



VALIDATION REPORT

for the CDM Project Activity

Hunan Zhugaotan Hydropower Project

in
P.R.China

Report No. 01 997 91050448615

Version No. 03, 2011-04-02

TÜV Rheinland Japan Ltd.

I. Project description:

Project title: Hunan Zhugaotan Hydropower Project
Host Country: P.R.China
Methodology: ACM0002, Version 11 ☒ Large Scale ☐ Small Scale
Annual average emission reductions (estimate): 95,802 tCO₂e

GHG reducing measure/technology: Hydro Power

Party	Project Participants	Party considered a project participant
P.R.China	Huayuan ChunJiang Power Generation Co., Ltd.	No
The United Kingdom of Great Britain and Northern Ireland	Camco International Limited	No
The United Kingdom of Great Britain and Northern Ireland	Camco Carbon Limited	No

II. Validation:

Contract party: Camco International Limited

Validation Team:

Role	Full name	Appointed for Sectoral Scopes	Affiliation
Team Leader	Sequoia A	1.2	TÜV Rheinland (Shanghai) Co., Ltd.
Team Member /Trainee	Stefan Liang*		TÜV Rheinland (Shanghai) Co., Ltd.
Technical Reviewer	Deng Cuiping	1.2, 5.1, 11.1, 12.1	TÜV Rheinland (China) Co., Ltd.

* leaving team member since November 2010.

Validation Phases:

- ☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues

Validation Status:

- ☐ Corrective Actions / Clarifications Requested
☒ Full Approval and Submission for Registration
☐ Rejected

III. Validation Report:

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Final approval: <input checked="" type="checkbox"/>	Released on: Date: 2011-04-06 By: Dr. Manfred Brinkmann	Designated Operational Entity (DOE): TÜV Rheinland Japan Ltd. Shin Yokohama Daini Center Bldg., 3-19-5, Shin Yokohama Kohoku-ku, Yokohama, JAPAN 222-0033 Tel.: +81 45 470 1850, Fax: +81 45 470-2361 E-mail: cdm@tuv.com
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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CCPG	Central China Power Grid
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
ERPA	Emission Reduction Purchase Agreement
EPB	Environmental Protection Bureau
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
IRR	Internal Rate of Return
MP	Monitoring Plan
NCV	Net Calorific Value
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PDR	Preliminary Design Report
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added Tax
VVM	Validation and Verification Manual

Executive Summary – Validation Opinion

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

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

The Validation was executed in the following steps so far:

- Project desk review (PDD Version 02, 15 September 2008)
- Public stakeholder comment process(22 October to 20 November 2008)
- On-site visit with stakeholder interviews(5 March 2009)
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft validation report & protocol(Version 00, 1 Sep. 2009)
- Desk review of revised PDD (Version 05, 01 April 2011)
- Review of proposed correction and clarifications
- Issue of the final validation report & protocol

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

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

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

The project applies approved consolidated baseline and monitoring methodologies ACM0002, Version 11, *"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"*.

And also the project applies the methodologies and tools as follows:

- *"Tool to calculate the emission factor for an electricity system" Version 02.*
- *"Tool for the demonstration and assessment of additionality" Version 05.2.*

By generating renewable energy from hydro resources and displace grid electricity, 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 total emission reductions from the project are estimated to be 958,020 tCO₂e over the whole crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate monitoring procedures have been implemented according to the monitoring methodology ACM0002, Version 11. Project operational staff's training records are available to the Audit Team.

The project proponent has resolved all Corrective Action Requests and Clarification Requests as stated in the Validation Report and the Validation Protocol, which has resulted in a revision of the PDD. In summary, it is the validation team's opinion that the Hunan Zhugaotan Hydropower Project in P.R.China as described in the PDD of Version 05, 01 April 2011, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and applies the baseline and monitoring methodology ACM0002, Version 11. TÜV Rheinland thus requests the registration of the Project as a CDM project activity.

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1 INTRODUCTION

The Camco International Limited has commissioned the DOE TÜV Rheinland Japan Ltd. to perform a validation of the CDM Project Activity “Hunan Zhugaotan Hydropower Project” (hereafter called “the Project”) in Hunan Province, China. 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. The term “UNFCCC criteria” refers to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

1.1 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).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

2 METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design documents
- II on-site visit and 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.

2.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

- /1/ Project Design Document for the “Hunan Zhugaotan Hydropower Project”, Hunan CDM Project Service Center, Version 05, 01 April 2011 and Version 02, 15 September 2008.
- /2/ Host Country Letter of Approval [Ref No.: 1372], National Development and Reform Commission of the People’s Republic of China (China DNA), August 2008.
- /3/ The Secretary of State for Environment, Food and Rural Affairs, Letter of Approval for Camco International Limited (Ref: CAMCOINTLTD/19/2009), 22 December 2009
- /4/ The Secretary of State for Environment, Food and Rural Affairs, Letter of Approval for Camco Carbon Limited (Ref: CCLtd/41/2009), 22 December 2009
- /5/ Modalities of Communication signed on 18 August 2010.
- /6/ “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, ACM0002, Version 11, 12 February 2010.
- /7/ CDM Executive Board, Clean Development Mechanism Validation and Verification Manual, Version 01.2.
- /8/ CDM Executive Board, The Project Design Document Form (CDM PDD) – Version 03.
- /9/ CDM Executive Board, Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM) version 07
- /10/ Preliminary Design Report (PDR) for the Project completed by Xiangxi Autonomous Region Water Resource & Hydro Power Survey & Design & Research Institution in March 2007 and approved (Ref No.: XiangShuiXu [2007] No.29) by the Water Resources of Henan Province on 19 March 2007.
- /11/ Environmental Impact Assessment (EIA) of the Project completed by Hunan Province Water Resources and Hydro Power Survey & Design & Research Institution in October 2006 and approved (Ref No.: XiangHuanPing [2006] No. 133) by Hunan Province Environment Protection Bureau on 8 December 2006.
- /12/ CDM Executive Board, Tool to calculate the emission factor for an electricity system, Version 2.
- /13/ Tool for the demonstration and assessment of additionality, Version 05.2.

- /14/ CDM Executive Board, Glossary of CDM terms, Version 05.
- /15/ CDM Executive Board, Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM, Version 03, EB 49 Annex 22, 11 Sep. 2009.
- /16/ CDM Executive Board, Guidelines on the Assessment of Investment Analysis, Version 03.1, EB51 Annex 58, 15 Jan. 2010.
- /17/ National Development and Reform Commission of P.R.China, Notification on Determining Baseline Emission Factor of China's Grid, 30 December 2009.
- /18/ China Electric Power Yearbook 2003 to 2007.
- /19/ China Energy Statistical Yearbook 2005 to 2007.
- /20/ Commercial registration License of the Huayuan ChunJiang Power Generation Co., Ltd.
- /21/ Hunan CDM Project Service Center, Investment Analysis Sheet.
- /22/ Hunan CDM Project Service Center, ER Calculation Sheet.
- /23/ Emission Factor Calculation Spreadsheet of CCPG 2009.
- /24/ Procurement Contract of Water-turbine Generator Units signed between Hangzhou Chunjiang Power Generation Facilities Co., Ltd. and the project owner on 8 September 2007.
- /25/ Construction Contract of Dam, Power House and Stilling Pool signed between Sinohydro No.8 Bureau and the project owner on 30 September 2007.
- /26/ Construction Permission signed by Supervision Office of the Region Hydro Power Engineering Supervision Co., on 9 October 2007.
- /27/ Construction Contract of Grid Connection signed between Sinohydro No.8 Bureau and the project owner on 22 November 2010.
- /28/ Purchase Contract of Speed Governor, Oil Pressure Installation and Accessory signed between Changsha Center Automatic Control Equipment Co., Ltd. and the project owner on 28 September 2010.
- /29/ Installation Contract of Metal Structure and Hoisting Equipment signed between Hunan Taojiang Hydraulic Machinery Co., Ltd. and the project owner on 28 October 2010.
- /30/ Mechanical & Electrical Installation Contract signed between Huitong County Xiangheng Power Engineering Co., Ltd. and the project owner on 14 June 2010.
- /31/ Transformer Purchase Contract signed between Shandong Taikai Transformer Co., Ltd. and the project owner on 2 July 2010.
- /32/ Emission Reduction Purchase Agreement signed between Camco International Limited and the project owner on 6 May 2008.
- /33/ Minute of Board meeting (Ref No.: ChunDianHan [2007] No. 86) of the project owner on 6 July 2007.
- /34/ Service Agreement of CDM Project Development (Ref No.: HNCDM20070062A) signed between Hunan Xiangke CDM Development Co., Ltd. and the project owner on 21 August 2007.
- /35/ Loan Approval of the project signed by Hunan Branch of China Bank on 27

January 2010.

- /36/ Loan Contract of Hunan Zhugaotan Hydropower Project signed between Jishou Sub-branch of China Bank and the project owner on 30 January 2010.
- /37/ Grid Connection Agreement of the project signed between Hunan Jinyuan Power (Group) Corp. and the project owner on 28 May 2007.
- /38/ Power Purchase Contract of the project signed between Hunan Jinyuan Power (Group) Corp. and the project owner on 28 September 2010.
- /39/ Notification of Power Tariff for Grid-connection Plant (Xiangjiazhong [2005] 129) issued by Hunan Price Bureau on 28 August 2005.
- /40/ Constructive Land Preliminary Examination Report (Ref No.: XiangGuoTuYuShenZi [2006] No. 65) issued by Land and Resources Department of Hunan Province on 12 December 2006.
- /41/ Outline Report of Land Expropriation and Immigration Resettlement completed by Hunan Hydro & Power Design Institute in July 2007 and approved (Ref No.: XiangYiHan [2007] No. 186) by Reservoir Migration Development & Administration Bureau of Hunan Province on 31 August 2007.
- /42/ Soil Conservation Plan Report of the Project, Xiangxi Autonomous Region Hydro Power Survey & Design Institution, Aug. 2006; and the Approval Letter (Ref No.: ZhouShuiFa [2006] No. 84) by the Xiangxi Autonomous Region Water Resources Bureau, 22 September 2006.
- /43/ Investigation Report on Hydropower Plants with Installed Capacity of over 15MW Completed after 2002 in Hunan Province issued by Hunan Province Water Resources and Hydro Power Survey & Design & Research Institution in March 2008
- /44/ Minute and Attendance list of CDM training to the Huayuan Chunjiang Power Generation Co., Ltd. , by Ma Ying (Hunan CDM Project Service Center), 10 Jan. 2008.
- /45/ Stakeholders Consultation Questionnaires.
- /46/ Stakeholders Survey Notification made by Huayuan County Government on 8 July 2007.
- /47/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. China Electric Power Press, 2003
- /48/ Interim Regulation on Enterprise Incoming Tax in People's Republic of China
- /49/ Ministry of Finance P.R.China & State Administration of Taxation, Notice on Value Added Tax Policy Regarding Resource Multiutilization and Other Products, 24 June 2003
- /50/ The State Council, Decision on Revising the "Temporary Regulation on the Education Added Tax", 20 Aug. 2005.
- /51/ The State Council, Temporary Regulation on the City Construction Tax, 8 Feb. 1985.
- /52/ Load Factor Specification of the project issued by Xiangxi Autonomous Region Water Resource & Hydro Power Survey & Design & Research Institution on 22 December 2010.

