourced from IPCC default values of the fuel type used in the project plant at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. The net calorific value of the fuel they use has to be monitored and can not be assumed to take the value of a coal equivalent (29.27 GJ/tonne). The source of the NCV needs to follow the requirement of the latest methodology ACM0013 version 04. Besides, the desulphurization expenditure of super critical coal-fired plants in GSP version of PDD was found inconsistent with the data in FSR, revision is required.	B.6.1 B.6.5 B.6.7 B.6.8 B.6.10 B.6.11	The parameter of EF_{FF,CO_2} was sourced from IPCC default values of the fuel type used in the project plant at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. The description of net calorific value for the coal consumed in the project were adjusted according to the Letter of Intent for coal supply. The PDD was revised accordingly.	The PDD was revised as per the the latest methodology ACM0013 version 04 and all evidences have been provided. CAR 2 is closed.
CAR 3: The methodology requires for the baseline	B.6.2 B.6.7	The energy efficiencies used in the emission factor calculations (both for option 1 and option 2) were net energy	All the evidences and references have been provided and verified by DNV. The adoption of 38.10% in the emission

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>emissions to use an emission factor that is the minimum of the top 15% of the power plants in the region with the same fuel and “the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario”. The latter is however in the PDD not done consistently between the baseline determination and the emission reduction calculation. The efficiency used in the baseline determination, originated from the FSR, is higher and the gap in efficiency between the baseline and the project is expanded from 1.48% in the baseline determination to 3.14% in the emission factor calculation. The emission factor therefore needs to be clarified.</p>	<p>B.6.8 B.6.10 B.6.11</p>	<p>efficiency (the net electricity delivered to the grid divided by the total energy consumption), while the efficiency used in the baseline determination was gross energy efficiency (the total electricity generated divided by the total energy consumption) in which the power plant self use and line loss was not excluded.</p> <p>In the option 1 of emission factor calculation, the net energy efficiency (38.10%) of the most likely baseline scenario is quoted from the <i>Bulletin on determining baseline emission factor for China Grid (updated in July 2009)</i>, in which it is calculated based on the efficiencies of newly built top 15% performing 600MW coal-fired power plants sourced from the Statistics by the State Electricity Regulatory Commission (SERC) and Data from the NDRC³.</p> <p>In the option 2 of emission factor calculation, the net energy efficiency is calculated by the NDRC based on the data of the top 30% performing coal-fired power plants of which the capacity is between 500MW and 1500MW</p>	<p>factor calculation is considered to be appropriate and conservative. CAR 3 is closed.</p>

³ <http://qhs.ndrc.gov.cn/qjzjz/W020090703644239079814.doc>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>within the geological area covered by SCPG⁴.</p> <p>The energy efficiency used in the baseline determination is 42.0%. Considering the power plant self use rate of 5.5% sourced from Referenced Cost Index of Power Engineering and Design 2007⁵ and the average line loss rate of 6.76% in SCPG in 2007, the net energy efficiency can be calculated as 37% which is lower than the 38.10% adopted in the PDD.</p> <p>Thus we can approve that the adoption of 38.10% in the emission factor calculation is appropriate and conservative.</p>	
<p>CL 1: The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology should be addressed.</p>	A.2.6	<p>The term “critical point” is a thermodynamic term which describes the state of a substance where water and steam coexist. The operating conditions for Supercritical is defined as with the temperature of 566 degrees and the pressure of 24.1MPa, while the Ultra-supercritical work under the temperature of 593 degrees or upper and the pressure of 24.1MPa or upper. The definition above referred</p>	<p>The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology was addressed in the revised PDD.</p> <p>CL 1 is closed.</p>

