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| Project Title | China Niaoerchao Hydropower Project |
| Project Reference | 1782.v1 |
| Report Date | 09 December 2010 |
| Client Name | Carbon Asset Management Sweden AB (Tricorona) |
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|------------------------|--|
| Version Control | Date |
| Version 01 | 19 April 2010 (Draft Validation Report) |
| Version 02 | 14 May 2010 (Final Validation Report) |
| Version 02.1 | 09 December 2010 (Final Validation Report updated upon receipt of Request for registration incompleteness message from UNFCCC secretariat) |

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|---|--|-------------------|--------------------|
| Project Title: China Niaoerchao Hydropower Project | | | |
| Project reference: | 1782.v1 | | |
| Project Location | Dongtingxi River, a branch of Yuanjiang River located in Yuanling County, Huaihua City, Hunan Province | | |
| Country: | People's Republic of China | | |
| Project Parties | People's Republic of China Sweden | | |
| Project Participants | Hunan Guohong Investment Co., Ltd Carbon Asset Management Sweden AB | | |
| Methodology used | ACM0002-Consolidated baseline methodology for grid-connected electricity generation from renewable sources | | |
| Methodology version number | v11 | | |
| Estimated Annual Average Emission Reductions | 61,687 tCO ₂ e | | |
| Crediting Period Dates | 01/01/2011-31/12/2020 | | |
| GSP PDD Version | Date: 03 February 2010 | Final PDD Version | Date: 05 May 2010 |
| | Version Number: 04 | | Version Number: 06 |
| | Start date of GSP: 11 March 2010 | | |

Summary:

ERM CVS under contractual agreement with Carbon Asset Management Sweden AB has performed a validation of the China Niaoerchao Hydropower Project on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, requirements specified in the validation and verification manual (VVM) and the subsequent and applicable decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) site assessment and follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Based on the independent validation work performed it is the opinion of ERM CVS that the 'China Niaoerchao Hydropower Project' as described in the PDD version 06 of dated, 05 May 2010, meets all stated criteria of the CDM, correctly applies the methodology 'ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources --- Version 11', and is expected to result in real, measurable and long term emission reductions, and the DNA of the host Party has confirmed that the project assists in meeting sustainable development criteria.

ERM CVS therefore requests that the CDM Executive Board registers the project as a CDM project activity.

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|----------------------------|-----------------------------------|--|--|
| Client: | Carbon Asset Management Sweden AB | | |
| Client Representative: | Niels von Zweigbergk | | |
| | | | |
| Report approved by: | | Signature  | |
| Name: Melanie Eddis | | | |
| Date: 09 December 2010 | | | |

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Abbreviations

| | |
|-------------------|--|
| A/R | Afforestation / Reforestation |
| BM | Build Margin |
| CAR | Corrective Action Request |
| CCPG | Central China Power Grid |
| CDM | Clean Development Mechanism |
| CDM-VVM | Clean Development Mechanism Validation and Verification Manual |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction |
| CH ₄ | Methane |
| CL | Clarification Request |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| COP | Conference of Parties |
| DNA | Designated National Authority |
| DOE | Designated Operational Entity |
| DRC | Development and Reform Committee (local level - China) |
| EIF | Environmental Impact assessment Form |
| GHG | Greenhouse Gas |
| GSP | Global Stakeholder Period |
| FAR | Forward Action Request |
| FSR | Feasibility Study Report |
| IPCC | Intergovernmental Panel on Climate Change |
| IRR | Internal Rate of Return |
| LoA | Letter of Approval |
| MOP | Meeting of Parties |
| MP | Monitoring Plan |
| NDRC | National Development and Reform Committee (National level - China) |
| ODA | Official Development Assistance |
| OM | Operating Margin |
| PDD | Project Design Document |
| PP | Project Participant |
| PDR | Preliminary Design Report |
| SPDR | Supplementary Preliminary Design Report |
| UNFCCC | United Nations Framework Convention on Climate Change |

1. Introduction

1.1. Validation Objective

The purpose of a validation is provide a thorough independent third party assessment of proposed CDM project activities to ensure that the proposed CDM project activity meets all the identified and applicable criteria for registration of projects under the Clean Development Mechanism. In particular, the project's baseline, additionality demonstration, applicability to an approved CDM methodology, monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reductions (CERs). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board. The validation will result in a conclusion as to whether the project should be submitted to registration. The final decision on whether to register the project rests with Executive Board and the Parties involved.

1.2. Scope

The validation scope is defined as an independent and objective review of the Project Design Document (PDD) and associated documentation. The PDD and associated documentation is reviewed against the criteria and requirements stated in the CDM Validation and Verification Manual (CDM-VVM) (EB 44, updated at EB 51) and Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, as well as relevant decisions by the CDM Executive Board. The validation scope also included an assessment of completeness and accuracy of documentation, evaluation of evidences, information and assumptions made in the PDD and supporting documentation.

1.3. CDM Project Description

The China Niaoerchao Hydropower Project (hereinafter referred to as "the project activity") is a newly built storage type hydropower plant with seasonal pondage reservoir. Two dams are constructed for the project activity: one is Niaoerchao dam, and second is Liujingtian coffer dam (small dam with 12 m in height). The Liujingtian coffer dam is used to divert the water resources through a tunnel to the Niaoerchao reservoir. The distance between these two dams is 8.6 km. The project is located in Qijiaping Town, Yuanling County, Huaihua City, Hunan Province. The layout and location of the project was validated during the site visit.

The total installed capacity of the project is 20 MW and the annual utilisation hours are 3,826 hrs. The corresponding load factor is calculated as 46.68% (3,826 h/8,760 h). The flooded area at the full reservoir level of Niaoerchao dam is 1.66 km², and the flooded area at the full reservoir level of Liujingtian coffer dam is 0.143 km². The total flooded area at the full reservoir level of the project activity is therefore 1.803 km². The power density of the project activity is calculated as 11.09 W/m². This information has been validated against the approved third party Supplementary Preliminary Design Report (SPDR) [Doc 1] as well as during the site visit.