- /53/ State Council, Adjustment Notice of Equity Proportion in Fixed Asset of Investment Project, 25 May 2009.
http://www.gov.cn/zwgk/2009-05/27/content_1326017.htm
- /54/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. China Electric Power Press, 2003
- /55/ CDM Executive Board, Guidelines for the reporting and validation of plant load factors, annex11 EB48
- /56/ Land Acquisition and Migration Resettlement Agreement of Huayuan County for the project signed between Huayuan County Government and the project owner on 20 September 2010.
- /57/ Land Acquisition and Migration Resettlement Agreement of Baojing County for the project signed between Baojing County Government and the project owner on 22 October 2010
- /58/ Hunan Province, Imposition Notice of Water Source Fee, 25 July 2003.
http://www.czw.gov.cn/Article/HTML/20050721111853_84.html
- /59/ Financial Ministry, Interim Regulation for Imposition, Management and Utilization of Medium-Large Scale Reservoir Fund, 17 April 2007.
- /60/ China Statistics Yearbook 2009
- /61/ Economic Evaluation Code for Small Hydropower Projects (SL16-95)
- /62/ Interim Regulation of Financial Assessment on Hydropower Project
- /63/ Historical Interest rate of Commercial Loan issued by Chinese People Bank
http://www.dkfx.cn/html/tools/loan_rate_table.html#anchor_03
- /64/ Economic Evaluation Code for Hydro energy Projects (Ref. No.: SL72-94)
- /65/ "Notification on the Standard of Annual Production Value for Land Expropriation, Xiangzhengbanfa [2005]47
- /66/ The Measurements on Implication of Land Administration in Hunan Province

2.2 Follow-up Interviews with Project Stakeholders

	Date	Name	Organization	Topic
/I/	2009-03-05	Liang Zhonghe Dai Liyou Wu Xingyong Wu Wenxue Lun zhengchou Su Mingjun Shi Jiakuan Long Jiafu	Local Government	<ul style="list-style-type: none"> – Local cement production conditions – WHR status of local cement plants – Project approval procedures – Positive or negative impact brought by the Project – Local environmental conditions – EIA approval status – Project impact on local environment and mitigation measures – Environmental monitoring
/II/	2009-03-05	Jia Shaowu Wang Chaojun	Local residents	<ul style="list-style-type: none"> – Benefits from the Project – Impact of the Project on local environment
/III/	2009-03-05	Ji Chengzhuan Liu deli Qiu Anjun	Huayuan ChunJiang Power Generation Co., Ltd.	<ul style="list-style-type: none"> – Project Management – Technical issues – Approval status by the host country – Sustainable development issues – Investment risks and barriers – Additionality – Monitoring plan – Training plan – Environmental impacts – Stakeholder process – Financial source – CDM incentive consideration
/IV/	2009-03-05	Ma ying	Hunan CDM Project Service	<ul style="list-style-type: none"> – Project design document

Center

- Baseline determination
- Emission reductions calculation
- Project additionality
- Status of LoAs

2.3 Resolution of Outstanding Issues

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

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

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for this project is enclosed in Appendix A to this report.

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

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

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

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

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a corrective action request (CAR) due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

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

Figure 1. Validation protocol tables

2.4 Internal Quality Control

The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with TÜV Rheinland's qualification scheme for CDM validation and verification.

2.5 Validation Team

Role	Full Name	Appointed for Sectoral Scopes	Affiliation
Team Leader	Sequoia A	1.2	TÜV Rheinland (Shanghai) Co., Ltd.
Team Member / Trainee	Stefan Liang*		TÜV Rheinland (Shanghai) Co., Ltd.
Technical Review	Deng Cuiping	1.2, 5.1, 11.1, 12.1	TÜV Rheinland (China) Co., Ltd.

* leaving team member since November 2010.

3 VALIDATION FINDINGS

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

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

3.1 Approval and Participation

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

Project participants	<i>1. Huayuan ChunJiang Power Generation Co., Ltd.</i>	<i>2. Camco International Limited</i>	<i>3. Camco Carbon Limited</i>
Parties involved	<i>P.R.China (host)</i>	<i>United Kingdom of Great Britain and Northern Ireland</i>	<i>United Kingdom of Great Britain and Northern Ireland</i>
Ratification status of the parties	China ratified the Kyoto Protocol on 30 August	United Kingdom of Great Britain and Northern Ireland, the Annex I party, ratified the Kyoto Protocol on 31 May 2002	

	2002.		
APPROVAL			
LoA received	Yes	Yes	Yes
Date of LoA	August 2008.	22 December 2009	22 December 2009
Reference to document	No. 1372 /2/	CAMCOINTLTD/19/2 009 /3/	CCLtd/41/2009 /4/
LoA received from	<i>The project participants</i>	<i>The project participants</i>	<i>The project participants</i>
Validation of authenticity	<i>All approved CDM projects by DNA of China NDRC will be published on: 'http://cdm.ccchina.gov.cn/'. The Project is indicated as approved by China DNA, source: 'http://cdm.ccchina.gov.cn/website/CDM/pdf/Item_new/Item_new3022.pdf'</i>	<i>The Audit Team made a comparison between the LoA of the Project with that of the latest registered CDM project as UK as the Annex I party and no doubts were found.</i>	<i>The Audit Team made a comparison between the LoA of the Project with that of the latest registered CDM project as UK as the Annex I party and no doubts were found.</i>
Validity of LoA	<i>Valid</i>	<i>Valid</i>	<i>Valid</i>
PARTICIPATION			
Party is party to Kyoto Protocol	Yes	Yes	Yes
Voluntary participation	Yes	Yes	Yes
Diversion of official development aid towards host country	N/A	No	No
Project contribution to SD	Yes	N/A	N/A

The Modalities of Communications (MoC) of the Project/5/ has been received by the audit team and it was confirmed that the MoC was signed on 18 August 2010 according to the latest Modalities of Communication Form (F-CDM-MOC) Version 01.2. The audit team confirmed the information presented in Annex I of the revised PDD is consistent with that in the signed MoC.

No public funding from an Annex I Party is involved in the project and 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.

3.2 Project Design Document

The Project Design Document is based on the currently valid PDD template/8/ and is completed in accordance with the applicable guidance document/9/.

3.3 Project Description

Zhugaotan Hydropower Project is located on the downstream of Youshui River in Huayuan County, Hunan Province, P. R. China. The geographic coordinate of the Project is east longitude of 109.4644° and north latitude of 28.5944°. The Project is constructed and operated by Huayuan ChunJiang Power Generation Co., Ltd.

The project is a new hydropower plant with the installed capacity of 33 MW (3×11MW), which has been confirmed through equipment purchase contract/24/ by the Audit Team. The electricity generation is 103,590 MWh/yr, the annual operation hours are 3139h, the net electricity supply is 98,410 MWh/yr, the surface area at the full reservoir level is 3km², and thus the power density of the project is 11 W/m². The power generated will be transferred to Huayuan County Power Grid by Huayuan substation, then to Central China Power Grid (CCPG) after the project operation. The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

Before the implementation of the project activity, the electricity generated by the project would be supplied by Central China Power Grid (CCPG), which is dominated by fossil fuel-fired power plants supplied equivalent electricity.

The project activity utilizes hydropower to generate electric energy which would not produce any greenhouse gas (GHG) during the operation. The electricity generated by the project can displace part of the electricity generated by the fossil fuel fired power plants of CCPG, thus the project activity could reduce GHG emissions and the expected annual emission reductions are 95,802 tCO₂e.

The participation parties changed voluntarily the crediting period from a renewable crediting period (3*7 years) to a fixed crediting period (10 years).

<i>Starting date of project</i>	<i>Expected project operational lifetime</i>	<i>Crediting period</i>
<i>8 September 2007/24/</i>	<i>25 Years (including 3.5 years construction period) as applied in the financial analysis</i>	<i>A fixed crediting period 10 Years (from 01/06/2011 to 31/05/2021)</i>

The training records /44/ have been provided by the project proponent and reviewed by the audit team.

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

3.4 Baseline and Monitoring Methodology

3.4.1 Applicability of the selected methodology to the project activity

The project activity involves electricity generation for a grid through hydro sources where the total output capacity is 33MW. It applies the ACM0002, Version 11 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources connected renewable electricity generation"/6/, which is valid from 26th February 2010 to 16th September 2010. The Requests for registration can be submitted until 17 May 2011 23:59:59 GMT/6/. The approved methodology is also in connection with the methodological tool i.e. "Tool to calculate the emission factor for an electricity system, version 2.0" /12/ and "Tool for the demonstration and assessment of additionality, Version 05.2"/13/. The compliance of the Project is presented as follows:

1. The Project is a greenfield diversion run-of-river hydropower plant and the electricity generated is to be supplied to CCPG, and the project don't involve switching from fossil fuels.
2. The Project involves a new reservoir with a power density of 11 W/m^2 , which is higher than 4 W/m^2 . The Validation Team have verified and can confirm the project activity meets each of the applicability conditions of the Methodology and the tools.

By onsite assessment and interview with local governmental official/I/, the validation team confirms that the project activity complies with all applicability conditions of the methodology and relevant tools. Furthermore, it has been confirmed by reviewing the PDR/10/and EIA report/11/ and onsite inspection that no other GHG emissions occurring within the project boundary as a result of the implementation of the project which is expected to contribute more than 1% of the overall expected average annual emissions reductions and not addressed by the applied methodology.

Therefore, the validation team confirms that the selected baseline and monitoring methodology ACM0002, Version 11 is applicable for the proposed project.

3.4.2 Project Boundary

The grid system boundary includes the physical site of the project activity and all the power plants connected to the Hunan Power Grid, The Validation Team has reviewed the Notification on Determining Baseline Emission Factor of China's Grid/17/, issued by China DNA on 30 December 2008, and confirmed that Hunan Grid is part of CCPG, which includes the Jiangxi, Hunan, Hubei, Henan, Sichuan and Chongqing power grids. The CCPG is dominated by coal-fired power plants according to the China Electric Power Yearbook 2003~2007/18/. It is deemed likely that development of renewable energy power plants will not have significant effects on the delineation of the grids in China during the whole crediting period.

Therefore, the identified boundary and the selected sinks and sources of greenhouse gases have been justified for the project activity in the PDD according to the applied methodology.

	GHGs involved	Description
Baseline emissions	CO ₂	CO ₂ is the main emission source from fossil fired power plants in CCPG.
Project emissions	Not involved	According to ACM0002, Version 11, the project emission is considered to be zero because the power density of the Project is greater than 10 W/m ² .
Leakage	Not involved	According to ACM0002, Version 11, the Leakage of hydro power project activity is Neglected

3.4.3 Baseline Identification

The Project is the installation of a new grid-connected renewable power plant, according to the methodology *ACM0002, Version 11* "Consolidated baseline methodology for grid-connected electricity generation from renewable sources connected renewable electricity generation"/6/, the baseline scenario is the following: Electricity delivered to the grid by the Project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources within CCPG, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system"/12/.

<i>The approved baseline methodology applicable to the project</i> - explicit criteria - implicit criteria (e.g. available scenarios, applicability of formulas for BE/PE/LE calculations)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	As discussed in Section 3.4.1, the compliance of the methodology has been justified in the PDD and verified by the Validation Team.
<i>PDD includes all assumptions and data used by project participants</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The PDD includes all assumptions and data in accordance with <i>ACM0002, Version 11</i> /6/ and the "Tool to calculate the emission factor for an electricity system" Version 02.
<i>All the references and documents used are relevant for establishing the baseline scenario</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	China Electric Power Yearbook 2003 – 2007 /18/, China Energy Statistical Yearbook 2005 – 2007 /19/ and China DNA's Notification on Determining Baseline Emission Factors of China Power Grid /17/ are relevant for establishing the baseline scenario according to <i>ACM0002, Version 11</i> /6/ and the "Tool to calculate the emission factor for an electricity system" Version 02 /12/.

<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the references and documents are confirmed to be correctly quoted and conservatively interpreted in the Section A.2, Section B.4 and Section B.6 of the PDD.
<i>All relevant policies / regulations considered are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All relevant policies / regulations considered are confirmed to be listed in the PDD as per <i>ACM0002, Version 11 /6/</i> and China DNA's Notification on Determining Baseline Emission Factors of China Power Grid on 2 Jul. 2009.
<i>Identified potential baseline scenarios reasonably represent what would/could occur in the absence of the proposed project activity</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	No other baseline scenarios need to be considered according to <i>ACM0002, Version 11 /6/</i> .
<i>The baseline scenario selection is appropriate and determined according to the methodology</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Baseline scenario is regulated by the methodology and appropriately applied in the PDD.
<i>The approved methodology used is applicable to the identified baseline scenario</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Yes.

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

3.4.4 GHG Emission Reductions

The baseline scenario is the electricity delivered to the grid by the Project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources within CCPG, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system"/12/. The combined margin (CM) consists of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system' version 02/12/, which has been correctly applied in the revised PDD Version 05, 01 April 2011.

For the Project, the combined margin (CM) approach is fixed ex-ante during the whole crediting period. The default weights for the proposed project of 50% OM and 50% BM have been selected according to Tool to calculate the emission factor for an electricity system (version 02). For the calculation of OM emission factor, simple OM emission factor calculation method is chosen because low cost/must run projects constitute less than 50% of the total grid generation and data is not available for applying the dispatch data analysis. It is deemed likely that coal-fired power plants will continue to dominate the power sector due to the local availability of low-cost coal. It is expected that renewable capacity additions will not have significant effects on the mix of the grid during the crediting period.