⁴ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1829.pdf>

⁵ This number is conservative since the provincial average of the self use rate of coal-fired power plants varied between 6.01% to 7.42% in SCPG in 2007.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		http://www.hitachi.com/environment/showcase/solution/energy/thermal_power.html . The PDD was revised accordingly.	
CL 2: As alternatives to provide equivalent service as the proposed project activity, the construction of 2*600MW supercritical and subcritical coal-fired power plants should be justified.	B.4.1 B.4.3 B.4.7 B.4.8 B.5.2 B.5.3	The standard unit with a capacity of 600MW for supercritical and subcritical plants is the only choice in compliance with the China regulation. Both 600MW supercritical and subcritical units can provide the service of base load and peak load (http://www.cec.gov.cn/info/NewsDetail.jsp?news_id=8645).	DNV verified the additional information and confirmed that the construction of 2*600MW supercritical and subcritical coal-fired power plants can provide equivalent service as the proposed project activity. CL 2 is closed.
CL 3: Whether the baseline alternative is available to the project participant or not needs to be demonstrated.	B.4.1	Guangdong Huizhou Pinghai Power Station Co., Ltd. as the project developer has experience in coal-fired, hydro, wind, LNG and nuclear power generation plants (http://www.gdyd.com/yuedian/About/), thus all the alternatives all available to the PD, but most of them shall be excluded by other reason as described in PDD.	The website of Guangdong Guangdong Huizhou Pinghai Power Station Co., Ltd. has been verified to confirm that the baseline alternatives are available to the project participant. CL 3 is closed.
CL 4: In financial sensitivity analysis, justification and further clarification is sought on the usage of +/- 10% assure the reasonable variations. Latest EB guidelines on financial analysis should be followed and complied with.	B.4.2 B.4.8 B.5.27 B.5.28	Latest EB guidelines on financial analysis was followed in the revised PDD.	The results of the sensitivity analysis show that only if the fuel price increases by 47%, or the load factor increases by 155%, or the investment decreases by 55%, the proposed project would reach the baseline alternatives. The justification on the variations of the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			parameters has been addressed in Section 4.4. CL 4 is closed.
<p>CL 5:</p> <p>Justifications for the following parameters in the financial analysis are requested: fuel price, other expenditure, waste expenditure (including an explanation of what type of waste, as the fuel consumption is less for the project than the other alternatives), employee number of the project.</p> <p>Contracts for the investments of the project and if signed a power purchase agreement are requested.</p> <p>Furthermore, a justification for the discount rate chosen is requested.</p>	B.5.14	<p>The contracted design institute provided a clarification letter to explain the following parameters: fuel price, other expenditure, waste expenditure, employee number of the project and discount rate.</p> <p>Main equipment purchase contract and civil work contract were provided for validation.</p>	<p>DNV has cross checked the input values used in the calculation of the levelized electricity generation cost (LCOE) of proposed project and coal fired power generation technologies in the PDD against third-party or publicly available sources as follows (the input values used in the calculation of LCOE of proposed project refer to the additionality analysis):</p> <p>1) The unit investment cost</p> <p>The unit investment costs used for calculation LCOE of 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 3 559 RMB/kW and 3 724 RMB/kW respectively /17/, which can be cross-checked by the corresponding data (3 372 RMB/kW for 600 MW sub-critical and 3 507 RMB/kW for 600 MW super-critical) stated in the public website. Hence, DNV could confirm that the unit investment costs for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant used in the levelized cost</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>analysis are reasonable.</p> <p>2) Discount rate</p> <p>The discount rate used in for calculation LCOE is 7%, which was sourced from the average long term loan base interest from 2002 to 2007. The data was published on the website of the People's Bank of China /40/. DNV considers that the discount rate used in the levelized cost analysis is appropriate.</p> <p>3) Annual operation hours</p> <p>The annual operation hours used for calculation LCOE of 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 5 000 hours /17/, this can be crosschecked by the annually average operation hours of thermal power plant in China from 2004 to 2007, which is about 4 500 hours to 5 500 hours /34/. Therefore, the annual operation hours (5 500 hours) used for calculation LCOE of 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are considered to be reasonable.</p> <p>4) Fuel consumption and fuel price</p> <p>The coal consumption efficiency (gross) for 600 MW super-critical coal-fired</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>power plant is 41.98% /17/. DNV confirmed that the value was from the approved FSR and the Referenced Cost Index of Power Engineering and Design 2007 /17/. The coal consumption efficiency for 600 MW sub-critical coal-fired power plant is 41.13% /17/, this is higher than the efficiency range of large capacity sub-critical coal-fired power plant (about 38%~40%), which is a conservative approach /43/. DNV can confirm that the coal consumption for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are reasonable.</p> <p>The coal prices for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 700 RMB/tSCE. DNV confirmed that the value was from the approved FSR and the Referenced Cost Index of Power Engineering and Design 2007 /17/. Hence the coal prices in the levelized cost analysis are appropriate.</p> <p>CL 5 is closed.</p>
<p>CL 6: The project participants are requested to justify the operating hours (i.e. load factor) of the baseline scenarios. Since the proposed project is more efficient than existing power</p>	B.5.20	<p>The operating hours of the project is determined during the negotiation between the PD and the grid company. According to the Grid Connection Approval issued by SCPG, the annual</p>	<p>The Grid Connection Approval issued by SCPG was verified to confirm that the annual operating hours of the proposed project is 5 500 hours. Furthermore, China Electric Power</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
plants in the grid, why is not a higher load factor assumed than for the other alternatives.		operating hour is 5,500. According to the latest China Electric Power Yearbook (2008), the average annual operating hour for the coal-fired units with the capacity larger than 600MW was 5,084. Thus the assumed annual operating hour for 600MW supercritical and subcritical is conservative.	Yearbook 2008 has been verified to confirm that the average annual operating hours for the coal-fired units with the capacity larger than 600MW was 5 084. Therefore the annual operating hours of 5 500 of the proposed project is considered to be appropriate and conservative. CL 6 is closed.
CL 7: The project participants are requested to include investment costs in the sensitivity analysis.	B.5.26	The PDD was revised accordingly.	The investment costs are included in sensitivity analysis. CL 7 is closed.
CL 8: The methodology requires “Use preferably well documented and reliable regional or national average values. If such data is not available, IPCC default values may be used”. The project participants are request to justify whether regional or national average values are available.	B.6.7	The NCV of coal shall be sourced from invoices provided by the fuel supplier in the revised PDD. This is the preferred source mentioned in the latest version of ACM0013.	The adoption of the NCV of coal fulfills the requirement of methodology. CL 8 is closed.
CL 9: It is not clear from the PDD what the choice of geographical area for the top 15% coal-fired power plants. This is requested to be included along with evidence and a list of the plants identified in steps 3 and 5.	B.6.10	P. R. China is divided into regional electricity systems which are defined by the DNA of P. R. China ⁶ . The Project is located in Guangdong which belongs to the South China Power Grid (SCPG). Therefore, the choice of geographical	SCPG is defined as the geographical area for the top 15% coal-fired power plants. DNV has verified the top 15% coal-fired power plants by means of on site validation in NDRC and can confirm

⁶ See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		area is the area the SCPG covered. The evidence and a list of the plants identified in steps 3 and 5 can be for onsite validation in NDRC.	that the evidence and a list of the plants within SCPG. CL 9 is closed.
CL 10: The storage period of the monitored data should be stated.	B.7.1 B.7.9 B.7.11	The PDD is revised accordingly.	The monitoring data will be stored for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later. CL 10 is closed.
CL 11: The monitoring frequency of the quantity of coal consumed, NCV_{coal} need to be stated. The accuracy of the measuring equipment need to be stated.	B.7.1 B.7.4 B.7.6 B.7.7	The PDD is revised accordingly.	The quantity of coal consumption will be measured and recorded whenever the coal be feed to the boiler, and Cross-checked by the annual energy balance that is based on purchased quantities and stock changes and also with the purchase invoices from the financial records. The accuracy of the electricity meter is 0.5%. CL 11 is closed.

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APPENDIX B

INITIAL CDM VALIDATION PROTOCOL

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR	Yes. The proposed project will be implemented in Pinghai Town, Huidong County, Huizhou City of Guangdong Province, in the People's Republic of China, with its geographical coordinates east longitude of 114°44'20", and north latitude of 22°36'53".		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	Yes. According to the definition of project boundary in methodology, the spatial extent of the project boundary includes the power plant at the project site and all power plants considered for the calculation of the baseline CO ₂ emission factor, therefore the SCPG which the proposed project is connected to is defined as system boundary which consists of the following provincial power grid: Guangdong, Guangxi, Yunnan and Guizhou.		OK
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party,</i>					

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	The host Party involved in the project is China and the Annex I participating Party is United Kingdom of Great Britain and Northern Ireland. Guangdong Huizhou Pinghai Power Station Co., Ltd. is the project participant from the Host Party (China) EcoSecurities International Limited is the project participant from the Sponsor Party (United Kingdom of Great Britain and Northern Ireland)		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/21/ /22/	DR	LoA from DNA of China has been provided. LoA from United Kingdom of Great Britain and Northern Ireland should be provided.	CAR-1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/21/ /22/	DR	China ratified the Kyoto Protocol on 30 August 2002. United Kingdom of Great Britain and Northern Ireland's assigned amount is 92% of the emission level in 1990. Both of them are voluntary participation. DNA of China is National Development and Reform Commission. The DNA of United Kingdom of Great Britain and Northern Ireland is the		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			Department for Environment, Food and Rural Affairs.		
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/21/ /22/	DR	The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards China.		OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/1/ /3/	DR	<p>The proposed power facility applies the technology of ultra-supercritical coal-fired power generation, which is a high efficiency coal-fired power generation technology.</p> <p>The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology should be addressed.</p>	CL4	OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/ /3/	DR	As a less carbon-intensive coal-fired power generation technology, the proposed electricity generation project will help reduce GHG emissions versus the present coal-fired power generation projects in SCPG.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/ /9/	DR	Training contract between Guangdong Huizhou Pinghai Power Station Co., Ltd and Guangdong Shajiao C Power Station has		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
	/12/		been provided.		
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/21/	DR	The LoA from DNA of China stated that the project assists China in achieving sustainable development.		OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /4/	DR	The proposed project will contribute by means of <ul style="list-style-type: none"> ◆ Supplying energy to the local grid and alleviating regional power supply and demand contradictions, promoting the local economic development; ◆ Reducing other pollutants such as SO₂ and NO_x rather than greenhouse gas emissions compared with the normal coal-fired power generation technology; ◆ Creating new employment opportunities directly at the project during construction and operation; ◆ Increasing local revenue and taxable income. 		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology					