Annual expected electricity generation from the project activity is 76,520 MWh, whereas, annual net electricity supply to the grid is expected to be 72,331 MWh. This information has been validated against the approved third party SPDR [Doc 1]. The difference between the total and net electricity supplied to the grid calculates to 5.47%, and it includes internal consumption of the plant and line losses equivalent to 363 MWh. Cross examination of information from the approved third party SPDR [Doc 1] and from two external sources (Economic Evaluation Code for Small Hydropower Projects (SL16-95) dated, 2 June 1995, which is still valid [Doc 6] and Hydroenergy Design Code for Small Hydropower Projects (SL76-94) [Doc 58]) shows that the upper limit of the coefficient of effective electricity generation (0.95) has been considered in the project activity which is found reasonable and conservative.

The electricity generated from the project activity will be delivered to the Central China Power Grid (CCPG). The electricity generated by the project activity will displace part of the power from the fossil fuel dominated CCPG. In 2007 fossil-fuel fired power stations constituted 64.54% of total power generation of CCPG [Doc 51]. This partial displacement of the electricity generation from the CCPG is expected to result into annual greenhouse gas (GHG) emission reductions of 61,687 tCO₂e by the project activity. A fixed crediting period of 10 years has been chosen for the project activity starting from the year 2011 and total emission reductions over the entire ten years of the crediting period are estimated to be 616,870 tCO₂e. The project itself wouldn't produce any significant GHG emissions during its implementation and operation.

No technology transfer is envisaged to take place by the project activity because the technology employed is locally produced and widely used in P R China. This has been validated based on the approved third party SPDR [Doc 1] and based on the validation team's local and sectoral knowledge and expertise. The project activity will contribute to the local sustainable development through mitigating the shortage of power in the region, creating job opportunities during the construction period, and providing 34 job opportunities during the operational period of the project activity. The project activity is also expected to improve the local infrastructure by reinforcing river banks and by building pavements and roads.

1.4. Validation Personnel

| Validation Team | Role | Coverage of sectoral scope | Coverage of technical area | Financial Expertise | Host country experience | Participated in site visit? |
|-----------------|------------------|----------------------------|----------------------------|---------------------|-------------------------|-----------------------------|
| Bilal Anwar | Lead validator | √ | √ | | | √ |
| Jia Tang | Validator | √ | √ | | √ | √ |
| Jan Smolders | Validator | | | | √ | √ |
| Angus McEwin | Financial expert | | | √ | | |

| Technical Review | Role | Coverage of sectoral scope | Coverage of technical area | Host country experience | Participated in site visit? |
|------------------|--------------------|----------------------------|----------------------------|-------------------------|-----------------------------|
| Jonathan Avis | Technical Reviewer | √ | √ | √ | |

Bilal Anwar has nearly ten years of professional experience in the area of International Climate Change Policy, Regulatory aspects of the Global Climate Regime, setting-up of the global accreditation system under the CDM and technical and methodological aspects relating to projects for reducing GHG emissions. This experience has been gained in the Secretariat for United Nations Framework Convention on Climate Change (UNFCCC) by supporting the CDM regulatory regime. In this role Bilal developed a profound understanding of all aspects of the project based mechanisms (CDM& JI) namely: regulatory, methodological, technical, legal and procedural. Bilal had been closely involved in the development of methodological and technical frameworks, including baseline and monitoring methodologies, standards for CDM projects, regulatory and technical requirements and associated procedural frameworks

Jia Tang is a GHG Auditor based in Guangzhou. Jia is also an ERM CVS and IEMA certified and registered Environmental Auditor and EMS Auditor. Jia has managed and contributed to a wide range of projects in a number of sectors, including environmental assessment of renewable energy projects (hydro, wind), due diligence of a Landfill gas power station in Shenzhen and the validation and verification of a number potential hydro and wind CDM projects in China. Jia is an experienced assessor with ERM China with over ten years experience.

Jonathan Avis is CDM Business Manager for ERM CVS, and a GHG Auditor and Technical Reviewer with over 5 years experience in the carbon market. His previous work experience includes screening and due diligence of carbon projects, Project Design Document (PDD) development, quality assurance and technical review of CDM project documentation, the development of carbon monitoring plans, and management of carbon projects through the validation, registration and verification stages. He has worked on the development and quality control of carbon projects in numerous sectors including hydroelectricity, wind energy, landfill gas, waste gas and heat, coal mine methane, biomass-to-energy and composting. Since joining ERM CVS Jonathan has worked as a Technical Reviewer and GHG auditor on numerous CDM validations.

Angus McEwin is a financial expert for ERM CVS and has over ten years experience of economic analysis and environmental auditing in the UK, Australia and Vietnam. In his previous work experience as an independent contractor, Angus worked in a range of roles in the financial services and investment banking sector in London, including carrying out analytical and operational roles for several large financial sector clients. Over the last six years Angus has worked as an environmental and socio-economist for ERM within the natural resources and environment sector in Southeast Asia, where his financial experience includes economic impact assessments in Australia and Singapore and numerous environmental assessments in Vietnam.

Jan Smolders has more than 25 years experience as occupational health and exposure researcher, environmental laboratory researcher and manager, environmental consultant and auditor. His experience includes auditing QA/QC systems of laboratories and air emission inspection institutes, environmental performance of industrial sites as well as technical inspection of facilities such as waste water treatment plants and air treatment installations. Jan has also been a lead validator and lead verifier for a number of CDM projects in China and Thailand regarding hydropower generation, wind power generation, methane recovery from waste water treatment plants and N₂O emission abatement..