Emission Factor

The average emission factor for the grid for each fuel type is calculated ex-ante based on a 3-year full generation-weighted average of the data available from 2004 - 2006 derived from China Electric Power Yearbook and China Energy Statistics Yearbook 2005 - 2007/18//19/, which are confirmed to be the most recent information at the time of PDD submission for validation. Because plant specific fuel consumption and electricity generation data is not publicly available in China, a deviation of the baseline methodology of AM0005 (later replaced by ACM0002) approved by the EB (as detailed in the PDD) is adopted for using most recent emission data published by the DNA of P.R. China on 30 December 2008. According to the Emission Factor Calculation Spreadsheet of CCPG 2008/23/ and revised PDD Version 05, 01 April 2011, the OM is calculated as 1.2783 and the BM is calculated as 0.6687 tCO₂e/MWh. The combined margin (CM) is thus calculated as 0.9735 tCO₂e/MWh using average weights.

Emission Factor issued by NDRC on 30 December 2008 is applicable for this project although the EF was available issued by NDRC on 18 July 2008 at the time of validation (PDD for GSP), the reasons are as follows:

- 1) As per the guidance of EB to the clarification request 'Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for the new added installed capacity should take more than 20% of the existing installed capacity. The BM issued by NDRC on 18 July 2008 is not correct for the new added capacity from 2005 to 2006 taking less than 20% of the existing installed capacity. The BM issued by NDRC on 30 December 2008 is correct for the new added capacity from 2004 to 2006 taking more than 20% of the existing installed capacity.
- 2) Compared the data (BM 0.7165) on 18 July 2008 with that (BM 0.6687) on 30 December 2008, the latter is conservative.

Considering the net electricity supplied to the grid by the project activity is 98,410 MWh, the baseline emissions are thus calculated as 95,802 tCO₂e annually.

Project emission

The proposed project is a newly-built hydropower project with a new reservoir, and the power density of the Project is 11 W/m². The power density is calculated with installed capacity of the Project (33MW) and the surface area of the reservoir at full load (3,000,000m²). The installed capacity has been checked by the Validation Team on the "Nameplate" of the water turbine generators during site assessment. The surface area was confirmed by PDR approved by Water Resources of Henan Province/10/. Since the power density of the Project is greater than 10W/m², the project emission is zero under ACM0002, Version 11 (PEy=0).

Leakage

The Validation Team can confirm the selection of leakage as zero is in accordance with the applied methodology (Ly=0).

In summary, the GHG emissions calculations are transparently documented and appropriate assumptions regarding expected amount of electricity output and import have been used to

forecast emission reductions. A conservative and appropriate approach has been adopted in both the prediction of baseline emissions and project emissions.

<i>All assumptions made for estimating GHG are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the assumptions made for estimating GHG have been confirmed listed in the PDD Section B.6. The main assumptions are in line with project situation in PDR, the methodology and the Notification on Determining Baseline Emission Factors of China Power Grid, which is published on China DNA's official website since 30 December 2008.
<i>All data used by project participants are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All data used by the project participants have been confirmed listed according to the PDR of the project, Tool to calculate the emission factor for an electricity system (version 02) and relevant China DNA's Guidance.
<i>Their references and sources are also listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The references and sources have been confirmed listed in the PDD Section B.6 and Annex 3 Baseline Information.
<i>Formulas, parameters, values are complete, accurate, transparent and conservative</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Formulas, parameters, values have been confirmed completely, accurately, transparently and conservatively documented in the PDD Section B.6 and Annex 3 Baseline Information according to the PDR of the project, the Tool to calculate the emission factor for an electricity system (version 02) and relevant China DNA's Guidance.
<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the references and documents used have been correctly quoted and conservatively interpreted in the PDD Section B.6 and Annex 3 Baseline Information according to the PDR of the project, the Tool to calculate the emission factor for an electricity system (version 02) and relevant China DNA's Guidance.
<i>Methodology has been applied correctly to calculate project emissions, baseline emissions, leakage emissions and emission reductions</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	The methodology (i.e. ACM0002, Version 11) has been correctly applied to calculate project emissions, baseline emissions leakage emissions and emission reductions. Please also see above descriptions in this section.
<i>All the emissions of baseline emissions can be replicated using information provided in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All the emissions of baseline emissions can be replicated by multiplying the annual net electricity supplied to the grid (i.e. 98,410 MWh) by the CO ₂ emission factor of SCPG (i.e. 0.9735 tCO ₂ e/WWh). The baseline

		emissions calculation is thus calculated as 95,802 tCO ₂ e per year.
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3.5 Additionality

The additionality of the project is demonstrated by applying “Tool for the demonstration and assessment of additionality, Version 05.2.

3.5.1 CDM consideration

It has been demonstrated that CDM was seriously considered in the decision to implement the project activity the proposed project by the following activities in accordance with the “Guidance on the demonstration and assessment of prior consideration of the CDM” /14/.

3.5.1.1 The starting date definition

The timeline of implementation of the project illustrated below has reviewed by the Validation Team and considered to be valid and realistic. The implementation or construction or real actions of the project are as follows:

Project Implementation timeline

Date	Events	Reference
8 December 2006	EIA was approved	/10/
March 2007	PDR was completed and approved	/9/
8 September 2007	Procurement Contract of Water-turbine Generator Units was signed	/24/
30 September 2007	Construction Contract of Dam, Power House and Stilling Pool was signed	/25/
9 October 2007,	Construction Permission was signed	/26/
2 July 2010	Transformer Purchase Contract	/31/
28 September 2010	Purchase Contract of Speed Governor, Oil Pressure Installation and Accessory	/28/
28 October 2010	Installation Contract of Metal Structure and Hoisting Equipment	/29/
22 November 2010	Construction Contract of Grid Connection	/27/

As per Glossary of CDM terms/14/, the starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. The date of the main equipment being signed, i.e. 8 September 2007, is taken as the starting date.

3.5.1.2 Awareness of the CDM prior to the project activity start date

As the starting date of the Project prior to the date of GSP, i.e. 22 October 2008. In accordance with the requirement of the Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM, version 03/15/, the project proponents demonstrate the Project's prior consideration of the CDM in the section B.5 of the revised PDD. The audit team has assessed the "CDM Development Timeline" with the supporting evidence and the findings are chronologically summarized below:

CDM development timeline

<i>Date</i>	<i>Events</i>	<i>Reference</i>
March 2007	PDR of the Project completed. CDM incentive was considered in the financial analysis in the PDR to conquer the financial unattractiveness.	/10/
6 July 2007	Board Decision about CDM Application was made	/33/
21 August 2007	Service Agreement of CDM Project Development was signed	/34/
6 May 2008	ERPA was signed	/32/
August 2008	Host Country Letter of Approval was issued	/2/
22 October 2008	PDD of the project was published for global stakeholder consultation	

The audit team has checked all documents mentioned in the above table and is able to verify that all documents are substantial and valid.

The investment decision for CDM application/33/ and Service Agreement of CDM Project Development/34/ were made on 6 July 2007 and 21 August 2007, respectively, which were earlier than the starting date of the project. The audit team confirmed that the project owner had the awareness of CDM prior to the project activity start date and CDM the CDM were a decisive factor in the decision to proceed with the project.

3.5.1.3 Continuing and real actions were taken to secure CDM status for the project in parallel with its implementation

Emission Reduction Purchase Agreement/32/ was signed on 6 May 2008 and Host Country Letter of Approval was issued in August 2008/2/, which were in parallels with the implementation of the project. Moreover, the gap between documented evidence was less than 2 years. The audit team confirmed that continuing and real actions were taken to secure CDM status for the project activity.

In accordance with the "Guidance on the Demonstration and Assessment of Prior Consideration of the CDM" /15/, the audit team concluded that the continuing and real action were taken to secure CDM status for the project in parallel with its implementation.

Starting date of project	Justification of and evidences (references) on the starting date of project	Date of CDM consideration
8 September 2007	<p><i>Procurement Contract of Water-turbine Generator Units was signed on 8 September 2007 /24/, Construction Contract of Dam, Power House and Stilling Pool was signed on 30 September 2007/25/, Mechanical & Electrical Installation Contract was signed on 14 June 2010/30/, Transformer Purchase Contract was signed on 2 July 2010/31/, Purchase Contract of Speed Governor, Oil Pressure Installation and Accessory was signed on 28 September 2010/28/, Installation Contract of Metal Structure and Hoisting Equipment was signed on 28 October 2010/29/, Construction Contract of Grid Connection was signed on 22 November 2010/27/.</i></p>	<p><i>Board Decision about CDM Application was made on 6 July 2007/33/, Service Agreement of CDM Project Development was signed on 21 August 2007/34/</i></p>

The Validation Team confirmed that the CDM was seriously considered in the decision to implement the project activity as per *Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (Annex 22, EB49) /15/*.

3.5.2 Alternatives

The project activity is based on the methodology *ACM0002, Version 11 /6/*, in which the baseline scenario has been prescribed for Greenfield projects. As per article 105 VVM /7/, no further alternative analysis is required.

3.5.3 Investment analysis

A benchmark analysis (Option III of Step 2 of tool for the demonstration and assessment of additionality) is selected for conducting the investment analysis. In China an IRR of 8% for the total investment of a project is regarded as a benchmark for investments in large scale hydropower plants, fossil fuel fired plants and wind farm projects /47/. This benchmark is deemed appropriate for this project. All input parameters used for investment analysis in the PDD are taken from the approved preliminary design report (PDR) /10/, based on the data of

which the project IRR without CER revenues accounts to 6.35 % /21/, which indicates that the project in the absence of CDM benefits is not financially attractive due to its lower than the benchmark of 8%.

The validation processes of the investment analysis are conducted in the following steps.

3.5.3.1 Choice of approach

Since the proposed project generates financial and economic benefits through the sales of electricity, a simple cost analysis (option I) can not be applied. Secondly, the alternative (d) to the proposed project is not a similar investment project, so an investment comparison analysis (option II) is also not an appropriate choice. Thus the benchmark analysis (option III) has been applied for conducting the investment analysis as per the Guidance on the Assessment of Investment Analysis (Version 3.1) /16/.

3.5.3.2 Justification of benchmark selection

The Validation Team has reviewed the source of the economic benchmark for the project investment analysis used by the project participant and confirmed that it is the valid authoritative reference – “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects” by the State Power Corporation of China /47/. As highlighted in section 1.11 of the reference document, it indicates that the project IRR of 8% is the benchmark used for the investments in hydropower plants, fossil fuel fired plants and wind farm projects. Thus, the Validation Team can confirm the 8% IRR benchmark (after tax) is appropriate for the investment analysis of the proposed project.

The Validation Team has also checked that in the Preliminary Design Report (PDR) of the Project /10/, the 8% of IRR (after tax) is also selected as the benchmark for the economic analysis. The PDR was approved by Water Resources of Henan Province on 19 March 2007, which implicates the benchmark of 8% (after tax), is considered appropriate by local governmental authorities. It may further be noted that design institutes, investors, government authorities, project owners, and consultants commonly apply this benchmark of 8% (after tax) for assessing the financial viability of large scale hydropower projects in China. This is also reflected in the financial analysis of other similar large scale hydropower projects in China registered as CDM project activities.

Therefore the Validation Team can confirm the benchmark of 8% project IRR (after tax) in the financial analysis is suitable to the project activity.

Assessment of IRR calculation

The Validation Team has assessed the IRR calculation sheet /21/. The Validation Team compared the input value in the IRR calculation sheet and confirmed that all values for calculation of the IRR of the proposed project sourced from the PDR /10/. The PDR was developed by Xiangxi Autonomous Region Water Resource & Hydro Power Survey & Design & Research Institution, which is certified to compile design reports for hydropower plants with grade A issued by Construction Ministry P.R.China. As discussed above, the investment decision of the project was made on 6 July 2007 based on the PDR, project starting date is considered to be 08 September 2007, and hence to the Validation Team's opinion, the PDR is

deemed to be the foundation of Project investment, and the period of time between the finalization of the PDR and the investment decision is sufficiently short and it is unlikely input values would have materially changed.

The computation method for Project IRR of the project activity was checked by the Validation Team. The Validation Team considered the method is compliance with that quoted in the “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects” /47/, and Guidelines on the Assessment of Investment Analysis, Version03.1 /16/. The Validation Team therefore confirms the consistency between the benchmark selected and project IRR calculation.

The Validation Team ensures that interest payable has been taken into account in the calculation of income tax in the IRR calculation /21/. The interest rate used in the investment analysis has been cross-checked by the Validation Team below, which is confirmed as prevailing commercial interest rates in China.

The input parameters used in the financial analysis were compared with the data reported for other similar hydro power CDM projects in Hunan province, comparing the plant load factor the investment costs per MW, percentage of O&M costs relative to total investment costs as follow tables, which shows the investment costs and O&M costs are in a reasonable range.