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/24/	DR	The approved methodology ACM0013 (Version 2.1, EB46) “Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology” has been applied for the project activity.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/24/	DR	<p>The methodology is applicable under the following conditions:</p> <p>1. 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 technology¹ than what would otherwise be used with the given fossil fuel.</p> <p>According to the Referenced Cost Index of Power Engineering and Design published by China Power Engineering Consulting Group Corporation /17/, the coal consumption per kWh of the ultra-supercritical power plant is 10gce less than that of the supercritical power plant which is the most commonly used for the new built power plant. So the project activity is the construction and operation of a new coal-fired grid-connected electricity generation plant that uses ultra-supercritical technology to achieve higher efficiency in coal-based</p>		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>electricity generation in China,</p> <p>2. The project activity is not a co-generation power plant. The FSR was verified to confirm that the project activity is not a co-generation power plant.</p> <p>3. Data on fuel consumption and electricity generation of recently constructed power plants is available. Data on coal consumption and electricity generation of recently constructed power plants is available as in baseline emission calculation.</p> <p>4. The identified baseline fuel is used in more than 50% of total generation by utilities in the geographical area within the country, as defined later in the methodology, or in the country. To demonstrate this applicability condition data for latest three year shall be used. Maximum value of the same fossil fuel generation estimated for three years should be greater than 50%.</p> <p>Based on the data from China Energy Statistics Yearbook 2005~2007 and China Electric Power Yearbook 2006~2008, the share of power generation from coal-fired power plants within SCPC are 67.5% in 2005, 69.2% in 2006 and 69.9% in 2007, which are greater than 50%.</p> <p>5. Also, FSR was verified to confirm that the proposed project is a new built electricity</p>		

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			generation plants. Therefore, ACM0013 is applicable to the project.		
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR	<p>The construction of 2*600 MW supercritical coal-fired power plant is selected as the most economically attractive alternative, and then the baseline scenario.</p> <p>As alternatives to provide equivalent service as the proposed project activity, the choices of 2*600 MW supercritical and subcritical coal-fired power plants should be justified.</p>	CL2	OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	<p>Baseline scenarios, which have been considered following the guidelines provided in ACM0013 are as follows:</p> <p>Step 1 Identify plausible baseline scenarios</p> <p>According to the FSR of the proposed Project, it is to operate as base load and also has the capacity of peak regulation capacity. The following baseline scenario alternatives are provided.</p> <p>(1) The project activity not implemented as a CDM project</p> <p>Scenario (1) is a plausible baseline scenario</p>		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>which can deliver similar services as the proposed project.</p> <p>(2) The construction of one or several other power plant instead of the proposed project activity</p> <p>a) Power generation using the same fossil fuel type as in the project activity, but technologies other than that used in the project activity;</p> <p>Scenario (2a) is a plausible baseline scenario which can deliver similar services as the proposed project. The typical technologies using coal providing similar service as the proposed Project are mainly two types, supercritical technology and subcritical technology. Therefore the 2*600 MW supercritical and subcritical coal-fired power plants are the two possible alternatives of the proposed project.</p> <p>As alternatives to provide equivalent service as the proposed project activity, the choices of 2*600 MW for supercritical and subcritical coal-fired power plants should be justified.</p> <p>b) Power generation using fossil fuel types other than that used in the project activity;</p> <p>Power generation using fossil fuel other than coal mainly includes oil-fired and natural gas-fired power plants. Construction of new</p>	CL-2	

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>oil-fired power plants is prohibited in electric power system according to China Energy Conservation Technology Policy Outline (2006), thus oil-fired power generation is not a possible scenario.</p> <p>The electricity generation of natural gas is mainly for peak load according the utilization policy of natural gas issued by NDRC on 30 August 2007 /22/, whereas the project is both base load and peak load. Therefore it can not be considered a scenario to provide equivalent service. Based on the fact that natural gas power plants apply for CDM, this alternative is furthermore not considered financial attractive.</p> <p>c) Other power generation technologies, such as renewable power generation;</p> <p>Other power generation technologies mainly include nuclear power, hydro power, wind power, solar power, biomass and others.</p> <p>The Security Management Regulation for Grid-connected Nuclear Power Plant was verified to confirm that nuclear power plant can not provide peak load service /26/.</p> <p>Hydro power generation has seasonal differences and can not provide similar services as the proposed project /27/.</p> <p>For the power plants using other renewable energy such as wind energy, solar energy,</p>		

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>biomass and others, based on the data from China Power Year Book 2008, in SCPG the total installed capacity and electricity generation using renewable energy except hydro energy and nuclear energy is only 250 MW and 390 GWh, respectively, which are much smaller than the expected ones from the proposed Project.</p> <p>(3) Import of electricity from connected grids, including the possibility of new interconnections</p> <p>FSR was verified to confirm that the import of electricity to SCPG is mainly from Three Gorge and Sichuan Grid (Central China Grid). However, electricity supplied by Sichuan Grid and Three Gorges Hydro power plant is chiefly from hydropower which has distinct seasonality, and the electricity supplied from Three Gorges Hydro power plant to SCPG in 2008 are respectively 1.97*10⁸ kWh in January, 0 in February, 3.54*10⁸ kWh in March, 7.85*10⁸ kWh in April, 0 in May, 21.80*10⁸ kWh in June, 22.60*10⁸ kWh in July, 21.80*10⁸ kWh in August, 21.93*10⁸ kWh in September, 10.69*10⁸ kWh in October, 13.42*10⁸ kWh in November, and 1.28*10⁸ kWh in December /23/. Therefore in dry seasons, it is difficult to guarantee normal supply from Sichuan Grid and Three Gorges Hydro power</p>	CL-2	

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			plant /23/. Step 2 Identify the economically most attractive baseline scenario alternative As section B.2.1 In sensitivity analysis, PP should give the reason that $\pm 10\%$ are the reasonable variations	CL 4	
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Ditto	CL 2	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Ditto	CL 2	OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /24/	DR	Yes. National & sectoral policies have been considered in determining baseline scenario. Refer B.2.2.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/ /24/	DR	Same as B.2.2	CL 2	OK
B.2.7. Have the major risks to the baseline been identified?	/1/ /24/	DR	Same as B.2.2	CL 2	OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to	/1/	DR	The project's additionality has been		OK