2. Methodology

The validation of the PDD and additional and supporting documentation was carried out following the requirements specified in the CDM-VVM, version 1.1(EB 51) and other criteria and relevant decisions of the CDM Executive Board. In undertaking the review of documentation standard auditing techniques were employed including necessary cross-checks and follow-up actions to ascertain the correctness of the information and credibility of the statements and assumptions made in the documentation. The validation team included staff with experience in the relevant sectoral scopes and technical areas within the sectoral scope, and included local host country expertise, sectoral knowledge, and financial expertise. The validation report and associated documents have undergone a thorough technical review by ERM CVS before being submitted to the CDM Executive Board for registration. The validation consisted of the following key phases:

- Upload of the PDD for Global Stakeholder Consultation (GSP), receipt of any comments from stakeholders (GSP from 11 March 2010 to 09 April 2010);
- Desk review of documentation including PDD, methodology and key supporting documents and references;
- A visit to the project site, including interviews with personnel responsible for developing the project (the site visit took place on the 18 - 19 March 2010)
- Development of a draft validation report, identifying non-compliances including Corrective Action Requests (CARs) and Clarification Requests (CLs) and forward action requests taking into account findings of the GSP, desk review and site visit and interviews with relevant stakeholders;
- Resolution of outstanding issues (CARs and CLs);
- Finalisation of a final validation report and validation opinion

2.1. Global Stakeholder Period consultation

The PDD version 04 dated 03 February 2010 was uploaded on the UNFCCC website for the global stakeholder consultation process. The Global stakeholder period was 11 March 2010 to 09 April 2010. Relevant information can be found at <http://cdm.unfccc.int/Projects/Validation/DB/V9WZ4EVD1AHRXT1JJFHPXZB2NP3AG6/view.html>

No public comments during the period were received.

2.2. Desk Review

A detailed desk review of the PDD, methodology and all other associated documentation and references took place in advance of the site visit, and additional documents that were not available for the desk review were requested for review during the site visit. A list of documents reviewed and persons interviewed is included in Appendix A. The project information was also cross-checked through other sources in order to evaluate the authenticity and credibility of information and ascertaining the correctness of the information against the requirements and established criteria. The review of the PDD and other associated documentation at the desk review stage raised a number of issues which were further reviewed and validated through additional supporting documentation and cross-checking from other sources and interviewing relevant personnel involved in the project during the site visit.

2.3. Site Visit and Interviews

The validation is based on the review of documentation and interviews with various personnel. Interviews took place on site, via telephone or via email and include relevant stakeholders in the host country, personnel responsible for project design and implementation, and other stakeholders as applicable.

The site visit took place on 18 -19 March 2010. The site visit included a tour of the physical project site, including the dam, powerhouse and the site where displaced people had been resettled. The site visit also included a visit to the main office of the project owner, Hunan Guohong Investment Co., Ltd.

Relevant staff from the project owner and the CDM consultant were interviewed and detailed document review took place. A list of interviewees, and the main topics discussed with each can be found in Appendix A.

The site visit enabled the validation team to undertake a detailed review of the project documentation, verify the supporting documentation, inspect the project site and verify its compliance with the PDD, cross-check the validity of the project information from other sources of information, and hold interviews with local stakeholders, relevant officials and other persons involved in the project activity.

At the conclusion of the desk review and site visit, the following broad issues were raised:

- Project description in the PDD was not detailed and clear;
- Lifetime of various project equipments and installations was not provided;
- Location of the project activity and distance between two dams was not provided;

- Substantiation of the information and claims regarding consideration of the CDM and real and continuous action taken by the project participants to secure CDM;
- Further substantiation on application of tariff and relevance of the financial analysis;
- Further clarifications requested on investment analysis relating to the project activity;
- Current financial status of the project activity in particular with reference to need for CDM benefits;
- Issues relating to the QA/QC procedures for implementation of the monitoring methodology and the monitoring plan;

A complete list of all issues raised (CARs and CLs) is included in Appendix B.

2.4. Main changes between the PDD version published for the global stakeholder comment period and the final version submitted for registration:

- Version of the PDD was corrected;
- Project description and location of the project was further clarified;
- Inconsistencies relating to the technical parameters were corrected;
- Further clarity on explanation of baseline selection and application of baseline methodology;
- Clear indication of annual operational hours of the plant and justification on adoption of coefficient of effective electricity generation;
- Crediting period clarified by the project developers;
- Further information incorporated on the project timeline to demonstrate that CDM was seriously considered in the decision to proceed with the project activity and real and continuing actions had been undertaken in parallel to the implementation of the project activity;
- Further clarity and justification provided in demonstrating additionality of the project activity;
- Further information, sources and justifications provided relating to the electricity tariff applied in the financial analysis;
- Operational and management structure with respect to the monitoring aspects further clarified;
- Sections relating to environmental impacts of the project corrected.

2.5. Validation Protocol and Remediation Form

CDM Validation Protocol Checklist

A checklist of the key requirements for validation is included as Appendix B. 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.
- It must also list project components/issues not covered in the validation engagement

The protocol describes the following:

| Checklist Question | Reference | Comment | Draft Conclusion | Final Conclusion |
|---|--|--|--|---|
| The requirements that the project should meet | The documents used to check the answer to the checklist question | This section is used to elaborate and discuss the conformance to the checklist question, and to explain the conclusion reached. It includes the means of validation, which explains how conformance with the checklist is justified. For example document review (DR) or interview (I). N/A means not applicable | This is either acceptable based on evidence provided (OK), or a <i>Corrective Action Request</i> (CAR) is required due to non-compliance with the checklist question. A request for <i>Clarification</i> (CL) is used when the validation team has identified a need for further clarification. A 'Minor Issue' may be recorded for typographical errors or similar minor errors that do not have an impact on the compliance of the project to the CDM rules but nevertheless should be corrected to improve clarity. A <i>Forward Action Request</i> (FAR) could be raised for issues to be addressed during first verification that do not form part of the registration requirements | Indicates whether the CAR or CL has been closed out (OK). |

Remediation Form: Clarification Requests (CL), Corrective Action Requests (CAR) and Forward Action Requests (FAR), plus minor issues

CLs, CARs and FARs are raised in the draft validation protocol and detailed in a separate form using Table 3 (Appendix C). In this form, note is made of actions taken by the Project Proponent to close outstanding CARs and respond to CLs and Forward Action Requests:

| Draft report corrective action, clarification, or forward action requests, or minor issues | Reference to CDM Validation Protocol Checklist | Summary of project participants' response | Final conclusion |
|--|---|---|--|
| List of CLs, CARs and FARs (and minor issues) | Reference to the validation protocol checklist question | Summary of response during the communication with the validation team | Summary of validation team responses and final conclusion. |

Clarification Requests (CL): A Clarification Requests (CL is raised where information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met

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

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

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

Forward Action Requests (FAR): FARs shall be raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

A 'Minor Issue' may be recorded for typographical errors or similar minor errors that do not have an impact on the compliance of the project to the CDM rules but nevertheless should be corrected to improve clarity.