Comparison criteria are as follows:

1. Same region, i.e. Hunan Province;
2. Installed capacity: ranging from >15MW to 50MW. According to the national guidelines, e.g. the applied benchmark SL16-95 /53/, the total installed capacity of 50MW or below is defined as small size of hydropower project(s) in P.R.China. The installed capacity of 15MW or below is excluded from the comparison due to the small-scale CDM project activities;
3. Registered CDM hydropower projects due to the publicly available information;
4. Data source from CD4CDM, CDM pipeline (update to June 2010)

(<http://cdmpipeline.org/publications/CDMpipeline.xlsx>)

Reg.No.	Capacity (MW)	Total investment (Million RMB)	Plant Load Factor (%)	Unit investment (RMB/ KW)	O&M (million RMB)	O&M/ MWh (RMB/MWh)
3967	25	202.350	42.08	8094	2.950	32.01
2899	50	286.340	26.48	5273	6.343	54.68
2786	24	181.077	37.61	7545	4.950	62.59
2118	20	145.352	33.96	7268	1.416	23.80
2484	45	479.884	44.49	10664	7.330	41.80
2001	18.9	139.025	45.80	7356	2.618	34.53
2011	35	266.947	35.55	7627	4.377	40.16
2014	20	98.923	31.46	4946	2.683	48.68
2201	16.5	124.729	34.22	7559	1.590	32.14
2120	18	128.676	35.92	7149	5.906	104.26
1761	20	146.673	35.06	9334	2.460	40.05
1333	16.5	125.990	38.33	7636	1.820	32.85
1367	20	162.983	45.91	8149	3.826	47.56
1365	33	244.110	32.34	7397	4.170	44.60
The proposed project	33	236.2797	35.83	7160	3.7632	36.33

The main input data in the IRR calculation are validated and cross checked by the Validation Team as below.

- **Project Installation**

The project installation capacity is 33MW. This is consistent with that indicated in the PDR and is confirmed by the Audit Team by reviewing the equipment nameplate and reviewing the project's approval /10/.

- **Period of Assessment**

The project IRR was selected as reference to demonstrate the financial viability in the PDD. Assessment Period applied in IRR spread sheet is selected as 25 Years (including 3.5 year of construction period), which are confirmed to be in line with the technical operation lifetime of the water turbine generating facilities and deemed appropriate in line with paragraph 3 of the Guidelines on Assessment of Investment analysis version 03.1/16/.

The Audit Team also checked the period of assessment with Economic Evaluation Code for Small Hydropower Projects (SL16-95)/61/, and confirmed the period of assessment is reasonable.

Therefore, the period of assessment is reasonable.

- **Electricity output**

According to the PDR of the Project, the annual on-grid output was estimated on the basis of 49-year hydrology monitoring information (i.e. 1957~2005) at the nearby Hydrology Monitoring Station along Huayuan River. The expected annual electricity generation is 103,590 MWh. Considering 0.95 effective coefficient, the corresponding annual electricity output is 98,410 MWh as per the PDR. The load factor of the proposed project is 35.83% ($103590\text{MWh}/(33\text{MW}\times 8760\text{h})=35.83\%$), which was determined by a third party Xiangxi Autonomous Region Water Resource & Hydro Power Survey & Design & Research Institution /52/ contracted by the project participants. As per the requirement of "Guidelines for the reporting and validation of plant load factors, annex11 EB48" /55/, the load factor of the project was defined correctly. In addition, the comparison showed that the annual load factor (35.83%) of the proposed project is close to those values (26.48% to 45.91%) of the similar projects in the same region in Hunan Province.

The Audit Team checked the effective power coefficient with Economic Evaluation Code for Small Hydropower Projects (SL16-95)/61/, and confirmed that 0.95 of effective power coefficient is reasonable. It was further confirmed that the project IRR would be 6.83% (after tax) below the benchmark IRR even if effective power coefficient is set as 1.

Therefore, the Expected Power output is reasonable.

- **Electricity Tariff**

The tariff of 0.342RMB/kWh (incl. VAT) in the PDD used for financial analysis of the proposed project is derived from the approved PDR /10/. The Audit Team cross-checked the electricity tariff determination regulation issued by the Hunan Price Bureau on 28 August 2005 /39/, that tariff of hydro-power within Hunan is regulated as 0.316 RMB/kWh (VAT Included). Moreover, the Audit Team cross-checked the grid connection agreement /37/, the tariff of the project is also 0.316 RMB/kWh (VAT Included).

Moreover, according to the “Information Note on The Highest Tariffs Applied By The Executive Board In Its Decisions On Registration of Projects in The People’s Republic of China” issued by EB54 Para 53, the highest hydro tariff of the similar project in Hunan Province is 0.315 RMB/kWh (VAT Included), which is lower than the tariff in the PDD.

The Audit Team concluded that the tariff used in the PDD is reasonable and conservative.

- **Project Investment**

The project total static investment is 236,279,700 RMB. The value is consistent with that of the PDR. Since the PDR would be evaluated by the local government regarding its credibility before getting approval, the Audit Team referred to the project’s approval /10/, issued by Water Resources of Henan Province, to check its consistency.

The investment cost used in the financial analysis was compared with the data reported for other similar proposed CDM projects in the Hunan Province. The investment costs per kW and investment costs per annual kWh were found to be in the range of the other projects or more conservative. The range of investment costs kW was found to be 4946 RMB/kW to 10664 RMB/kW.

The Audit Team cross-checked the credibility of the project investment using Equipment Purchase Contract /24//28//31/, Construction Contract /25/, Construction Contract of Grid Connection /27/, Installation Contract /29//30/ and Land Acquisition and Migration Resettlement Agreement /56//57/, the realised expense reached 237,547,500 RMB , which is higher than the investment of the PDR.

The Audit Team’s opinion, the investment value applied in the PDD is reasonable and conservative.

- **Annual O&M Cost**

The investment cost used in the financial analysis were compared with the data reported for other similar proposed CDM projects in Hunan Province. The range of operation costs per MWh were found to be 23.80 RMB/MWh to 104.26 RMB/MWh

The detailed breakdown of project annual O&M cost is listed clearly in the Project IRR

calculation spreadsheet /21/. The O&M cost covers maintenance cost, staff's salary & welfare, reservoir maintenance cost, water resources cost, and other cost. The annual O&M cost is sourced from and consistent with the PDR /10/ of the proposed project, which is confirmed by the Audit Team.

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

Components	Amount (RMB)	Opinions of the Audit Team
Reparation cost	2,417,400	The maintenance cost is calculated as 1% of the fixed asset investment. The rate 1% is same as that Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects /54/.
Materials cost	165,000	5RMB/KW. According to "Interim Regulation of Financial Assessment on Hydropower Project"/62/, the materials cost of hydro power project below 250 MW is 5 RMB/kW. Therefore, the Audit Team confirmed that material cost of the Project is reasonable.
Water Resources cost	98,410	0.001RMB/kWh of the power generation. The Audit Team checked the regulation on water resources of Hunan Province/58/ and confirmed the rate of water resources cost is valid and conservative.
Reservoir maintenance cost	98,410	0.001RMB/kWh of the power supply. The Audit Team checked Interim Regulation for Imposition, Management and Utilization of Medium-Large Scale Reservoir Fund /59/ and can confirm the rate is reasonable.
staff's salary & welfare	588,000	14,000RMB/Person. According to China Statistics Yearbook 2009 /60/, average salary and welfare of power production and supply in Hunan in 2008 is 28,899 RMB /person. Therefore, salary and welfare of the Project is very conservative.
other cost	396,000	12RMB/KW. According to Economic Evaluation Code for Small Hydropower Projects (SL16-95) /61/, the standard of other fees of the hydropower project with installed capacity of over 12MW is 12yuan/KW, Therefore, the Audit Team confirmed that other fees of the Project is conservative.

100% of the annual O&M cost has been cross-checked by the Audit Team, and the Audit Team considered the O&M cost applied in the investment analysis is conservative.

- **Interest Payment**

The interest rate of 6.48% adopted by the PPD is consistent with the value of the PDR. These loan interest rates are cross-checked against rates published by the People's Bank of China/63/ by the Audit Team. The Audit Team can confirm that actual interest rates in years 2005 to 2007 and the rates estimated in PDR in August 2006 (which is the closest to the date of PDR completion) are corresponding to synchronized interest rates published (i.e. 6.48%).

15.9% of total investment comes from debt estimated in PDR. The Audit Team checked Loan Approval signed by Hunan Branch of China Bank/35/ and Loan Contract signed with Jishou Sub-branch of China Bank/36/. The actual loan is 35 million yuan, which is 14.8% of the total static investment cost (i.e. 236.2797 RMB million RMB). Based on fixed interest rate and pay-back period, a deduction of project IRR was made that a lower proportion of debt will result in less interest payments, which consequently result in more profit and more tax payments. This again would lead to a lower project IRR. A higher debt ratio in the PDR is therefore conservative.

The Audit Team confirmed the actual interest payable has been taken into account in the calculation of income tax in the IRR spreadsheet, which is in line with paragraph 11 of the Guidance on Assessment of Investment analysis version 3.1.

- **Depreciation rate (%) and period (year)**

The depreciation rate 4.47% adopted by the PDD is consistent with that in PDR. The depreciation period is the whole operation period (i.e. 21.5 years). The depreciation period is in line with the Chinese taxation laws (i.e. Minimum 10 years of depreciation period for machines) (State Administration of Taxation, Deduction guideline for Corporation Income tax); thus, the selection of a 21.5-year depreciation period is consistent with the laws and regulations. The depreciation rate (%), i.e. 4.47% of fixed asset investment is selected according to the official guideline document, "Economic Evaluation Code for Hydro energy Projects (Ref. No.: SL72-94)/64/.

The Audit Team confirmed that the depreciation rate of the project is reasonable.

- **Taxes**

The enterprise tax rate is 33% /48/, the VAT for electricity tariff is 6% /49/, the Education Added Tax is 3% /50/ and the City Construction Tax is 5% /51/. The Audit Team confirms that they are consistent with relevant host country's regulations.

3.5.3.3 Sensitivity Analysis

A sensitivity analysis has been assessed with regards to static investment, annual operational costs, electricity output, and on-grid tariff, which constitute more than 20% of either total

project costs or total project revenues as per “Guidance on the assessment of Investment Analysis” /16/. And the sensitivity analysis covered a range of +10% and -10%. The sensitivity analysis shows that without the income from CERs sales the IRR of the proposed project is still lower than the benchmark even when the variations. The Audit Team confirmed that the sensitivity analysis has been carried out correctly.

Critical Condition	Practical assessment of the critical factors
Electricity Tariff	<p>Only when the grid-in tariff is increased by 18.5% the IRR would reach the benchmark of 8%.</p> <p>The project IRR would reach benchmark when the electricity tariff increases by 18.5%. However, the applied tariff (i.e. 0.342 RMB/kWh) was confirmed conservative through cross-check with the tariff approval for hydropower projects by local government. Therefore, it is unlikely that the applied tariff will increase significantly in the context of the project activity.</p> <p>Thus, the increase of 18.5% of the electricity tariff shall not occur.</p>
Electricity generation	<p>When the annual operation hour increase by 18.6%, the IRR of project reach the benchmark of 8%.</p> <p>Besides the determined design proposal of the project, the variation of electricity generation is mainly subject to the water resources of project site, and also be the outcome of the year's rainfall. It is impossible for the electricity generation of project to increase more than 18.6%, because the electricity generation was speculated according to the hydrology documents for 49 years (1957-2005) and it would not change much.</p> <p>And thus, the 18.6% increase of project's electricity generation is unlikely to occur.</p>
Total investment	<p>When total investment of project decrease by 16.2%, the IRR of project reach the benchmark of 8%.</p> <p>The actual investment of the project reached 237,547,500 RMB , which is higher than the investment of the PDR.</p> <p>And thus, it is unlikely for the total investment of project to decrease by 16.2%.</p>

O&M cost	Even the O&M cost decrease to 0, the IRR of the project is still below the benchmark of 8%.
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In conclusion, the investment analysis and sensitivity analysis have presented that the proposed project is unlikely to be the most financially attractive option. The financial calculations and assumptions have been assessed and considered appropriate and conservative. The project IRR with CER revenues was estimated to be above the benchmark.

3.5.4 Barrier analysis

No other barrier analysis is applied in the PDD by the project proponent for this hydropower project.

3.5.5 Common practice analysis

In line with “Tool for the demonstration and assessment of additionality” /13/, the common practice analysis should be carried out on similar projects in the same region and taking place in a comparable environment with regards to regulatory framework, investment climate, access to technology, and access to financing, etc.