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the methodology?	/24/ /25/		demonstrated following the “Tool for the demonstration and assessment of additionality” of version 5.2		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /24/ /25/	DR	<p><i>Step 1: Identification of alternatives to the project activity consistent with current laws and Regulations</i></p> <p>The project proponent has identified plausible alternatives to the proposed activity, see B.2.2</p> <p><i>Step 2: Investment analysis</i></p> <p>The project proponent has adopted investment analysis to establish additionality, by comparing the levelized cost of the alternatives.</p> <p>Whether the baseline alternative is available to the project participant or not needs to be demonstrated.</p> <p>The project participants are requested to justify the operating hours (i.e. load factor) of the baseline scenarios. Since the proposed project is more efficient than existing power plants in the grid, why is not a higher load factor assumed than for the other alternatives.</p> <p>Justifications for the following parameters in the financial analysis are requested: fuel price, other expenditure, waste expenditure (including an explanation of what type of</p>	<p>CL2</p> <p>CL3</p> <p>CL5</p> <p>CL6</p>	OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>waste, as the fuel consumption is less for the project than the other alternatives), employee number of the project.</p> <p>Contracts for the investments of the project and if signed a power purchase agreement are requested.</p> <p>Furthermore, a justification for the discount rate chosen is requested.</p> <p>The project participants are requested to include investment costs in the sensitivity analysis.</p> <p>Step 3: Barrier analysis The barrier analysis is not used to prove the additionality of the proposed project.</p> <p>Step 4: Common practice analysis The following issues for common practice should be clarified.</p> <ul style="list-style-type: none"> ➤ The criteria for similar projects in common practice should be stated and justified. ➤ The reference used for identifying similar projects in common practice should be justified. 	CL7	
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /24/ /25/	DR	Refer to Section B.3.2	CL2 CL6	OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /3/ /6/ /7/ /8/ /10/ /11/	DR	<p>The starting date of the project activity is determined as per EB41, Para 67, to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit.</p> <p>The FSR was prepared by Guangdong Electric Power Design Institute in April 2008 and approved by NDRC on 7 October 2008. On 1 December 2008, the notification was sent to EB from EcoSecurities International Limited for seeking CDM status for Guangdong Pinghai Power Plant Phase I Project. The ERPA between the project developer and EcoSecurities was signed on the 20 October 2008. DNV also verified the notice on the 60th CDM meeting issued by DNA of China dated 4 March 2009 to confirm that the proposed project applied for the LoA of China at the 60th CDM meeting on 17 March 2009.</p> <p>This shows that CDM was seriously considered in the decision to proceed with the project activity. The continued actions to secure CDM status in parallel with the physical implementation of the project is found satisfactory.</p>		OK
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated</i>					

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<i>according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /26/ /27/	DR	<p>The CO₂ emissions from electricity generation in the proposed project activity (PEy) have been estimated using the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”. The estimation found to be complete and transparent.</p> <p>The methodology requires “Use preferably well documented and reliable regional or national average values. If such data is not available, IPCC default values may be used”. The project participants are request to justify whether regional or national average values are available.</p>	CL-8	OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/ /26/ /27/	DR	Yes.		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/ /26/ /27/	DR	Yes.		OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and</i>					

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<i>values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /24/ /26/ /27/	DR	<p>The baseline emissions have been calculated in line with the approved consolidated methodology ACM0013. the baseline emission factor has been determined using the lower value between the two as below</p> <ul style="list-style-type: none"> ➤ the emission factor of the supercritical coal-fired technology <p>The emission factor of the technology and fuel identified as the most likely baseline scenario was 0.8939 tCO₂/MWh</p> <p>The data source of the parameters was verified and the calculation was considered to be appropriate.</p> <p>The methodology requires for the baseline emissions to use a emission factor that is the minimum of the top 15% of the power plants in the region with the same fuel and “the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario”. The latter is however in the PDD not done consistently between the baseline determination and the emission reduction calculation. The efficiency used in the baseline determination, originated from the FSR, is higher and the gap in efficiency between the baseline and the project is expanded from 1.48% in the baseline determination to 3.14% in the</p>	CAR-2	OK

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			<p>emission factor calculation. The emission factor therefore needs to be clarified.</p> <p>➤ And the emission factor determined based on the performance of the top 15% coal-fired power plants in SCPG (0.8703 tCO₂/MWh), which is consistent with the figures issued by NDRC on 2 June 2008.</p> <p>It is not clear from the PDD what the choice of geographical area for the top 15% coal-fired power plants. This is requested to be included along with evidence and a list of the plants identified in steps 3 and 5.</p>	CL-9	
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/ /24/ /26/ /27/	DR	Same as B.5.1		OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/ /24/ /26/ /27/	DR	Same as B.5.1		OK
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /24/ /26/ /27/	DR	No leakage emission is associated with the project activity.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/ /24/ /26/ /27/	DR	Ditto		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/ /24/ /26/ /27/	DR	Ditto		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/ /24/ /26/ /27/	DR	Yes, the emission reductions are measurable and have been estimated for a 10 years crediting period. The actual amount of emission reductions will be confirmed in the final validation report.		OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/ /24/	DR	Yes, the monitoring plan has been prepared in line with the applied methodology		OK

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B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/ /24/	DR	The storage period of the monitored data should be stated.	CL-10	OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/ /24/ /26/ /27/	DR	<p>The parameter of EF_{FF,CO2} needs to be sourced from IPCC default values of the fuel type used in the project plant at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. The net calorific value of the fuel they use has to be monitored and can not be assumed to take the value of a coal equivalent (29.27 GJ/tonne). The source of the NCV needs to follow the requirement of the latest methodology ACM0013 version 3.</p> <p>Besides, the desulphurization expenditure of super critical coal-fired plants in GSP version of PDD was found inconsistent with the data in FSR, revision is required.</p> <p>The monitoring frequency of the quantity of</p>	<div style="text-align: center;">CAR-3</div> <div style="text-align: right;">CL-11</div>	OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			coal consumed, NCV_{coal} and $EF_{CO_2, coal, y}$ need to be stated. The accuracy of the measuring equipment need to be stated.		
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/ /24/ /27/	DR	CO ₂ is the only GHG indicator relevant to this project.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/ /24/ /27/	DR	Ditto	CL-11	OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/ /24/ /27/	DR	Ditto	CL-11	OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/ /24/ /27/	DR	The accuracy of the measuring equipment should be stated.	CL-11	OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/ /24/ /27/ /	DR	See B.9.1	CL-11	OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/ /24/ /27/	DR	Yes.		OK
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the	/1/	DR	Yes. All meters and instruments will be installed, maintained and calibrated regularly		OK