2.6. Internal Quality Control

The draft and final reports prepared by the validation team, and the validation decision, are subject to independent Technical Review. The scope of the Technical Review process is to independently assess that all procedures have been followed, necessary requirements have been met, and all conclusions are justified. The final validation decision is based on the findings and conclusions of the validation team, assessing the compliance of the project activity with the CDM requirements, and the technical evaluation of the independent technical reviewer. The final report is then approved and signed off by the qualified signatory / final decision maker within ERM CVS.

3. Validation Findings

3.1. Approval and Participation Requirements

The project participants are Hunan Guohong Investment Co. Ltd., authorised by PR China, and Carbon Asset Management Sweden Pte Ltd., authorised by Sweden. Both project participants are listed in A.3 and Annex 1 of the PDD and necessary letters of approval (LoA) from their respective Designated National Authorities (DNAs) have been validated.

The host country LoA [Doc 37] has been issued by the China National Development and Reform Commission (NDRC) (Chinese DNA), on 17 December 2007. The LoA confirmed that:

- P R China ratified the Kyoto Protocol on 30th Aug 2002 and it is a Party to the Kyoto Protocol;
- Hunan Guohong Investment Co. Ltd. is authorised as a project participant by P R China to voluntarily participate in the project activity;
- The project activity complies with the permission requirements provided for in the Measures for Operation and Management of CDM projects in China, and assists China in achieving sustainable development;
- Hunan Guohong Investment Co., Ltd. is hereby authorised as China's participant to voluntarily participate in and carry out the project activity;
- The LoA references the precise project title 'China Niaoerchao Hydropower Project' as indicated in the PDD.

A LoA has been provided by the Swedish Energy Agency (Swedish DNA) for the CDM, on 20 November 2007 [Doc 36]. The letter confirms that:

- Sweden ratified the Kyoto Protocol on 31st May 2002;
- Sweden approves the project activity as the CDM project in accordance with Article 12 of the Kyoto Protocol and relevant rules, decisions, guidelines, modalities and procedures thereunder and confirms that participation in the CDM is voluntary;
- Sweden authorises the applicant to participate in the project activity in accordance with the Kyoto Protocol, the Marrakech Accords and relevant rules, decisions, guidelines, modalities and procedures thereunder .
- Sweden confirms that public funding is not used for the purchase of certified emissions reductions from the project;
- The LoA references the precise project title 'China Niaoerchao Hydropower Project'. This is consistent with the project title in the PDD.

The authenticity of both LoAs had been validated and confirmed from the publicly available information on the respective websites of both DNAs [Doc 36, 37].

Based on the above confirmation ERM CVS confirms that approval and participation requirements, as referred in the CDM VVM are satisfied.

Neither LoA contains any additional specifications or conditions regarding the project activity, or references a specific version of the Validation Report or PDD. The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding.

3.2. Project Design

Conformance of the PDD with EB guidelines

The PDD has been checked against the latest 'Guidelines for developing the Project Design Document' (version 7) and the latest template for the Project Design Document (version 3) available on the CDM website. It is confirmed that the final PDD is in compliance with the template and guidelines.

Conformance of the project design in the PDD with source documents such as the FSR

The project design and technical description of the project activity has been cross checked against the approved third party SPDR and concluded to be consistent. The SPDR was developed by an independent third party institution 'Huaihua Institute of Hydroelectric Investigation' in August 2006 [Doc 1]. The SPDR was approved by the local government, the Water Resources Bureau of Huaihua City, [Doc 32] on 22 November 2006. The project design in the PDD and SPDR was also cross checked against the physical layout of the project during the site visit, and against the details of the project and technology contained in the project layout maps [Doc 52] and the environmental impact assessment report (EIA) [Doc 42]. It was further confirmed by cross-checking and assessing key equipment purchase contracts, installation and construction order for the project activity [Docs 22, 29, 33].

The project activity had been subject to design changes due to poor financial returns and in order to optimise the use of available water resources. The initial designed installed capacity of the project activity, as indicated in the approval of FSR in

May 2005 [Doc 16] was 12 MW which was later enhanced to 16 MW as evident from Draft Version of the project design report (PDR) in November 2005 [DOC 65]; final version of the project design report in April 2006 and its approval [Doc 27] and generator and turbine purchase agreement [Doc 22]. The designed capacity was further upgraded to 20 MW as evident from the draft SPDR, dated February 2006 [Doc 20], supplementary generator and turbine purchase agreement signed in June 2006 [Doc 29] and approval of the SPDR in November 2006 [Doc 32]. Following the expansion in the designed installed capacity of the project activity, the final SPDR was completed in August 2006 [DOC1] and approved in November 2006 [Doc 32]. ERM CVS has verified the draft version PDR [Doc 65] and the SPDR [Doc 1] in order to confirm the reasons behind the capacity changes of the project activity, as were explained and justified in the PDD. It has also been confirmed by ERM CVS that the capacity expansion of the project activity had not resulted in improving the financial viability of the project activity to the extent that project could be implemented without CDM benefits. The internal rate of return of the project activity even at 20 MW capacity is confirmed to be below the industry benchmark of 10 % [Doc 6] for renewable energy power projects in PR China. This has been further substantiated by undertaking a comparison between the financial returns of the project activity at 12 MW (original capacity) and 20 MW (enhanced and final capacity) and this has confirmed that the project is not financially attractive under either scenario without revenues from certified emission reductions (CERs). Further details are provided in the additionality section below.