In China, the different province has different tariff policy, project site conditions and investment circumstances. Each province has its own tariff policy and set the standard tariff effective within the province published by the Price Bureau of the province. The physical condition of a project site is determined largely by the river water flow condition, which is affected by weather conditions which vary province by province. And general conditions for investment differ province by province, as each province has their own policy on hydropower project investments. Therefore application of the criteria, located in Hunan Province is reasonable and appropriate.

The hydropower project with the installed capacity below 50MW is defined as small scale hydropower project in terms of the <Yearbook of China Water power 2005>. According to UNFCCC, the project with installed capacity below 15MW is defined as the small-scale project. Considering “Tool for the demonstration and assessment of additionality”, If necessary data/information of some similar projects are not accessible for PPs to conduct this analysis, such projects can be excluded from this analysis” (Additionality tool version 5.2 /13/). In Investigation Report on Hydropower Plants with Installed Capacity of over 15MW Completed after 2002 in Hunan Province /43/, there are no any hydropower projects with installed capacity below 15MW, thus projects with installed capacity lower than 15MW were not considered in the common practice. The validation team thus confirms it is reasonable to select similar small-scale hydropower projects with installed capacity within the range of 15MW~50MW.

On 10th February 2002, the State Council published the notice on Issuing Electric Power Sector Reform Program which has largely affected the investment scheme for hydropower projects. Especially small-scale private investors were affected, as with the reform some financial supports by the government were cancelled, and instead financial competitions were

introduced for cost saving, while state-owned investors still can keep enjoying some financial benefits provided by the government. These were confirmed with relevant information provided by the project participant. As such, investment circumstances for hydropower projects were fundamentally changed after the reform, it is considered appropriate to include only hydropower projects of which construction started in and after 2002.

There are seven projects identified within the 15MW to 50MW after 2002 in Hunan Province /43/.

#1 Mulongtan Project has obtained the financial funds from Zhangjiajie City Government because it is also a flood prevention project of the city. And the annual operation hour is higher than the project. Therefore the investment per electricity generation is lower than the proposed project.

#2 Ruoshui Project is located in the downstream of Baiyun reservoir which has a year-regulating ability and thus can regulate the flow rate of the river water. So it can have more electricity generation on average, and the annual operation hour is much higher than the project. However, there was no reservoir in the upstream of Zhugaotan Project, and the reservoir of Zhugaotan Project is of day-regulating ability which means weak regulate ability and less electricity generation. Therefore the unit investment is lower than the proposed project.

#3 Yongxing II Project and #5 Leizhong Project are both developed by state-owned enterprises. They're located in the downstream of Dongjiang reservoir which has a year-regulating ability and thus can regulate the flow rate of the river water. So both projects have high operation hours and more electricity generation compared to all other projects. So their unit investments are lower than the proposed project.

Similar to #3 and #5, #4 Chengjiangkou Project is also located in the downstream of Dongjiang reservoir but developed by a private company. Though its advantages are not as prominent as the above two state-owned projects, it still benefits from the upstream regulating facilities and has relatively low investment compared to the proposed project due to very small submergence. Therefore its unit investment is lower than the proposed project.

#6 Ouyanghai Expanded Project is an expansion project based on an existing reservoir, and some old facilities such as the dam can be utilized and didn't need rebuilt. So its total investment is much lower than that for a new project with the same scale. So its unit investment is among the lowest of the projects and is much lower than the proposed project.

#7 Yangmingshan II project was developed by a state-owned enterprise with even better natural conditions. It is a diversion type hydropower station with high water head (398m) and small submergence. Moreover, the construction cost on dam is small which leads to evident low total investment. So the investment per electricity generation of Yangmingshan II Project is among the lowest of all the projects, and are much lower than that of the proposed project.

The Audit Team verified the data source and confirmed that there are essential distinctions with the project.

In summary, the validation team has confirmed that there are essential distinctions between the project activity and other similar wind power projects and the project activity is not common practice and is hence additional.

3.6 Monitoring

The project applies the approved baseline and monitoring methodology, ACM0002, Version 11. The application of the methodology has been justified in section 3.4.1 of this report. The data monitored and the monitoring interval and frequency is in compliance with the methodology. The monitoring method has been clearly described in section B.7.1 of the PDD and examined by the Audit Team to be appropriate. The project investor has issued the CDM Monitoring Manual and Training Plan /44/ for training the monitoring staff and implementing the monitoring procedure.

In Audit Team's opinion, the project owner is capable of implementing the project monitoring job.

3.6.1 Parameters determined ex-ante

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

The baseline grid emission factor is determined ex-ante, based on IPCC default value, the most recent information available at the time of PDD submission for validation /18//19/, published by Chinese DNA /17/, and is calculated as a combined margin, consisting of the weighted average of the OM and BM emission coefficients; The data source are listed clearly in Annex 3 of the PDD;

3.6.2 Parameters monitored ex-post

According to the ACM0002, Version 11, Total electricity produced by the project activity and Net electricity supplied by the project activity to the grid need to be monitored ex-post. The monitored parameters in the PDD are the electricity generated, exported to and imported from the grid, which are consistent with the methodology. The monitoring meter's accuracy level is not lower than 0.5s. The electricity supplied and imported will be continuously monitored and cross checked by the sales receipts. The data will be kept for 2 years after the end of the crediting period.

For determination of project emission, the Installed capacity and Area of the reservoir measured in the surface of the water when the reservoir is full, after the implementation of the project activity are to be monitored yearly according to ACM0002, Version 11. The description of monitoring these two parameters is consistent with the methodology ACM0002, Version 11.

In Audit Team's opinion, the monitored data are complete and are in line with the applied methodologies.

3.6.3 Management system and quality assurance

A CDM team will be set up by the project owner to carry out the monitoring implementation. As discussed above, all the monitoring staff will be trained against with the CDM Monitoring Manual and training plan /44/. The data collection follow has been clearly described in the PDD. The monitoring position and parameters are also indicated in the PDD. The meters accuracy level, monitoring frequency and monitoring erroneous handling procedures are discussed in the PDD. The metering equipment will be calibrated once a year. The accuracy level of the metering equipment will be not lower than 0.5s. All important indicators for controlling and reporting of project performance are incorporated in the monitoring plan.

In Audit Team's opinion, the project participants are able to implement the monitoring plan.

3.7 Sustainable Development

The DNA from the host country NDRC has issued the Letter of Approval /2/, which has been assessed by the Audit Team to be valid, and confirms the Project will assist China in achieving sustainable development.

By document reviewing of the PDR /10/ of the project, the Project will bring positive effects to the local people such as providing clean energy and increasing permanent job opportunity during operation and temporary job opportunities during construction phase. The Project can also stimulate the local economy conditions because the construction materials are purchased locally.

3.8 Environmental Impacts

According to "Outline Report of Land Expropriation and Immigration Resettlement" was carried out by Hunan Hydro & Power Design Institute in July 2007/41/, and the approval was received on 31 August 2007, there were 378.98 plantation to be expropriated and 117 immigrations. The compensation of plantation would be implemented in line with government documents "Notification on the Standard of Annual Production Value for Land Expropriation, Xiangzhengbanfa [2005]47/65/", the compensation of other land will be implemented in line with government documents "The Measurements on Implication of Land Administration in Hunan Province/66/". The Audit Team checked "Land Acquisition and Migration Resettlement Agreement of Huayuan County and Baojing County/56//57/", and confirmed that plantation compensation and immigration resettlement has been implemented according to government laws and regulations. During the period of on site visit, the Audit Team interviewed with the local stakeholders and confirmed that the plantation compensation and immigration resettlement was implemented smoothly and under supervision & administration of the government.

The EIA /11/ has been finalized by Hunan Province Water Resources and Hydro Power Survey & Design & Research Institution in October 2006 and approved by by Hunan Province Environment Protection Bureau on 8 December2006. The environment impacts have been described in Section D.1 of the PDD. According to the EIA, no significant environmental impacts are expected. During on site interview with local government officer /I/ and local

residents /II/, no complaints are received for the construction of the Project. The EIA has been performed in accordance with all relevant local regulations.

In Audit Team's opinion, the environmental impact assessment has been carried out correctly in accordance with procedures as required by China.

3.9 Local Stakeholder Consultation

The local stakeholder survey was carried out in September 2007/45/. Project proponents introduced to the Audit Team that at start of the stakeholder interview, the local stakeholders were informed by means of published notices /46/. Totally 150 questionnaires were distributed and 145 questionnaires were returned. The survey results and statistics analysis are presented in section E.2 of the PDD. The survey demonstrates that the local community are supportive to the project. The implementation of the project could benefit the local in aspects of ecological environment protection and job opportunities.

In Audit Team's opinion, the process for the survey is adequate and credible for local stakeholder consultation.

3.10 Comments by Parties, Stakeholders and NGOs

The PDD of "Hunan Zhugaotan Hydropower Project" was made publicly available on (<http://cdm.unfccc.int/Projects/Validation/DB/BWEZ5WQA0DPYAPSXY1BK2RPSXXRVNW/view.html>) from "22 Oct. 2008" to "20 Nov. 2008" in order to invite comments from public stakeholders.

No public comments were received during that period.

Appendix A

CDM VALIDATION PROTOCOL

Hunan Zhugaotan Hydropower Project in Hunan Province, China

REPORT NO. 01 997 91050448615

Table 1: Validation requirements					
(based on § 37 of the CDM Modalities and Procedures and on CDM Validation and Verification Manual, Annex 3 of EB44)					
Checklist question	Ref.	MoV ¹	Findings, comments, references, data sources	Draft conclusion	Final conclusion
1. Approval					
1.1 Have Letters of Approval have been provided from all involved Parties?	/1/ /2/	DR I	England stated in PDD is not an official Title of the Annex I Country, which is to be revised. The letter of approval from the DNA of Annex I Country is to be provided.	CAR 1	OK
1.2 Are all Parties, who issued the LoA, Parties to the Kyoto Protocol <u>and</u> is this stated in the LoA?	/1/	DR I	Ditto	CAR 1	OK
1.3 Is every LoA from the Parties involved issued by an organisation listed as Designated National Authority (DNA) on the UNFCCC web site?	/1/	DR I	Ditto	CAR 1	OK
1.4 Is the participation in the CDM project activity voluntary <u>and</u> is this stated in all LoAs?	/1/	DR I	Ditto	CAR 1	OK
1.5 Is the LoA unconditional with respect to 1.2 to 1.4?	/1/	DR I	Ditto	CAR 1	OK

¹ MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

1.6	Is the title of the CDM project activity as given in the PDD identical with the title given in all LoAs and Modalities of Communication?	/1/	DR I	Ditto	CAR-4	OK
1.7	If any of provided LoAs contains additional specification of the CDM project activity (PDD version number, validation report version number, amount of ER, etc.) are those specifications valid and consistent with other documents?	/1/	DR I	Ditto	CAR-4	OK
1.8	Does the project activity involve any public funding from Annex I Parties? <u>If yes</u> , has Annex I Party provided a written confirmation that the use of such funding does not lead to the diversion of the official development assistance.	/1/	DR I	The funding of the project is sourced from the owned fund and the loan of the domestic bank. Therefore, the project activity doesn't involve any public funding from Annex I Parties.		OK
2. Participation (VVM E.2)						
2.1	Are the Parties and project participants (PP) listed in the section A.3 of the PDD correctly <u>and</u> is this information consistent with the contact details provided in Annex 1 of the PDD?	/1/	DR	Please provide commercial registration license of "Huayuan ChunJiang Power Generation Co., Ltd." for checking relevant information of the project developer.	CAR-2	OK
2.2	Has every Party involved approved the participation of each corresponding PP, either by means of a LoA or by a separate written document?	/1/	DR I	See 1.1	CAR-4	OK
3. Project Design Document (VVM E.3)						
3.1	Is the PDD presented for validation based on the latest template available at the UNFCCC website?	/1/ /15/	DR	The latest PDD template is to be employed.	CAR-3	OK

3.2	Has the PDD been established in accordance with the CDM requirements for completing PDDs issued by the CDM EB?	/1/	DR	To be analysed step by step		OK
4. Project Description (VVM E.4)						
4.1	Does the PDD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	/1/ /17/ /24/	DR I	Please clarify the technical parameters and equipment models.	GL-1	OK
4.2	In the case of greenfield project activity, is the project design described sufficiently by means of specifications, drawings and manuals?	/1/ /17/	DR I	Yes		OK
4.3	Does the project activity reflects current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used technologies in the host country?	/1/ /24/	DR	The main equipments in the project are domestically produced and the project doesn't involve technology and installations from abroad.		OK
4.4	In cases where the project activity involves the alteration of an existing installation or process, does the PDD provide a clear description of the differences between the project and the pre-project scenario?	/1/	DR	Not applicable		OK
5. Baseline and Monitoring methodology						
5.1 General requirements						