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calibration intervals being observed?	/24/ /27/		as per industry practices. Calibration of meters will be implemented according to the relevant standards.		
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/ /24/ /27/	DR	Yes.		OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /24/ /26/ /27/	DR	Yes. Net electricity supplied to the grid by the project will be continuously measured and monthly recorded by meter. The CO ₂ emission factor (EF _{CO₂,coal,y}) of the coal used in the project plant will be applied the default in Table 1.4, Chapter 1 of the “2006 IPCC Guidelines for National Greenhouse Gas Inventories”		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/24/	DR	CO ₂ is the only GHG indicator relevant to this project.		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/24/	DR	Yes.		OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/24/	DR	Yes.		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/24/	DR	The accuracy of the measuring equipment should be stated.	CL-11	OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/24/	DR	Yes.		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/24/ /	DR	Yes.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/24/	DR	Yes. All meters and instruments will be installed, maintained and calibrated regularly as per industry practices. Calibration of meters will be implemented according to the relevant standards.		OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/24/	DR	Yes.		OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/24/	DR	According to ACM0013, the project proponents do not need to consider leakage.		OK
B.11.2. Are the choices of project leakage indicators	/24/	DR	Ditto		OK

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reasonable and conservative?					
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/24/	DR	Ditto		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/ /4/ /24/	DR	Monitoring of sustainable development indicators is not mandatory in China.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /4/ /24/	DR	Ditto		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/ /4/ /24/	DR	Ditto		OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall	/1/	DR	Yes, responsibility & authority delegation		OK

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project management clearly described?	/24/		has been adequately defined.		
B.13.2. Are procedures identified for training of monitoring personnel?	/1/ /24/	DR	Training records of monitoring personnel have been provided.		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /24/	DR	Yes.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/ /24/	DR	Yes.		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/ /24/	DR	Yes.		OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR	The operational lifetime of the project is 20 years. The starting date of the project activity is determined as per EB41, Para 67, to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit.		OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/ /24/	DR	Yes. The crediting period will start on 01/10/2010, or on the date of registration of		OK

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			the CDM project activity, whichever is later.		
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /4/	DR	Yes. The impacts are properly described, including the impacts on noise, waste water, dust and solid waste.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /4/	DR	Yes. Environmental Impact Assessment has been approved by Ministry of Environmental Protection on 24 April 2008.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/ /4/	DR	No. The project will have positive impact to the local environment.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /4/	DR	There are no transboundary environmental impacts foreseen for the project.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /4/	DR	Yes.		OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/ /4/	DR	Yes. The project complies with Chinese environmental legislation as EIA was approved by national authority.		OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
E.1.1. Have relevant stakeholders been consulted?	/1/ /13/	DR	An notice was put at the gate of the Pinghai Town Government Office and Guangdong Huizhou Pinghai Power Station Co., Ltd., which included a technical description of the Project as well as a brief explanation of how the project activity mitigates climate change and brings other sustainable development benefits. 110 copies of questionnaires were sent to the local stakeholders which covered 9 villages (90 copies questionnaires) and 1 community (10 copies questionnaires) near the plant, the staffs at Pinghai Power plant (5 copies questionnaires) and the offices (5 copies questionnaires) at local government, and 107 copies got back in July 2009. The survey shows the support from the stakeholders.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes.		OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/ /13/	DR	Questionnaires have been provided.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.1. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/21/ /22/	DR	LoA from United Kingdom of Great Britain and Northern Ireland has not been obtained. The LoA from China was received through the project participant.	CAR-1	OK
A.2. Project design					
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/ /3/ /4/	DR	Yes, the project location, the technology of the project are clearly described in the PDD and in line with the approved FSR, system boundaries determination in line with the		OK

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			approved methodology ACM0013 and the delineation of grid boundaries as provided by the DNA of China.		
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/ /3/ /6/ /7/ /8/	DR I	The project activity was under construction at the start of the validation, which was verified by the site visit conducted by auditors from DNV. The project is a new built project in Pinghai, Huizhou City, which was verified against the purchase contract for turbine generators, construction contract and construction permit. It was also confirmed by site visit by auditors from DNV.		OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/ /10/	DR I	The project is to install and operate two ultra-supercritical coal-fired power generation units with the total capacity of $2 \times 1000\text{MW}$, which is a large scale project. The on-site visit has been carried out by Huang Peng, Dong Nan from DNV.		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/ /3/	DR I	No. The project is a new built project.		OK
A.3. Project emissions not addressed by the methodology					
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/	DR	Yes. The project emissions have been estimated in accordance with the applied methodology of ACM0013.		OK
A.4. Documentation of baseline emissions					
A.4.1 Documentation of the baseline determination:	/1/	DR	See Section B.2.2	CL-2	OK

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<ul style="list-style-type: none"> a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 					
A.5. Documentation of the calculations					
A.5.1 Algorithms and/or formulae used to determine emission reductions 1) All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced 2) All documentation is correctly quoted and interpreted. 3) All values used can be deemed reasonable in the context of the project activity 4) The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	/1/ /3/ /4/	DR	Yes. 1) All assumptions and data used by the project activity are listed in the PDD and related document will be submitted for registration. 2) Yes. 3) Yes. DNV could validate the data used for calculations. 4) Yes. 5) Yes.		OK
A.6. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring	/1/	DR	See B.8.2 and B.9.1	CL-10	OK

plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?				CL 11	
A.7. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/ /3/ /6/ /7/ /8/	DR	<p>The starting date of the project activity is determined to be 24 October 2008, the earliest date of the purchase contract for boilers, turbines and generators, construction contract and construction permit.</p> <p>The FSR was prepared by Guangdong Electric Power Design Institute in April 2008 and approved by NDRC on 7 October 2008. On 1 December 2008, the notification was sent to EB from EcoSecurities International Limited for seeking CDM status for Guangdong Pinghai Power Plant Phase I Project. The ERPA between the project developer and EcoSecurities was signed on the 20 October 2008.</p> <p>This shows that CDM was seriously considered in the decision to proceed with the project activity. The continued actions to secure CDM status in parallel with the physical implementation of the project is found satisfactory.</p>		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1: LoA from United Kingdom of Great Britain and Northern Ireland should be provided.	A.2.2	The LoA from Annex I Party is issued by U.K. government, and provided to DOE, please check.	The DNA of U.K issued the LoA on 4 August 2010 and authorized EcoSecurities International Limited as project participant. DNV received LoA directly and considers the provided letter as authentic. CAR 1 is closed.
CAR 2: The parameter of EF_{FF,CO_2} needs to be sourced from IPCC default values of the fuel type used in the project plant at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. The net calorific value of the fuel they use has to be monitored and can not be assumed to take the value of a coal equivalent (29.27 GJ/tonne). The source of the NCV needs to follow the requirement of the latest methodology ACM0013 version 04. Besides, the desulphurization expenditure of super critical coal-fired plants in GSP version of PDD was found inconsistent with the data in FSR, revision is required.	B.5.1	The parameter of EF_{FF,CO_2} was sourced from IPCC default values of the fuel type used in the project plant at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. The description of net calorific value for the coal consumed in the project were adjusted according to the Letter of Intent for coal supply. The PDD was revised accordingly and the change of annual estimated emission reduction between the GSP and final version of PDD was only because the above mentioned revision in ACM0013 version 04.	The PDD was revised as per the the latest methodology ACM0013 version 04 and all evidences have been provided. CAR 2 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 3:</p> <p>The methodology requires for the baseline emissions to use an emission factor that is the minimum of the top 15% of the power plants in the region with the same fuel and “the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario”. The latter is however in the PDD not done consistently between the baseline determination and the emission reduction calculation. The efficiency used in the baseline determination, originated from the FSR, is higher and the gap in efficiency between the baseline and the project is expanded from 1.48% in the baseline determination to 3.14% in the emission factor calculation. The emission factor therefore needs to be clarified.</p>	B.5.1	<p>The energy efficiencies used in the emission factor calculations (both for option 1 and option 2) were net energy efficiency (the net electricity delivered to the grid divided by the total energy consumption), while the efficiency used in the baseline determination was gross energy efficiency (the total electricity generated divided by the total energy consumption) in which the power plant self use and line loss was not excluded. In the option 1 of emission factor calculation, the net energy efficiency (38.10%) of the most likely baseline scenario is quoted from the <i>Bulletin on determining baseline emission factor for China Grid (updated in July 2009)</i>, in which it is calculated based on the efficiencies of newly built top 15% performing 600MW coal-fired power plants sourced from the Statistics by the State Electricity Regulatory Commission (SERC) and Data from the NDRC*.</p> <p>In the option 2 of emission factor calculation, the net energy efficiency is calculated by the NDRC based on the</p>	<p>All the evidences and references have been provided and verified by DNV. The adoption of 38.10% in the emission factor calculation is considered to be appropriate and conservative.</p> <p>CAR 3 is closed.</p>

* <http://qhs.ndrc.gov.cn/qjzjz/W020090703644239079814.doc>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>data of the top 30% performing coal-fired power plants of which the capacity is between 500MW and 1500MW within the geological area covered by SCPG*.</p> <p>The energy efficiency used in the baseline determination is 42.0%.</p> <p>Considering the power plant self use rate of 5.5% sourced from Referenced Cost Index of Power Engineering and Design 2007[†] and the average line loss rate of 6.76% in SCPG in 2007, the net energy efficiency can be calculated as 37% which is lower than the 38.10% adopted in the PDD.</p> <p>Thus we can prove that the adoption of 38.10% in the emission factor calculation is appropriate and conservative.</p>	
<p>CL 1:</p> <p>The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology should be addressed.</p>	A.3.1	<p>The term “critical point” is a thermodynamic term which describes the state of a substance where water and steam coexist. The operating conditions for Supercritical is defined as with the temperature of 566 degrees and the pressure of 24.1MPa, while the Ultra-</p>	<p>The definition of the operating conditions such as ranges of pressure and temperature for ultra-supercritical compared to supercritical technology was addressed in the revised PDD.</p> <p>CL 1 is closed.</p>

* <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1829.pdf>

[†] This number is conservative since the provincial average of the self use rate of coal-fired power plants varied between 6.01% to 7.42% in SCPG in 2007.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		supercritical work under the temperature of 593 degrees or upper and the pressure of 24.1MPa or upper. The definition above referred http://www.hitachi.com/environment/showcase/solution/energy/thermal_power.html . The PDD was revised accordingly.	
CL 2: As alternatives to provide equivalent service as the proposed project activity, the construction of 2*600MW supercritical and subcritical coal-fired power plants should be justified.	B.2.1 B.2.2 B.2.4 B.2.6 B.2.7 B.3.1	The standard unit with a capacity of 600MW for supercritical and subcritical plants is the only choice in compliance with the China regulation. Both 600MW supercritical and subcritical units can provide the service of base load and peak load (http://www.cec.gov.cn/info/NewsDetail.jsp?news_id=8645).	DNV verified the additional information and confirmed that the construction of 2*600MW supercritical and subcritical coal-fired power plants can provide equivalent service as the proposed project activity. CL 2 is closed.
CL 3: Whether the baseline alternative is available to the project participant or not needs to be demonstrated.	B.3.2	Guangdong Huizhou Pinghai Power Station Co., Ltd. as the project developer has experience in coal-fired, hydro, wind, LNG and nuclear power generation plants (http://www.gdyd.com/yuedian/About/), thus all the alternatives all available to the PD, but most of them shall be excluded by other reason as described in PDD.	The website of Guangdong Guangdong Huizhou Pinghai Power Station Co., Ltd. has been verified to confirm that the baseline alternatives are available to the project participant. CL 3 is closed.
CL 4:	B.2.2	Latest EB guidelines on financial	The results of the sensitivity analysis

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
In financial sensitivity analysis, justification and further clarification is sought on the usage of +/- 10% are the reasonable variations. Latest EB guidelines on financial analysis should be followed and complied with.		analysis was followed in the revised PDD.	show that only if the fuel price increases by 47%, or the load factor increases by 155%, or the investment decreases by 55%, the proposed project would reach the baseline alternatives. The justification on the variations of the parameters has been addressed in Section 4.4. CL 4 is closed.
CL 5: Justifications for the following parameters in the financial analysis are requested: fuel price, other expenditure, waste expenditure (including an explanation of what type of waste, as the fuel consumption is less for the project than the other alternatives), employee number of the project. Contracts for the investments of the project and if signed a power purchase agreement are requested. Furthermore, a justification for the discount rate chosen is requested.	B.3.2	The contracted design institute provided a clarification letter to explain the following parameters: fuel price, other expenditure, waste expenditure, employee number of the project and discount rate. Main equipment purchase contract and civil work contract were provided for validation.	DNV has cross checked the input values used in the calculation of the levelized electricity generation cost (LCOE) of proposed project and coal fired power generation technologies in the PDD against third-party or publicly available sources as follows (the input values used in the calculation of LCOE of proposed project refer to the additionality analysis): 1) The unit investment cost The unit investment costs used for calculation LCOE of 2*600 MW sub-critical coal-fired power plant and super-critical coal-fired power plant are 3 559 RMB/kW and 3 724 RMB/kW respectively, and are sourced from the approved FSR /3/. DNV has checked the “Referenced Cost Index of Power