ERM CVS further investigated about the potential for further capacity enhancement in order to improve the financial viability of the project, however, it was confirmed that available water resources do not allow further expansion of the capacity of the project activity. It was also confirmed from the approved operational time of the project activity as defined in the SPDR [Doc 1] and hydrological data collected from six hydrological monitoring station located at upstream, downstream of the river for 45 years, which was discussed in the FSR [Doc 15] that further capacity expansion was not possible.

Timeline and operational status of the project

As per the project implementation plan in the SPDR [Doc 1], the construction of the project was expected to be completed in three years. The construction on the project activity started on 12 December 2006 [Doc 33] and was expected to be completed in 2009. Stage I of the project construction, including the first dam, the reservoir and the equipment including two power generators, two turbines and one main transformer have been completed at the time of validation. This was confirmed at the time of the site visit. Stage II of the construction includes a second tunnel, second dam and the water channel, and began in March 2010. Due to extreme weather conditions in late 2007 and early 2008 throughout southern China, the completion of stage II of the project is expected to be slightly delayed but the tunnel for phase 2 is expected to satisfy the water diversion function by the end of 2010 or beginning of 2011, and all construction and auxiliary engineering work on phase 2 is expected to be completed by the end of 2011. This slight delay in the construction is considered to have no impact on the overall operation and completion of the project activity.

The project activity started its operations in August 2008 and through the confirmation of the sale of electricity to the grid company [Doc 53] it is confirmed that the project was operating at 30 % of its designed capacity at the time of the site visit.

The expected operational lifetime of the project activity is 20 years, plus 3 years of construction time. This has been confirmed based on the analysis from an independent source 'Economic Evaluation Code for Small Hydropower Projects (SL16-95)' approved by the Ministry of Water Resources and cross checked against the manufacturer's specifications of the equipments installed for the project activity [Docs 2, 3].

Permits and approvals:

ERM CVS has ensured that the project activity has all the relevant permits and approvals needed to be developed as a hydroelectric project in the host country. ERM CVS has checked relevant permits and approvals including:

- Feasibility Study Report (12 MW) of Yuanling County Dongting River Niaoerchao Hydropower Project, April 2005 [Doc 15]
- Hunan Yuanling Niaoerchao Hydropower Project Supplementary Preliminary Design report, August 2006 by Huaihua Institute of Hydroelectric Investigatio [Doc 1]
- Notice of Applying CDM Project in Hunan Province, Hunan Development and Reform Committee and Hunan S&T Department, Nov. 07 2005 [Doc 21]
- Approval Letter of Supplementary Preliminary Design Report (Huaihuidian [2006] No.139), 22 November 2006 [Doc 32]
- Construction Order issued by Engineering Supervision Department, 10 December 2006 [Doc 33]
- CDM Letter of Approval for China Niaoerchao Hydropower Project as a Clean Development Mechanism issued by National Development and Reform Commission of the People's Republic of China, 17 December 2007 [Doc 37]

All the necessary permits and approvals were found to be in place in accordance with host country requirements and applicable national laws and regulations. Furthermore, the project description was found to be consistent between the final PDD and the approvals.

Project location

The project is located on the Dongtingxi River, a branch of Yuanjiang River located in Yuanling County, Huaihua City, Hunan Province, People's Republic of China. The location was confirmed during the site visit.

3.3. Baseline

Applicability of selected methodology

The project activity applies the approved baseline and monitoring methodology ACM0002 (version 11), which is the latest version of the methodology approved at EB52. This version of the methodology is valid at the time of validation submission. The approved applied methodology also refers to the "Tool for the demonstration and assessment of additionality (Version 5.2)" and "Tool to calculate the emission factor for an electricity system" (Version 02). These were the most recent versions of these tools valid at the time of the start of the validation.

The project activity meets the applicability conditions of the methodology ACM0002 (version 11) as follows:

- The project activity is a new hydro power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant) to generate electricity and supplied to the grid (CCPG), which is dominated by fossil fuel-fired power plants;
- The project activity involves a new reservoir and the power density of the power plant is 11.09 W/m² that is greater than 4 W/m².
- The project activity does not involve switching from fossil fuels to renewable energy sources at the site of the project activity

The conformity of the project activity to the applied approved methodology ACM0002 (version 11) was cross checked against the design of the project activity as contained in the SPDR [Doc 1], and also during the site visit.

Project boundary

The physical, geographical site of the renewable generation source delineates the project boundary. The project boundary also includes the electricity grid to which the project activity is connected. The generated electricity of the project will be delivered to the Central China Power Grid (CCPG) whose geographic extent includes: Jiangxi Province, Henan Province, Hubei Province, Hunan Province, Sichuan Province and Chongqing Municipality. According to the "Tool to calculate the emission factor for an electricity system" if the DNA of the host country has published a delineation of the project electricity systems, these delineations should be used. Therefore, in accordance with the delineation given by the Chinese DNA, CCPG is the project electricity system as well as the project boundary of the project activity.

Table 1: Emission sources and gases included in the project boundary

| | GHGs involved | Source |
|--------------------|-----------------|---|
| Baseline emissions | CO ₂ | Grid (CCPG) |
| Project emissions | n/a | Project emissions are regarded as zero as the project is a renewable energy (hydro) project. |
| Leakage | n/a | No leakage needs to be considered in applying ACM0002 (version 11) for hydro electric project activities. |

The project activity being a hydro power project, there is no fossil-fuelled backup generator as part of the project and no other emissions are involved with the implementation and operation of the project activity. As the power density of the project activity is greater than 10 W/m², emissions from the reservoir are considered zero as per the methodology. This has been verified against the SPDR [Doc 1] and during the site visit. The project activity is not expected to result in any emissions other than those allowed by the methodology and there are no sources of greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the project activity which are expected to contribute more than 1% of the overall expected annual average emission reductions which are not already addressed by the methodology.