5.1.1 Is the methodology used in the project activity approved by the CDM EB <u>and</u> is the selected version still valid?	/1/	DR	The methodology ACM0002 Version 07 applied by PDD (version 02) is not valid to the project activity yet. Please revise and update the PDD of the project activity, by applying the latest version of approved baseline and monitoring methodology ACM0002 which is applicable to the project activity, in terms of justification of the choice of the methodology, calculation of emission reductions, monitoring methodology and monitoring plan, and parameters and their descriptions, etc.	CAR-4	OK
5.2 Applicability of the selected methodology					
5.2.1 Does the project activity qualify under the criteria for small-scale CDM project activities set out in § 6 (c) of decision 17/CP.7 and Annex II of the Modalities and Procedures for the CDM?	/1/	DR	Not applicable		OK
5.2.1.1 If yes, does the PDD extensively demonstrates and confirms that the small-scale project activity is not a debundled component of a larger project?	/1/	DR	Not applicable		OK

5.2.2 Are all applicability conditions of the selected baseline and monitoring methodology and all tools involved satisfied by the project activity?	/1/ /6/ /13/ /14/	DR	<p>Yes.</p> <p>The project meets all the applicability criteria stated in the methodology:</p> <ul style="list-style-type: none"> - The project is an installation of a hydro power plant; - The project activity results in new reservoirs and the power density is greater than 4 W/m². - The project does not involve an on-site switch from fossil fuels to a renewable source; - The geographic and system boundaries for the relevant electricity grid, the CCPG, can be clearly identified and information on the characteristics of the grid is available. 		OK
5.2.3 Is the selection of the applied baseline and monitoring methodology justified?	/1/ /6/	DR	Yes		OK
5.2.4 Is the selected methodology correctly quoted in all related documents?	/1/ /6/	DR	Yes		OK
5.2.5 Does the PDD sufficiently describe all the GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions?	/1/ /6/	DR	Yes. In compliance with the Methodology.		OK
5.3 Project boundary					

5.3.1 Does the PDD correctly describe the project boundary?	/1/	DR	<p>The project is a new renewable energy source and does not involve on-site fuel switch from fossil fuels to a renewable source. The power plant and Central China Power Grid (CCPG) are defined as project system boundary.</p> <p>Some emission sources and gases, and the monitoring variables are observed not being included in the flow diagram of the project boundary in PDD. As per the latest version Guidelines for Completing the PDD, all emission sources and gases, and monitoring variables is to be presented in the flow diagram.</p>	CAR 5	OK
5.3.2 Does the PDD correctly indicate and describe the emission sources and sinks of GHG gases that are included in the project boundary?	/1/	DR	Definition of the sources in the Table 3 of the PDD is to be revised in order to be in conformity with the applied methodology.	CAR-6	OK
5.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs?	/1/	DR	Not applicable		OK
5.4 Baseline identification					
5.4.1 Has the procedure contained in the selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the PDD?	/1/ /6/	DR	Yes. The baseline scenario has been given in ACM0002.		OK
5.4.1.1 Is the identified baseline scenario plausible?	/1/ /6/	DR	Ditto		OK

5.4.1.2 Are all assumptions stated in a transparent and conservative manner?	/1/ /6/	DR	Ditto		OK
5.4.2 Does the selected methodology require the use of tools <u>and</u> does PDD reflects that correctly?	/1/ /6/ /13/ /14/	DR	The version is to be updated to the correct one for the tools <i>Tool for the demonstration and assessment of additionality</i> and <i>Tool to calculate the emission factor for an electricity system</i> in PDD.	CAR-7	OK
5.4.2.1 Were all the tools applied correctly?	/1/	DR	Ditto	CAR-7	
5.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered <u>and</u> have no reasonable alternative scenario been excluded?	/1/	DR	The baseline scenario has been given in ACM0002.		OK
5.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?	/1/	DR	The baseline scenario has been given in ACM0002.		OK
5.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the PDD and other reference sources?	/1/	DR	The baseline scenario has been given in ACM0002.		OK
5.4.6 Does the PDD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the PDD?	/1/	DR	The baseline scenario has been given in ACM0002.		OK
5.4.7 Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity?	/1/	DR	The baseline scenario has been given in ACM0002.		OK

5.5 Algorithm and/or formulae used to determine emission reductions

5.5.1 Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner?	/1/	DR	See 5.1.1	CAR-4	OK
5.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?	/1/	DR	The procedure of how Power density was calculated and option was selected in PDD with adequate justification and document evidenced is to be provided. Further explanation on how the surface area of reservoir at full level was derived is to be provided with document supported.	CAR-8	OK
5.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and calculations correct, applicable to the proposed CDM project activity and conservative?	/1/	DR	Detailed and transparent calculation of emission reduction and emission factor is to be provided for further verification. Please provide transparent calculation of the table 8 "Constitution of low-cost/must run resources in CCPG during year 2002~2006" in PDD. Please clarify how to confirm the new added installed capacity, which is used for BM calculation.	CAR-9 CAR-10 CL-2	OK
5.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the PDD for these data and parameters reasonable?	/1/	DR	Yes		OK
5.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the PDD?	/1/	DR	No major risks are to be identified.		OK

5.6 Leakage					
5.6.1 Has the leakage been identified and calculated according to the approved methodology?	/1/	DR	There are no leakages that need to be considered in applying this methodology.		OK
5.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?	/1/	DR	Ditto		OK
5.6.3 Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Ditto		OK
6. Methodology-related issues for afforestation or reforestation CDM project activities					
Add specific A/R requirements – if applicable!	/1/	DR	Not applicable for this CDM project activity		OK
7. Additionality					
7.1 Prior consideration of the CDM (VVM E.6.III.a)					

7.1.1 Is there documented evidence provided by the project participants on how and when the decision to proceed with the project activity was taken?	/1/ /17/	DR	<p>Evidences listed below were provided on key CDM incentive and actions:</p> <ul style="list-style-type: none"> - The PDR and its approval on 19th Mar. 2007; - Board meeting's minute on 6th Jul. 2007; - Service Agreement of CDM Project Development on 21st Aug. 2007. - Procurement Contract of Water-turbine Generator Units on 8th Sep. 2007. <p>A clear timeline of implementation of the project and timeline of events and actions which have been taken to achieve CDM registration is requested in the PDD, which should indicate awareness of the CDM by PP prior to the project activity start date, the starting date of the project activity and decisive factor of start of the project activity, and continuing and real actions were taken to secure CDM status for the project, with specific document evidenced and statement of references.</p>	CAR-11	OK
7.1.2 Is the starting date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms" <u>and</u> CDM VVM (§97)?	/1/	DR	The starting date of the project is defined as 8 th Sep. 2007. Please provide a description of how this start date has been determined, and a description of the evidence available to support this start date.	CAR-12	OK

7.1.3 Is the date stated in the provided evidence consistent with other available evidence (e.g. dates of construction, purchase orders for equipment)?	/1/	DR	Ditto	CAR 12	OK
7.1.4 If the project was not published and the starting date is on or after 2 nd August 2008, was it possible to receive from UNFCCC secretariat and/or DNA a written confirmation that PPs previously informed the above entities on commencement of the project activity and of their intention to seek CDM status?	/1/	DR	Not applicable		OK
7.1.5 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were previously aware of CDM?	/1/	DR	See 7.1.1	CAR 11	OK
7.1.6 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that CDM benefits have been a decisive factor in the decision to proceed with the project activity?	/1/	DR	Ditto	CAR 11	OK
7.1.7 Does the individual or body that took the decision to proceed with the project activity have/had the authority to do so?	/1/	DR	Yes		OK
7.1.8 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were taking continuing and real actions to secure CDM status for the project in parallel with its implementation?	/1/	DR	See 7.1.1	CAR 11	OK

7.1.7 In case there is a significant gap between the start date of the project activity and the commencement of validation, how was it possible for the project participant to commit funds to the project in advance of receiving a positive validation opinion?	/1/	DR	Not applicable		OK
7.2 Identification of alternatives					
7.2.1 Does the PDD identify and list credible alternatives to the CDM project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?	/1/	DR	The baseline scenario has been given in ACM0002.		OK
7.2.2 Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a CDM project activity?	/1/	DR	Yes		OK
7.2.3 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity?	/1/	DR	Not necessary. The baseline scenario has been given in ACM0002.		OK
7.2.4 Is the exclusion of the alternatives for legal reasons justified?	/1/	DR	Yes. Alternative of "Construct a fossil fuel-fired power plant" is eliminated for legal reason.		OK
7.3 Investment Analysis					

7.3.1 Are all sources of revenues (including savings) have been considered in the PDD and all calculations?	/1/ /17/	DR I	<p>The IRR value in the PDD is inconsistent with that of the IRR spreadsheet.</p> <p>References to the Sensitivity Analysis (Sub-step 2d of B.5. of PDD) in PDD are not public assessable, which is to be provided and corrected.</p>	CAR-13 CAR-14	OK
7.3.2 Is the type of investment analysis selected correctly in the PDD?	/1/ /17/	DR I	Yes. Benchmark analysis is selected in the PDD.		OK
7.3.3 Is the selected financial indicator chosen and applied correctly?	/1/ /17/	DR I	Yes.		OK
7.3.4 Is the guidance on IRR calculation and assessment correctly applied?	/1/ /17/	DR I	It is to be clarified and evidenced further how to determine the tariff, the electricity generation, the total investment, Residual rate of fixed assets value, and the annual O&M Cost stated in Table 4 "Main assumptions for investment analysis and calculation".	GL-3	OK
7.3.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially?	/1/ /17/	DR I	All values in the PDD are sourced from the PDR approved by the local government. The period between the PDR date and investment decision was reasonably short and PDR values did not change materially.		OK
7.3.6 Are all the values consistent between FSR and PDD <u>and</u> are inconsistencies properly justified?	/1/ /17/	DR I	Ditto		OK
7.3.7 Were all the values from FSR applicable and valid at the time of the investment decision?	/1/ /17/	DR I	Ditto		OK

7.3.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have lead to a change in the benchmark?	/1/ /17/	DR I	Not applicable		OK
7.3.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?	/1/ /17/	DR I	Operation hour is requested to be included as sensitive factor in the sensitivity analysis, and the figure showing outcome of sensitivity analysis is to be provided.	CAR 15	
7.4 Barrier analysis					
7.4.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis?	/1/	DR	Not applicable		OK
7.4.2 Do the listed barriers exist <u>and</u> is their existence substantiated?	/1/	DR	Not applicable		OK
7.4.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the possible alternatives, in particular the implementation of the identified baseline scenario?	/1/	DR	Not applicable		OK
7.5 Common practice analysis					
7.5.1 If the PPs claim in the PDD that CDM project activity is the "first of its kind", is it justified?	/1/	DR	Not applicable		OK

7.5.2 Are the geographical boundaries of the project activity identified correctly?	/1/	DR	Please further clarify in PDD on how the boundary of common practice analysis is defined, and why similar projects completed after 2002 were selected for common practice analysis, with documented evidence provided.	GL4	OK
7.5.3 Does the PDD provide an explanation why this region was selected and deemed more appropriate <u>and</u> is this explanation traceable and reliable?	/1/	DR	Ditto	GL4	OK
7.5.4 Are there similar operational project activities, other than CDM activities, “widely observed and commonly carried out” in the defined region?	/1/	DR	Please further clarify in PDD on why the projects within the selected geographical boundary and timescale with the installed capacity of 25MW to 50MW can be considered as “similar activities” to the proposed project activity.	GL5	OK
7.5.5 In case there are similar commercially operated project activities, other than CDM activities, already “widely observed and commonly carried out” in the defined region, are there essential distinctions between the CDM project activity and the other similar activities?	/1/	DR	Ditto	GL5	OK
8. Monitoring plan					
8.1 Are all parameters required by the selected approved methodology or tool identified <u>and</u> listed in the PDD?	/1/	DR	Yes. EGy, Cap_{PJ} and A_{PJ} will be monitored.		OK
8.2 Is the measurement method clearly stated for each value to be monitored and deemed appropriate?	/1/	DR	Yes. In compliance with the Methodology.		OK