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>Engineering and Design 2007” published by China Power Engineering Consulting Group Corporation, which is a authoritative power design book in China and the publication updated every year /17/, and confirms that the unit investment costs for 600 MW sub-critical coal-fired power plant and super-critical coal-fired power plant used in the levelized cost analysis are reasonable for the industrial common practice in China. The investment cost of the project at 7 994 million RMB is sourced from the FSR. DNV has verified the Financial Audit Report for Guangdong Pinghai Power Plant Phase I Project 2010 issued by Guangdong Zhongtian Accountant Firm on 25 January 2011 /45/, which is the qualified financial entity /44/. In the financial audit report, it showed that the Guangdong Pinghai Power Plant Phase I Project has not been totally completed and the actual investment till the end of 2010 has occupied 88.19% of the total investment assumed in the FSR. Hence, DNV considers the value of total investment assumed in FSR as</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>reasonable.</p> <p>In addition, DNV has also verified the reasonableness of the unit cost/KWh of the project at 3 997 RMB/KW, by comparing the cost/KW of a similar registered project (# 3288 registered in December 2010) at 4522 RMB/KW.</p> <p>2) Discount rate</p> <p>The discount rate used for the calculation of the LCOE is 7%, which was sourced from the approved FSR /3/. DNV has checked the average long term loan base interest from 2002 to 2007 which was published on the website of the People's Bank of China /40/ and considered that the discount rate used in the levelized cost analysis is appropriate. Since the same discount rate is used in the LCOE calculation of the three alternatives, the long term base rate of 7% is considered appropriate.</p> <p>3) Annual operation hours</p> <p>The annual operation hours used for calculation LCOE of the proposed project, 600 MW sub-critical coal-fired power plant and 600 MW super-critical</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>coal-fired power plant are all 5 500 hours /17/, this can be crosschecked by the annually average operation hours of thermal power plant in China from 2004 to 2007, which is about 4 500 hours to 5 500 hours /34/. Therefore, the annual operation hours (5 500 hours) used for calculation LCOE are considered to be reasonable. The same number of operating hours is considered for the registered project # 3288.</p> <p>4) Fuel consumption and fuel price</p> <p>The coal consumption for the proposed project is 283 kg SCE/MWh, the coal consumption for 600 MW super-critical coal-fired power plant is 293 kg SCE/MWh, and the coal consumption for 600 MW sub-critical coal-fired power plant is considered at 299 kg SCE/MWh. DNV confirmed that the values above were from the approved FSR /3/. DNV has also checked the Referenced Cost Index of Power Engineering and Design 2007 and confirmed the data is reasonable /17/. The coal consumption efficiency for 600 MW sub-critical coal-fired power plant is considered at 41.13% /17/. This</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>efficiency is higher than the efficiency range of large capacity sub-critical coal-fired power plant about 38%~40% which is local industry common practice /43/. Thus DNV determined it a conservative approach. Based on the analysis above DNV confirmed that the assumed coal consumption for the proposed project, the 600 MW sub-critical coal-fired power plant and the 600 MW super-critical coal-fired power plant were all reasonable.</p> <p>The coal prices in the levelized cost analysis for the proposed project, the 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are all 700 RMB/tSCE. DNV confirmed that the value was from the approved FSR /3/. DNV has checked the Referenced Cost Index of Power Engineering and Design 2007 and confirmed it reasonable and appropriate /17/. Also considering the fact that the same price is being used in all the three cases, it does not have much impact.</p> <p>5) O&M cost</p> <p>According to the FSR, the O&M cost</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>for a coal consumption power plant includes: material expenditure, water expenditure, desulphurization expenditure, waste expenditure, denitrification, salary and welfare, repair expenditure, insurance expenditure and other expenditure /3/. DNV checked the FSR and confirm that all the portions in the O&M cost were from the approved FSR /3/. Besides that DNV has checked the Referenced Cost Index of Power Engineering and Design 2007 /17/ and the registered project # 3288, which is the only one registered ACM0013 project in China and then confirmed that all data in the O&M cost is reasonable.</p> <p>CL 5 is closed.</p>
<p>CL 6: The project participants are requested to justify the operating hours (i.e. load factor) of the baseline scenarios. Since the proposed project is more efficient than existing power plants in the grid, why is not a higher load factor assumed than for the other alternatives.</p>	B.3.2	<p>The operating hours of the project is determined during the negotiation between the PD and the grid company. According to the Grid Connection Approval issued by SCPG, the annual operating hour is 5,500. According to the latest China Electric Power Yearbook (2008), the average annual operating hour for the coal-fired units with the capacity larger than 600MW</p>	<p>The Grid Connection Approval issued by SCPG was verified to confirm that the annual operating hours of the proposed project is 5 500 hours. Furthermore, China Electric Power Yearbook 2008 has been verified to confirm that the average annual operating hours for the coal-fired units with the capacity larger than 600MW was 5 084.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		was 5,084. Thus the assumed annual operating hour for 600MW supercritical and subcritical is conservative.	Therefore the annual operating hours of 5 500 of the proposed project is considered to be appropriate and conservative. CL 6 is closed.
CL 7: The project participants are requested to include investment costs in the sensitivity analysis.	B.3.2	The PDD was revised accordingly.	The investment costs are included in sensitivity analysis. CL 7 is closed.
CL 8: The methodology requires “Use preferably well documented and reliable regional or national average values. If such data is not available, IPCC default values may be used”. The project participants are request to justify whether regional or national average values are available.	B.4.1	The NCV of coal shall be sourced from invoices provided by the fuel supplier in the revised PDD. This is the preferred source mentioned in the latest version of ACM0013.	The adoption of the NCV of coal fulfills the requirement of methodology. CL 8 is closed.
CL 9: It is not clear from the PDD what the choice of geographical area for the top 15% coal-fired power plants. This is requested to be included along with evidence and a list of the plants identified in steps 3 and 5.	B.5.1	P. R. China is divided into regional electricity systems which are defined by the DNA of P. R. China*. The Project is located in Guangdong which belongs to the South China Power Grid (SCPG). Therefore, the choice of geographical area is the area the SCPG covered. The evidence and a list of the plants	SCPG is defined as the geographical area for the top 15% coal-fired power plants. DNV has verified the top 15% coal-fired power plants by means of on site validation in NDRC and can confirm that the evidence and a list of the plants within SCPG.

* See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		identified in steps 3 and 5 can be for onsite validation in NDRC.	CL 9 is closed.
CL 10: The storage period of the monitored data should be stated.	B.8.2	The PDD is revised accordingly.	The monitoring data will be stored for for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later. CL 10 is closed.
CL 11: The monitoring frequency of the quantity of coal consumed, NCV_{coal} and $EF_{CO_2,coal,y}$ need to be stated. The accuracy of the measuring equipment need to be stated.	B.9.1 B.9.3 B.9.4 B.9.5 B.9.6 B.10.5	The NCV_{coal} should be obtained for each fuel delivery, from which weighted average annual values should be calculated the $EF_{CO_2,coal,y}$ will be monitored continuously The PDD is revised accordingly.	The quantity of coal consumption will be measured and recorded whenever the coal is feed to the boiler, and Cross-checked by the annual energy balance that is based on purchased quantities and stock changes and also with the purchase invoices from the financial records. The accuracy of the electricity meter is 0.5%. CL 11 is closed.