Baseline

Approved baseline methodology ACM0002 (version 11) prescribes the baseline scenario for a new grid-connected renewable power plant as electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

In accordance with the methodology the baseline emissions are the product of electrical energy baseline EGBL, y expressed in kWh of electricity produced by the renewable generating unit, multiplied by an emission factor calculated using option (a): combined margin (CM), consisting of the combination 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". The PDD correctly identifies the

baseline. For the project activity, the baseline scenario is the equivalent amount of annual electricity would be supplied by the grid (CCPG).

The baseline as prescribed in the methodology and adopted by the project activity is considered to be a true representation of what would otherwise take place in the absence of the project activity. It has been confirmed that the grid (CCPG) is dominated by fossil fuel-fired power plants [Doc 51]. Based on the historical trend and current growth of renewable energy sources, it is expected that renewable capacity additions will not have significant effects on the generation mix of the CCPG during the crediting period of the project activity. The combined margin calculations have been checked by ERM CVS.

3.4. Monitoring Plan

In accordance with the monitoring methodology (ACM0002 (version 11)) for hydro electric project activities monitoring shall consist of measuring the following parameters: the net electricity supplied by the project activity to the grid ($EG_{\text{facility},y}$) the area of the reservoir (A_{PJ}), and the installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ}). Measurements of the electricity supplied to the grid shall be continuous and monthly recording shall be undertaken, the area of the reservoir shall be measured annually based on the surface of the water, after the implementation of the project activity, when the reservoir is full, and the capacity of the hydro power plant shall be determined annually based on recognised standards.

The project activity correctly applies the methodology, the data and parameters to be monitored are indicated, and the necessary equipment is in place. The monitoring plan monitors the net electricity to the grid using a meter installed at the Wuqiangxi substation. There is another meter installed at the Qijiaping Substation which will be only used in emergency situations. This data will be double-checked from the electricity sales receipts. The area of the reservoir will be measured yearly from topographical surveys, maps and satellite pictures. The installed capacity of the hydro power plant will be monitored annually.

Table 2: Parameters Monitored

| Parameter | Description | Measurement methods |
|--------------------------|--|--|
| $EG_{\text{facility},y}$ | Quantity of net electricity generation supplied by the project plant/unit to the grid in year y | Continuous measurement and monthly recording. |
| Cap_{PJ} | Installed capacity of the hydro power plant after the implementation of the Project Activity | The installed capacity will be monitored annually based on recognized standards. |
| A_{PJ} | Area of the reservoir measured in the surface of the water, after the implementation of the Project Activity, when the reservoir is full | Measured from topographical surveys, maps, satellite pictures, etc |

Equipment:

One bidirectional meter will be installed at each substation (Wuqiangxi Substation and Qijiaping Substation (used in emergency situation)) to measure electricity supplied to the grid and the electricity consumed by the project activity which is imported from the grid. The net power supply is the difference of the electricity imported from power grid and exported to power grid. The meters will be configured as the technology requirements of "Management Regulations for Power Energy Metered Device Technology" (DL/T448-2000) and following the Regulation of Electrical Energy Meters with Electronics (JJG596-1999) will be calibrated every five years.

Data:

The electricity imported from power grid and exported to power grid will be measured through bidirectional meters installed at each substation (the meter at the Qijiaping Substation used only in emergency cases). The data will be measured hourly and recorded monthly. The net power supply is the difference of the electricity imported from the power grid and electricity exported to the power grid. The sales receipts and other monitoring records will be used to cross check the monitored data. According to the monitoring plan all monitoring data will all monitoring data and records will be archived electronically and be kept at least for 2 years after the end of the last crediting period.

The data management procedures are considered appropriate to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Organisation:

A monitoring management structure has been established and illustrated in the PDD. The monitoring structure includes a general manager, CDM group, monitoring department and an internal verifier. The General Manager is responsible for general management of the project and for the final approval of the internal monitoring report. The CDM Project Group consists of Monitoring Personnel and the Internal Verifier, and is supervised by the General Manager. The Monitoring Department is responsible for data monitoring, recording and reporting. The Monitoring Department is also responsible for regular operation of the project and maintenance of equipments. The Internal Verifier is responsible for checking the monitoring data and financial

settlement with the grid company, as well as calculating CERs. This monitoring structure is considered appropriate to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Quality Assurance and Quality Control:

The PDD contains information on how quality will be controlled and assured in the monitoring of emission reductions. The following measures are to be established for quality assurance and quality control purposes:

- The meters will be calibrated at least every five years as per the local standards. After the calibration, the meters will be sealed and the project owner and the power grid are not allowed to break the seal independently;
- In case of errors in the meter over the permissible range and/or in case of any repairing the installed meter will be replaced or calibrated;
- All the data should be kept during crediting period and two years after;
- A training program will be held to train staff on CDM knowledge, the operational regulations, the quality control (QC) standard flows, the data recording requirements and the management rules.

Feasibility of the monitoring plan:

The project participants have developed a detailed 'Handbook of Monitoring and Management for Niaoerchao Hydropower Project' [Doc 41] which puts the monitoring plan into practice. ERM CVS has undertaken a validation of the monitoring equipments, data handling procedures and instituted QA/QC procedures through review of documentation, such as actual electronic data recording sheets, interviewed relevant staff about their understanding of the monitoring requirements during the site visit. This provides confidence that the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

3.5. Additionality

Start date

The starting date of the project activity is 08 December 2005. This is the date when the agreement for the first payment for the generator and turbine became effective [Doc 24]. This date indicates that the project owner has committed to expenditures related to the implementation of the project activity. It may be noted that another agreement (supplementary agreement) of the payment for the purchase of the generator and turbine was made on 17 June 2006 [Doc 29] due to change in the capacity of the project activity to 20 MW. Although final approval of the SPDR [Doc 1] indicating the capacity enhancement was issued on 22 November 2006 [Doc 32], the project participants took early action in order to proceed with the implementation of the project activity before the finalization of the SPDR [Doc 1] and its formal approval [Doc 32]. Both purchase agreements have been checked by ERM CVS and the dates of the agreements had been confirmed.