8.3	Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools?	/1/	DR	See 5.5.3 and 5.5.4	CAR-9 CAR-10	OK
8.4	Is the measurement equipment for each parameter described and deemed appropriate?	/1/	DR	Yes. In compliance with the Methodology.		OK
8.5	Is the measurement accuracy addressed and deemed appropriate?	/1/	DR	Yes, accuracy of the meters will meet the national standard		OK
8.6	Are procedures in place on how to deal with erroneous measurements <u>and</u> are the corrective actions identified?	/1/	DR	The procedures on how to deal with erroneous measurements are to be clarified.	GL-6	OK
8.7	Is the frequency of measurement identified and deemed appropriate?	/1/	DR	The applied methodology ACM0002 required parameter A_{PJ} to be monitored in a frequency of yearly, which is not stated in PDD. Please modify in PDD accordingly.	CAR-16	OK
8.8	Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	See 8.6 and 8.7 The difference in the crediting period between the GSP PDD and the revised PDD. The starting date of crediting period is not realistic and shall be updated.	GL-6 CAR-16 CAR-17 CAR-18	OK
8.9	Are the sampling, measurement methods and procedures defined?	/1/	DR	Yes. In compliance with the Methodology.		OK
8.10	Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	Yes. In compliance with the Methodology.		OK

8.11 Are the equipment calibration intervals identified and justified?	/1/	DR	Yes. The equipment calibration intervals is identified and justified in PDD.		OK
8.12 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Yes		OK
8.13 Are the monitoring arrangements described in the monitoring plan feasible within the project design?	/1/	DR	Yes		OK
8.14 Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified?	/1/	DR	See 8.6 and 8.7	CL-6 CAR-16	OK
8.15 Do the PPs make provisions for personnel training needs?	/1/ /44/	DR	Yes		OK
8.16 Is the authority and responsibility of overall project management clearly described?	/1/	DR	Yes		OK
8.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Yes		OK
8.18 Are procedures identified for review of reported results/data?	/1/	DR	Yes		OK
8.19 Is the data archiving period for this project activity stated in the PDD and appropriate?	/1/	DR	Yes		OK

8.2 Monitoring of the leakage

8.2.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	Not applicable		OK
8.2.2 Is the choice of project leakage indicators made according to selected methodology in a reasonable and conservative manner?	/1/	DR	Not applicable		OK
8.2.3 Is the measurement method clearly stated and deemed appropriate for each leakage value?	/1/	DR	Not applicable		OK
9. Sustainable development					
9.1 Does the LoA from the Host country DNA contain the confirmation that the proposed CDM project activity contributes to the sustainable development of the host Party?	/1/	DR	Yes		OK
9.2 If PDD indicates any additional environmental benefits of the project, other than GHG emission reductions, were those benefits properly substantiated?	/1/ /17/ /18/	DR	Yes. Those benefits properly substantiated in FSR and EIA.		OK
10. Stakeholders' consultation and comments					
10.1 Were the stakeholders identified in appropriate and complete manner?	/1/	DR	<p>1) Process of how the PP identified stakeholders, described the project and received comments in open and transparent manner is to be provided in PDD, with document supported.</p> <p>2) DOE received 145 pieces of questionnaires, but only 30 pieces was mentioned in PDD. Please revise and update the PDD.</p> <p>3) The statistics of the stakeholders is requested to be provided in PDD for clear understanding of the adequacy of the stakeholder consultation.</p>	CAR-19	OK

10.2 Are the identified stakeholders plausible?	/1/	DR	Ditto	CAR 19	OK
10.3 Does PDD describe the means being used to invite local stakeholder's comments?	/1/	DR	Ditto	CAR 19	OK
10.4 Were those means appropriate?	/1/	DR	Ditto	CAR 19	OK
10.5 Was the project presented to the stakeholders in unbiased manner?	/1/	DR	Ditto	CAR 19	OK
10.6 If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	Ditto	CAR 19	OK
10.7 Is a summary of the stakeholder comments provided in the PDD?	/1/ /45/	DR I	Ditto	CAR 19	OK
10.8 Has due account of any stakeholder comments been taken by PPs and reflected in the PDD?	/1/	DR	Ditto	CAR 19	OK
11. Environmental impacts					
11.1 Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the PDD?	/1/ /18/	DR	Yes		OK
11.2 Is an environmental impact assessment (EIA) required for the CDM project activity?	/1/ /18/	DR I	Yes		OK
11.3 In case an EIA is required, has the EIA has been approved by local authorities and is the outcome accurately reflected in the PDD?	/1/ /18/	DR I	Yes		OK
11.4 Does the PDD include a brief description of the environmental effects of the project, including transboundary?	/1/ /18/	DR I	Specific environmental effects in terms of land acquisition and resettlement are to be included in the PDD, with documentation evidence supported.	CAR 20	OK

11.5 Are those effects properly addressed in the design of the project activity?	/1/ /18/	DR I	Ditto	GAR-20	OK
11.6 Does the project comply with environmental legislation in the host country?	/1/ /18/	DR I	Yes		OK

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

No.	CAR/CL	Observation (CAR/CL)	Reference (in Table 1)	Summary of project owner response	Validation team conclusion
1.	CAR 1	England stated in PDD is not an official Title of the Annex I Country, which is to be revised. The letter of approval from the DNA of Annex I Country is to be provided.	1.1 - 1.7 2.2	The Letter of Approval from the DNA of Annex I Country has been submitted to DOE.	The LoA from the DNA of Annex I Country has been verified by the Audit Team. This CAR is closed.
2.	CAR 2	Please provide commercial registration license of “Huayuan ChunJiang Power Generation Co., Ltd.” for checking relevant information of the project developer.	2.1	The commercial registration license of “Huayuan ChunJiang Power Generation Co., Ltd” has been submitted to DOE.	The Audit Team verified with the commercial registration license. This CAR is closed.
3.	CAR 3	The latest PDD template is to be employed.	3.1	The latest PDD template has been employed in the revised PDD.	The Audit Team verified with “The Project Design Document Form (CDM PDD) – Version 03” has been. This CAR is closed.
4.	CAR 4	The methodology ACM0002 Version 07 applied by PDD (version 02) is not valid to the project activity yet. Please revise and update the PDD of the project activity, by applying the latest version of approved baseline and monitoring methodology ACM0002 which is applicable to the project activity, in terms of justification of the choice of the methodology, calculation of emission reductions, monitoring methodology and monitoring plan, and parameters and their descriptions, etc.	5.1 5.5.1	The PDD has been revised according to methodology ACM0002 (Ver. 11).	ACM0002 (Ver. 11) has been applied correctly. This CAR is closed.
5.	CAR 5	Some emission sources and gases, and the monitoring variables are observed not being included in the flow diagram of the project	5.3.1	The flow diagram of the project boundary in PDD has been revised according to the latest version	“Guidelines for completing the project design document (CDM-PDD) and the

		boundary in PDD. As per the latest version Guidelines for Completing the PDD, all emission sources and gases, and monitoring variables is to be presented in the flow diagram.		guidelines for completing the PDD.	proposed new baseline and monitoring methodologies (CDM-NM) version 07" has been applied correctly. This CAR is closed.
6.	CAR 6	Definition of the sources in the Table 3 of the PDD is to be revised in order to be in conformity with the applied methodology.	5.3.2	The emission sources of baseline and project activity in the Table 3 of the PDD has been revised in order to be in conformity with the methodology ACM 0002 (Version 11).	The PDD has been revised as per ACM 0002 (Version 11) This CAR is closed.
7.	CAR 7	The version is to be updated to the correct one for the tools <i>Tool for the demonstration and assessment of additionality</i> and <i>Tool to calculate the emission factor for an electricity system</i> in PDD.	5.4.2	The version of the <i>Tool for the demonstration and assessment of additionality</i> has been revised to 05.2. The version of the <i>Tool to calculate the emission factor for an electricity system</i> has been revised to 02.	The relevant <i>Tool</i> has been updated correctly. This CAR is closed.
8.	CAR 8	The procedure of how Power density was calculated and option was selected in PDD with adequate justification and document evidenced is to be provided. Further explanation on how the surface area of reservoir at full level was derived is to be provided with document supported.	5.5.2	The surface area of reservoir at full level of 3 km ² is from the PDR. The geographical contour line of the reservoir is surveyed firstly, then the reservoir surface area is calculated by the data. The survey and calculation process are implemented by Western Hunan Autonomous Prefecture Hydro & Power Design Institute, it is an B-Class qualified hydropower designation institute with history of 40 years, it is one of the most outstanding design institute in Hunan	The Audit Team verified with the PDR. This CAR is closed.

				Province, it has been accomplished the design of more than 200 projects. Therefore the value of surface area of reservoir at full level in the PDD is valid.	
9.	CAR 9	Detailed and transparent calculation of emission reduction and emission factor is to be provided for further verification.	5.5.3 8.3	The revised calculation of percentage of low-cost/must run resources in CCPG has been submitted to DOE. The EF calculation has been submitted to DOE. The ER presentation has been revised in B.6.3.	The Emission Factor and Emission Reduction have been calculated correctly in the updated PDD and ER spreadsheet. This CAR is closed.
10.	CAR 10	Please provide transparent calculation of the table 8 "Constitution of low-cost/must run resources in CCPG during year 2002~2006" in PDD.	5.5.3 8.3	See CAR 9.	The OM has been calculated correctly in the updated PDD and ER spreadsheet. This CAR is closed.
11.	CAR 11	A clear timeline of implementation of the project and timeline of events and actions which have been taken to achieve CDM registration is requested in the PDD, which should indicate awareness of the CDM by PP prior to the project activity start date, the starting date of the project activity and decisive factor of start of the project activity, and continuing and real actions were taken to secure CDM status for the project, with specific document evidenced and statement of references.	7.1.1 7.1.5 7.1.6 7.1.8	The updated timeline of the project is included in B.5 of the revised PDD.	The timeline of the project is described in the PDD correctly. This CAR is closed.
12.	CAR 12	The starting date of the project is defined as 8 th Sep. 2007. Please provide a description of how this start date has been determined, and a description of the evidence available to support this start date.	7.1.2 7.1.3	The starting date of the project is defined as the date of the signing the Procurement Contract of Water-turbine Generator Units, it is the earliest starting date of the activity.	The starting date was identified correctly as per the <i>Glossary of CDM terms</i> . This CAR is closed.

				It can be proved by the Procurement Contract of Water-turbine Generator Units.	
13.	CAR 13	The IRR value in the PDD is inconsistent with that of the IRR spreadsheet.	7.3.1	The IRR value in the PDD has been corrected.	The IIR value in the GSP PDD was wrong, which has been corrected in the updated PDD. This CAR is closed.
14.	CAR 14	References to the Sensitivity Analysis (Sub-step 2d of B.5. of PDD) in PDD are not public assessable, which is to be provided and corrected.	7.3.1	Evidences of references to the Sensitivity Analysis (Sub-step 2d of B.5. of PDD) in PDD have been submitted to DOE.	All references has been confirmed by the Audit Team. This CAR is closed.
15.	CAR 15	Operation hour is requested to be included as sensitive factor in the sensitivity analysis, and the figure showing outcome of sensitivity analysis is to be provided.	7.3.9	Operation hour is included as sensitive factor in the sensitivity analysis of the revised PDD.	Operation hour has been added as a sensitivity factor in the updated PDD. This CAR is closed.
16.	CAR 16	The applied methodology ACM0002 required parameter A_{PJ} to be monitored in a frequency of yearly, which is not stated in PDD. Please modify in PDD accordingly.	8.7 8.8 8.14	The monitoring frequency of A_{PJ} is revised in the PDD.	The PDD has been updated correctly. This CAR is closed.
17.	CAR 17	The difference in the crediting period between the GSP PDD and the revised PDD.	8.8	The participation parties changed voluntarily the crediting period from a renewable crediting period (3*7 years) to a fixed crediting period (10 years).	OK. This CAR is closed.
18.	CAR 18	The starting date of crediting period is not realistic and shall be updated.	8.8	The starting date of crediting period has updated to 01 June 2011.	The starting date of crediting period has been updated considering completeness check schedule and then 4 weeks for review period before registration. This CAR is closed.