APPENDIX C

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS



CERTIFICATE OF COMPETENCE

Li, Lei:

Mr. Li Lei, Kevin holds a Master Degree in Environment Science & Technology. He has an overall experience of around 3 years. Prior to joining DNV, he had around 1.2 years experience as a government servant in covering environment management, carbon footprint research and supporting the government decision making process. Prior to that, he has completed one year practical training on the CDM project consulting majoring in the sector of energy generation from renewable energy sources.

He had an experience of around 2 years in validation and verification of numerous CDM projects in DNV, majoring in China.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.

Tang, Zhiang:

Mr. Tang Zhiang, Walter holds a Bachelor Degree in Thermodynamic Engineering and a Master Degree in Business Administration. He has an overall experience of around twelve years. Prior to joining DNV, He had around 5 years in the field of power industry covering of consulting and engineering for thermal power, wind power, hydropower and solar energy projects. His experience also covers the field of space industry for thermal design, the energy analysis and thermal control for about 4 years.

He has gained the relevant financial and investment knowledge through his courses in MBA. He has applied his financial and investment knowledge in his consulting work for the power industry, such as investment risk analysis, financial accounting, investment parameters assessment, etc.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV both in China and abroad.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.

Dong, Nan:

Mr. Dong Nan, holds a Master’s Degree in Environmental Science and Engineering. Possesses experience of more than 2 years in the field of planning and design of urban wastewater treatment, urban water supply and urban solid waste treatment as part of working environmental planning&design and environmental consulting. His experience also covers the fields of environmental management, resource conservation and cleaner production in various industries.

He has experience of around 1.5 years in validation and verification of CDM projects.

His qualification, industrial experience and experience in CDM demonstrate him/her sufficient sectoral competence in (areas in which person is qualified for as sector competence-only include those areas for approval was obtained as it shows in the CDM_ JI auditors table-under sectoral competence worksheet).



CERTIFICATE OF COMPETENCE

Huang, Peng:

Mr. Huang Peng, holds a Bachelor Degree in Thermal Dynamic Engineering and a bachelor Degree in Mass Communication. He possesses experience of more than 8 years in the field of consulting and management of energy efficiency as part of his work in a thermal power plant and Iron & Steel plant. His experience also covers the fields of energy efficiency, resource conservation and cleaner production in various power plants and manufacture industries. He has experience of more than 3 years in validation and verification of numerous renewable and energy efficiency CDM projects in DNV. He has also been actively involved in energy efficiency service projects in various industrial sectors for more than 2 years in DNV. Since 2007, he has worked in the fields of Climate Change Service including CDM, VCS, GS and WCD project and energy efficiency service.

Before joining DNV, Peng Huang has worked in Tsinghua Tongfang Co.,Ltd, Sustainable Developing Center of NDRC and Energy Efficiency Department of NDRC. He has rich project development experiences in renewable energy and many other industry sectors. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.

Hou, Baojun:

Mr. Hou Bao Jun holds a Master Degree in Applied Chemistry. Having an overall experience of around 5 years. Prior to joining DNV, having around 4 years experience in thermal power plant and about 10 months experience in chemical cleaning field. He was responsible for the normal operation of water treatment equipment and was tasked to redesign the production process to raise its efficiency. He participated in the device process design and construction. He has accumulated rich experience in the construction of the power equipment. He is also familiar with other areas of a power plant, namely the boiler system, the turbine system and the electricity system. His experience covers the fields of chemistry and energy. His qualification, industrial experience demonstrate his sufficient sectoral competence in “Thermal Energy Generation from Fossil Fuels and Biomass including Thermal Electricity from Solar” and “Waste Handling and Disposal”.

Lai, Chee Keong:

Mr. Lai Chee Keong holds a Bachelor Degree in Applied Science majoring in Environmental Biology, a Master Degree in Environmental Engineering and a Post Graduate Diploma in Accounting and Finance. He possesses a combined Asian & International experience of more than 16 years in the field of environmental consulting and environmental auditing. His experience also covers the fields of environmental management and environmental impact assessment for various on-shore industries such as petro-chemical plants, general chemical plants, residential developments and industrial park developments.

He has also been actively involved in Management System audits such as ISO 9001, ISO



CERTIFICATE OF COMPETENCE

140001 and OHSAS 18001 standards in various industrial sectors for more than 7 years in DNV.

He has experience of more than 5 years in validation and verification of numerous CDM projects in DNV in Asia including those in South East Asia and China.

His qualification, industrial and investment experience and experience in CDM demonstrate him sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”, “Waste Handling and Disposal” and “Animal Waste Management”..

Hendrik W. Brinks

Mr. Hendrik W. Brinks holds a Master Degree in Inorganic Chemistry & Material Science and a Dr. Scient Degree in Inorganic Chemistry & Material Science. He has an overall experience of around 16 years. Prior to joining DNV, he has 7 years of working experience at a research institute by scientific research on future energy systems with hydrogen as an energy carrier and project management for monitoring system design. He has published >50 papers in international journals with peer reviews. His experience also covers teaching and research at University of Oslo, Norway.

He has 4 years extensive experience in validation and verification of >400 CDM projects worldwide and also experience from other 3rd party validation/verification schemes.

Technical Director for CDM, Hendrik W. Brinks is the service line responsible for CDM in DNV and is qualified for approval of CDM projects.

His qualification and experience in CDM demonstrate his sufficient sectoral competence in “Waste Handling and Disposal” and quality control (technical review) competence for projects within renewable energy, biomass power, waste heat recovery, energy efficiency, waste handling, wastewater, coal mine methane, transport, charcoal and flare reduction.

Kakaraparathi Venkata Raman:

Mr. Kakaraparathi Venkata Raman holds a bachelor degree (B.Tech) in Chemical Engineering and a Diploma in Management. He has an overall experience of 18 years in the Chemical Process Industry - Fertilisers and Chemicals industry (FACT). His main areas of work include a) Technical Services (for Ammonia, Urea, Co-generation thermal power plants (captive), and complex fertilizers plants)- 10 years b) Erection, commissioning and hands-on operation of state of art HTAS Ammonia plant - 4 years c) Management and operation of Sulphuric acid plant as Plant Manager- 2 years and d) two years in management Information System operation and assisting of top management in planning of operations..

While in FACT he has completed the ISO14001 EMS LA course and also involved in implementation of Environmental Management Systems and in conducting internal audits.

Experience prior to joining Fertiliser industry include six months experimental work on



CERTIFICATE OF COMPETENCE

charcoal manufacture in Karnataka Regional Engineering college.

He has experience of around 5 years in validation and verification of numerous CDM projects. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass as well as thermal electricity from solar (b) 1.2 Energy Generation from renewable energy sources (c) 5.1/4.13/11.1/12.1 Chemical Processes Industries and (d) 13.1 Waste handling and disposal.