Based on a review of documentary evidence it is confirmed that 08 December 2005 is the earliest date of real action with respect to the implementation of the project activity. The establishment of the purchase agreement and making the actual payment for key equipment of the project activity (generator & turbine) demonstrates that the project participants are proceeding with the implementation of the project activity. This evidence is considered consistent with the glossary of CDM terms.

The time of the investment decision of the project activity is 05 August 2005 when the meeting of the company directors was held and decision of CDM consideration took place [Doc 18]. The minutes of this meeting show that the decision was made to apply for the CDM support for the proposed project in order to improve the financial indicator of the project. It proves that incentives from the CDM had been seriously considered in the decision to proceed with the implementation of project activity.

The following documents were checked to confirm that the agreement for the first payment for the generator and turbine was the earliest real action on the project:

Table 3: Implementation timeline and start date of the project activity

| Document | Date | Parties involved PP/Issued by | Activity | Document number (on document request list) |
|--|---------------|---|--|---|
| Feasibility Study Report (12 MW) | April 2005 | Huaihua Institute of Hydroelectric Investigation | Feasibility study for the project activity with 12 MW capacity completed | [Doc 15] |
| Approval of Feasibility Study Report (12 MW) | 26 May 2005 | Development and Reform Commission of Huaihua City | Approval of Feasibility Study Report (12 MW) | [Doc 16] |
| Minutes of Director | 5 August 2005 | Project Owners | Meeting of director for | [Doc18] |

| Document | Date | Parties involved PP/Issued by | Activity | Document number (on document request list) |
|---|-------------------|---|---|---|
| Meeting of Hunan Guohong Investment Co., Ltd., | | | decision of CDM consideration (Time of the investment decision) | |
| Loan agreement signed between the project owners and China Construction Bank | 30 September 2005 | First loan agreement signed between the project owners and China Construction Bank | Loan was subject to CDM consideration | [Doc 19] |
| Notice of Applying CDM Project in Hunan Province, | 07 November 2005 | Project owner application to Hunan Development and Reform Committee and Hunan S&T Department, | Application for CDM to the local authorities | [Doc 21] |
| First payment receipt for Generator and Turbine Agreement | 8 December 2005 | Payment by project owners from China Construction Bank (CCB) | Payment agreement for purchase of key project equipment (starting date of the project activity) | [Doc 24] |
| Letter of Intent of Emission Reductions signed with Carbon Asset Management Sweden AB | 23 June 2006 | Project owner and Carbon Asset Management Sweden AB | Letter of intent for purchase of CERs | [Doc 30] |
| Approval of Supplementary Preliminary Design Report | 22 November 2006 | Water Resources Bureau of Huaihua City | Approval of SPDR for 20 MW capacity | [Doc 32] |
| Construction Order | 10 December 2006 | Engineering Supervision Department | Construction work started on the project activity | [Doc 33] |
| Third bank loan agreement signed | 05 June 2007 | Project owners with CCB Changsha Huaxing Branch | Bank loan agreement | [Doc 35] |
| Letters of approval | 20 November 2007 | CDM Letter of Approval issued by Swedish DNA | LoA issued by Swedish DNA | [Doc 36] |
| Letters of approval | 17 December 2007 | CDM Letter of Approval issued by Chinese DNA | LoA issued by Chinese DNA | [Doc37] |

Prior consideration of the CDM and timeline of real and continuing actions to secure CDM status

The project activity start date is 08 December 2005 and the decision to proceed with the investment on the project activity took place on 05 August 2005 when the meeting of the company directors was held and decision of CDM consideration took place [Doc 18]. This decision of the company directors meeting was based on an earlier meeting of Yuanling County Government, held in June 2005 [Doc 17]. The minutes of this meeting confirmed that project participants became aware of existence of CDM projects in the region and the possibility of this project to be developed as the CDM project activity.

The project was subject to design changes taking into consideration poor financial returns and in order to optimise the use of available water resources. The initial designed installed capacity of the project activity, as indicated in the approval of FSR in May 2005 [Doc16] was 12 MW which was later enhanced to 16 MW as evident from project design report (PDR) in April 2006 [Doc 27] and first generator and turbine purchase agreement [Doc 22]. The designed capacity was further upgraded to 20 MW as evident from the draft SPDR [Doc 20] and its approval in November 2006 [Doc 32] and supplementary generator and turbine purchase agreement, in June 2006 [Doc 29].

As indicated in the PDD and supported by the background documentation, the project developer's decision to proceed with the investment on the project activity coincided with the decision on the consideration of the CDM which took place in the director's meeting held on 05 August 2005 [Doc 18.]. This meeting took place after the approval of the FSR for the original 12 MW capacity project on 26 May 2005, in recognition of the fact that the internal rate of return (IRR) of the project activity (12 MW) was much lower than the industry applicable benchmark (10%) for such projects [Doc 6]. It was also acknowledged that the IRR

of the project activity can be improved by considering the support from the CDM. Following this acknowledgement, the board of directors in the meeting, held on 05 August 2005 [Doc 18], decided to apply for CDM support for the proposed project in order to improve the financial rate of return of the project. The first bank loan agreement was signed with the China Construction Bank (CCB), Changsha Huaxing Branch on 30th September 2005 [Doc 19]. The loan from the bank was issued subject to the project activity being developed as a CDM project. Therefore, it can be confirmed that incentives from the CDM had been seriously considered by the project developers and were key factor to proceed with investment on the project activity. Timelines and details of activities in the below table further substantiate this aspect of the project activity.