19.	CAR 19	<p>1) Process of how the PP identified stakeholders, described the project and received comments in open and transparent manner is to be provided in PDD, with document supported.</p> <p>2) DOE received 145 pieces of questionnaires, but only 30 pieces was mentioned in PDD. Please revise and update the PDD.</p> <p>3) The statistics of the stakeholders is requested to be provided in PDD for clear understanding of the adequacy of the stakeholder consultation.</p>	10	<p>1) In order to survey the local resident's opinions about the construction, the project owner put up bulletins all around the project site, the main contents are as follows: "Zhugaotan Hydropower Station is located on the downstream of Youshui River in Huayuan County, the proposed installed capacity is 33MW, and the project will start construction around Oct. 2007".</p> <p>Then they carried out questionnaire in September 2007. 150 survey papers have been distributed to local people and 145 papers received. Of the 145 respondents, 64 persons are over senior middle school, 70 persons are of junior middle school, 11 persons are of elementary school; 35 aged people, 79 middle age, 31 youth; 19 officials, 122 farmers and 4 other occupation.</p> <p>The evidence documents has been submitted to DOE.</p> <p>2) The description of questionnaires has been revised in the PDD.</p> <p>3) The statistics of the stakeholders has been provided in the revised PDD.</p>	<p>The Audit Team checked the questionnaires and interviewed the stakeholders during the period of on site visit.</p> <p>This CAR is closed.</p>
20.	CAR 20	Specific environmental effects in terms of land acquisition and resettlement are to be included in the PDD, with documentation evidence supported.	11.4 11.5	Specific environmental effects in terms of land acquisition and resettlement have been included in D.1 of the revised PDD.	The Audit Team checked "Outline Report of Land Expropriation and Immigration Resettlement"

				<p>Land acquisition and resettlement plan will be implemented according to the “Outline Report of Land Expropriation and Immigration Resettlement”.</p> <p>The “Outline Report of Land Expropriation and Immigration Resettlement” was carried out by Hunan Hydro & Power Design Institute in July 2007, and the approval was received on 31 Aug. 2007. According to the report, there were 378.98 plantation to be expropriated and 117 immigrations. The documentation evidence has been submitted to DOE.</p>	<p>and the approval. The compensation of plantation will be implemented in line with government documents “Notification on the Standard of Annual Production Value for Land Expropriation, Xiangzhengbanfa [2005] 47”, the compensation of other land will be implemented in line with government documents “The Measurements on Implication of Land Administration in Hunan Province”. The Audit Team checked “Land Acquisition and Migration Resettlement Agreement of Huayuan County and Baojing County”, and confirmed that compensation of plantation and immigration resettlement has been implemented according to government laws and regulations. During the period of on site visit, the Audit Team interviewed with the local stakeholders and confirmed that the plantation compensation and immigration resettlement was implemented smoothly and under supervision & administration of the government.</p>
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					This CAR is closed.
21.	CL 1	Please clarify the technical parameters and equipment models.	4.1	The model of generators in the former PDD is incorrect for a clerical error, it has been revised to in line with the information in the "Procurement Contract of Water-turbine Generator Units".	The Audit Team verified the "Procurement Contract of Water-turbine Generator Units", and confirmed the PDD has been revised correctly. This CL is closed.
22.	CL 2	Please clarify how to confirm the new added installed capacity, which is used for BM calculation.	5.5.3	As per the guidance of EB to the clarification request 'Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for the new added installed capacity should take more than 20% of the existing installed capacity. The PDD and ER spreadsheet have been corrected.	The Audit Team verified through China Electric Power Yearbook 2005 to 2007. The new added capacity from 2004 to 2006 took more than 20% of the existing installed capacity. This CL is closed.
23.	CL 3	It is to be clarified and evidenced further how to determine the tariff, the electricity generation, the total investment, Residual rate of fixed assets value, and the annual O&M Cost stated in Table 4 "Main assumptions for investment analysis and calculation	7.3.4	1) According to the electricity tariff determination regulation issued by the Hunan Price Bureau on 28 August 2005, that tariff of hydro-power within Hunan is regulated as 0.316 RMB/kWh (VAT Included). Moreover, according to the grid connection agreement, the tariff of the project is also 0.316 RMB/kWh (VAT Included). Therefore the electricity tariff of 0.342 in the PDD is conservative. According to Equipment Purchase Contract, Construction Contract,	The Audit Team verified all relevant evidence provided by the PP and confirmed that the values are reasonable and conservative. This CL is closed.

				<p>Construction Contract of Grid Connection, Installation Contract and Land Acquisition and Migration Resettlement Agreement, the realised expense reached 237,547,500 RMB , which is higher than the investment of the PDR. Therefore, the investment in the PDR is reasonable and conservative.</p> <p>The annual O&M cost is composed by five parts:</p> <p>1) Repairs Cost</p> <p>Repairs costs equal to “fixed assets investment value” multiplies “repair rate”.</p> <p>According to “Interim Regulation of Financial Assessment on Hydropower Project”, the repair rate is 1%.</p> <p>2) Salary, welfare, insurance and housing fund</p> <p>The Salary, welfare, insurance and housing fund equal to staff salary multiplies total welfare, insurance and housing fund rate.</p> <p>The staff salary of 14,000 RMB yuan per year is from the PDR, it is decided based on the price level of 2008, and the average annual salary of power industry in Hunan is 28,899 RMB yuan, the data was</p>	
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				<p>published by State Statistical Bureau in 2009. Thus the value in IRR analysis is much lower and more conservative than present average salary level of power industry.</p> <p>The evidence for average salary of power industry has been submitted to DOE.</p> <p>The total welfare, insurance and housing fund rate of 40% is from the PDR, the value is 42% according to the government regulation. Therefore the value in IRR analysis is lower and more conservative than the actual total welfare, insurance and housing fund rate. The detailed information of total welfare, insurance and housing fund rate is as follow:</p> <p>The Pension Insurance: 20%, The Decision on the Optimization of Pension In-surance System (Guofa [2005] No. 38), State Council, Dec. 2005.</p> <p>The Medical Insurance: 8%, The Decision on the Establishment of Labour Medical Insurance System (Guofa [1998] No. 44), State Council, Dec. 1998.</p> <p>The Housing Fund: 8.5%, Guiding Opinion on the Specific Problems of Housing Fund Management, Construction Ministry of P.R.C.,</p>	
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				<p>Finance Ministry of P.R.C. and The People's Bank of China, Jan. 2005. The Unemployment Insurance: 3%, The Management Method on the Implement of Unemployment Insurance Regulation, Hunan provincial government's, Mar. 2001. Childbirth insurance: 1%, Notice on Publication of the Method of Labour Childbirth Insurance, Labour Ministry, Jan. 1995 Injury insurance: 1%, Notice on Problem of Injury Insurance Rate, Provincial Department of Labour and Social Security, Oct. 2003.</p> <p>3) Reservoir region maintenance cost The reservoir region maintenance cost equal to net electricity generation multiplies the reservoir region maintenance fee. The reservoir region maintenance fee of 0.001 yuan/kWh is from the PDR, and according to the "Notice on Abstracting Reservoir Region Maintenance Fund from Generation Cost (Diancaizi No. 56)", the value is 0.001 yuan/kWh.</p> <p>4) water resources fee The water resources fee of 0.001 yuan/kWh is from the PDR, and according to the "Notice on the</p>	
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				<p>Verification of Water Resource fee (Xiangjiafei (2003) No. 128)", the water resources fee is regulated as 0.001 yuan/kWh.</p> <p>5) Materials costs According to "Interim Regulation of Financial Assessment on Hydropower Project", the materials costs of hydro power project below 250 MW is 5 yuan/kW.</p> <p>5) Other costs. According to "Interim Regulation of Financial Assessment on Hydropower Project", other cost of hydropower project over 12MW is 12yuan/KW.</p>	
24.	CL 4	Please further clarify in PDD on how the boundary of common practice analysis is defined, and why similar projects completed after 2002 were selected for common practice analysis, with documented evidence provided.	7.5.2 7.5.3	<p>Reform of the power sector in China took place since 2002. As a result, the investment environment of hydropower plants in China before and after 2002 is very different. Before 2002, according to "Note on Implement methods of Various Electricity Tariff (Document No. 101SDCZ[1987])", "the electricity tariff of each power plant should be determined according to the principle of full-cost recovery and reasonable benefit". With such favorable policies provided by the government, the developer of hydropower plants didn't face any investment risk. In Feb. 2002, the</p>	<p>On 10th February 2002, the State Council published the notice on Issuing Electric Power Sector Reform Program which has largely affected the investment scheme for hydropower projects. Especially small-scale private investors were affected, as with the reform some financial supports by the government were cancelled, and instead financial competitions were introduced for cost saving, while state-owned investors still can keep enjoying some</p>

				<p>favorable policies for electricity tariff were cancelled due to "Notice on Issuing Electric Power Sector Reform Program" issued by State Council, the main aim is to break the monopolization and optimize resource collocation, which means an open and competitive regional electricity market, however, without governmental funds, project of high investment cost and bad financial index are of low financial attractive. Since the starting date of the project is later than 2002, project activities similar to the project should be those which are constructed later than 2002.</p>	<p>financial benefits provided by the government. These were confirmed with relevant information provided by the project participant. As such, investment circumstances for hydropower projects were fundamentally changed after the reform, it is considered appropriate to include only hydropower projects of which construction started in and after 2002.</p> <p>This CL is closed.</p>
25.	CL 5	<p>Please further clarify in PDD on why the projects within the selected geographical boundary and timescale with the installed capacity of 25MW to 50MW can be considered as "similar activities" to the proposed project activity.</p>	<p>7.5.4 7.5.5</p>	<p>According to Classification & Design Safety Standard of Hydropower Project (DL5158-2003), hydropower plants with capacity below 50 MW are classified as small size projects, and common analysis is not applicable to projects below 15MW. Thus for the common practice analysis in the PDD, the similar scale for other similar activities is defined between 15 ~ 50 MW of the installed capacity of the project. According the analysis above, the former definition of 25-50MW for common practice is not reasonable. And the revised common practice is adopted in the revised PDD.</p> <p>Further clarify of "similar activities" has been described in the revised</p>	<p>The hydropower project with the installed capacity below 50MW is defined as small scale hydropower project in terms of the <Yearbook of China Water power 2005>. According to UNFCCC, the project with installed capacity below 15MW is defined as the small-scale project. Considering "Tool for the demonstration and assessment of additionality", If necessary data/information of some similar projects are not accessible for PPs to conduct this analysis, such projects can be excluded from this analysis"</p>

				PDD.	(Additionality tool version 5.2 /13/). In Investigation Report on Hydropower Plants with Installed Capacity of over 15MW Completed after 2002 in Hunan Province, there are no any hydropower projects with installed capacity below 15MW, thus projects with installed capacity lower than 15MW were not considered in the common practice. The validation team thus confirms it is reasonable to select similar small-scale hydropower projects with installed capacity within the range of 15MW~50MW. This CL is closed.
26.	CL 6	The procedures on how to deal with erroneous measurements are to be clarified.	8.6 8.8 8.14	When the main meters are in error, the back up meters would take the function of the main meters. The readings would be cross-checked with the receipts of the gird.	The Audit Team checked the line diagram and confirmed it. This CL is closed.

Table 3: List of forward action requests (FARs)			
FAR number	Reference	Summary of project owner response	Validation team conclusion
FAR01			
FAR02			
...			

Appendix B

CERTIFICATES OF COMPETENCE

Qualification

A, Qingxing (Sequoia) /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☐ yes
(Zus-tzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

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

Add. qualification:
(zus. Qualifikation)

First Appointment: 2008-05-19
(Erstberufung)

Valid to: 2011-05-18
(Gültig bis)

Remarks: CDM 01 valid for TA1.2 – Renewable Energies

Languages: Chinese
English

Experience Exchange

Date

Location

Remarks

Accredita

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(n-chste
Beurteilung)

Remarks:

History of scope allocation

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

History

Created:	2008-05-19 17:35:31	Sequoia A/Shg/Chn/TUV
Modified:	2011-01-25 22:52:07 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-12-19 14:23:04 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-12-19 14:21:19 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-12-19 14:19:54 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-12-19 14:19:18 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-09-13 16:07:36 ZE9	Manfred Brinkmann/Jpn/TUV

Qualification

Deng, Cuiping /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No. :
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zus-tzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 05 – Chemical industry
CDM 11 – Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride
CDM 12 – Solvents use

Add. qualification:
(zus. Qualifikation)

First Appointment: 2010-10-09
(Erstberufung)

Valid to: 2013-10-08
(Gültig bis)

Remarks: Appointed as Technical Reviewer for
TA 1.2
TA 5.1, 11.1, 12.1

Languages:

Experience Exchange

Date

Location

Remarks

Accredita

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(n-chste
Beurteilung)

Remarks:

History of scope allocation

Date: 2010-11-11
Change: EAC CDM, CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: Appointed as Technical Reviewer for
TA 1.2
TA 5.1, 11.1, 12.1

History

Created:	2010-08-13 11:19:43	Cuiping Deng/Bj/Chn/TUV
Modified:	2010-11-11 12:00:44 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-11-11 11:59:20 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-11-11 11:58:18 ZE9	Manfred Brinkmann/Jpn/TUV
	2010-08-13 11:21:37	Cuiping Deng/Bj/Chn/TUV