Table 4: Timelines and events showing prior consideration of the CDM

| Document | Date | Parties involved PP/Issued by | Activity | Document number (on document request list) |
|---|-------------------|---|--|--|
| Feasibility Study Report (12 MW) | April 2005 | Huaihua Institute of Hydroelectric Investigation | Feasibility study for the project activity with 12 MW apacity completed | [Doc 15.] |
| Approval of Feasibility Study Report (12 MW) | 26 May 2005 | Development and Reform Commission of Huaihua City | Approval of Feasibility Study Report (12 MW) | [Doc 16] |
| Meeting Minutes of Yuanling County Government | 21 June 2005 | Project owner and Yuanling County government | | [Doc 17] |
| Minutes of Director Meeting of Hunan Guohong Investment Co., Ltd., | 5 August 2005 | Project Owners | Meeting of director for decision of CDM consideration (Time of the investment decision) | [Doc 18] |
| Loan agreement signed between the project owners and China Construction Bank | 30 September 2005 | Loan agreement signed between the project owners and China Construction Bank | Loan was subject to CDM consideration | [Doc 19] |
| Notice of Applying CDM Project in Hunan Province, | 07 November 2005 | Project owner application to Hunan Development and Reform Committee and Hunan S&T Department | Application for CDM to the local authorities | [Doc 21] |
| First payment receipt for Generator and Turbine Agreement | 8 December 2005 | Payment by project owners from China Construction Bank (CCB) | Payment agreement for purchase of key project equipment (starting date of the project activity) | [Doc 24] |
| Letter of Intent of Emission Reductions signed with Carbon Asset Management Sweden AB | 23 June 2006 | Project owner and Carbon Asset Management Sweden AB | | [Doc 30.] |
| Approval of Supplementary Preliminary Design Report | 22 November 2006 | Water Resources Bureau of Huaihua City | Approval of SPDR for 20 MW capacity | [Doc 32] |

It should be noted that the capacity enhancement (12MW-to-16MW-to-20MW) did not improve the financial viability of the project activity sufficiently; therefore the consideration and realisation of CDM benefits remained a vital element of the project implementation even after installed capacity enhancement. ERM CVS confirmed this by undertaking a comparative review of the financial analysis of the project activity both for 12MW and 20 MW capacities [Doc 1]. It is confirmed that the capacity enhancement from (from 12MW to 20MW) improves the IRR of the project from 7.55 % to 8.51%. However, the project IRR still remained below the applied benchmark (10%).

In consideration of the importance of the CDM in the implementation of the project activity the project developer undertook continuing and real actions to secure CDM in parallel to the implementation of the project activity.

The table below lists some of the events reflecting real and continuing actions by the project developer.

Table 5: Timelines and events showing real and continuing action

| Document | Date | Parties involved PP/Issued by | Activity | Document number (on document request list) |
|---|-------------------|--|--|--|
| Feasibility Study Report (12 MW) | April 2005 | Huaihua Institute of Hydroelectric Investigation | Feasibility study for the project activity with 12 MW capacity completed | [Doc 15] |
| Approval of Feasibility Study Report (12 MW) | 26 May 2005 | Development and Reform Commission of Huaihua City | Approval of Feasibility Study Report (12 MW) | [Doc 16] |
| Meeting Minutes of Yuanling County Government | 21 June 2005 | Project owner and Yuanling County government | Participation in the meeting held by local government on existence and possibility for CDM in the region | [Doc 17] |
| Minutes of Director Meeting of Hunan Guohong Investment Co., Ltd., | 5 August 2005 | Project Owners | Meeting of director for decision of CDM consideration (Time of the investment decision) | [Doc 18] |
| Loan agreement signed between the project owners and China Construction Bank | 30 September 2005 | Loan agreement signed between the project owners and China Construction Bank | Loan was subject to CDM consideration | [Doc 19] |
| Notice of Applying CDM Project in Hunan Province, | 07 November 2005 | Project owner application to Hunan Development and Reform Committee and Hunan S&T Department, | Application for CDM to the local authorities | [Doc 21] |
| First payment receipt for Generator and Turbine Agreement | 8 December 2005 | Payment by project owners from China Construction Bank (CCB) | Payment agreement for purchase of key project equipment (starting date of the project activity) | [Doc 24] |
| Letter of Intent of Emission Reductions signed with Carbon Asset Management Sweden AB | 23 June 2006 | Project owner and Carbon Asset Management Sweden AB | | [Doc 30] |
| Approval of Supplementary Preliminary Design Report | 22 November 2006 | Water Resources Bureau of Huaihua City | Approval of SPDR for 20 MW capacity | [Doc 32] |
| Construction Order | 10 December 2006 | Engineering Supervision Department, | Construction work started on the project activity | [Doc 33] |
| Third bank loan agreement signed | 05 June 2007 | Project owners with CCB Changsha Huaxing Branch | Bank loan agreement | [Doc 35] |
| Global Stakeholder Process (GSP) under validation | 30 September 2007 | Project owners/TUV Rheinland | Validation activity | UNFCCC website |
| Letters of approval | 20 November 2007 | CDM Letter of Approval issued by Swedish DNA | LoA issued by Swedish DNA | [Doc 36] |
| Letters of approval | 17 December 2007 | CDM Letter of Approval issued by Chinese DNA | LoA issued by Chinese DNA | [Doc 37] |
| Bank Loan agreement signed | 13 January 2008 | Loan agreement between project owners and | Loan agreement signed | [Doc 26] |

| Document | Date | Parties involved PP/Issued by | Activity | Document number (on document request list) |
|--|------------------|---|--|--|
| | | Agricultural Bank of China | | |
| Bank loan reply letter sent by ABC confirming that CDM is a decisive factor to approve the bank loan | 15 December 2009 | Loan reply letter from Agricultural Bank of China | Reply letter from the Bank | [Doc 62] |
| Water Diversion Tunnel Construction Contract of Liujingtang Dam signed | 09 February 2010 | Project owner/construction company | Water diversion tunnel construction contract | [Doc 61] |
| Global Stakeholder Process (GSP) | 11 March 2010 | Project Owners/ERM CVS | Validation activity | UNFCCC website |

From the above chronology of events it is evident that becoming aware of the CDM and securing CDM benefits was the decisive factor in proceeding with the investment on the project activity. It also demonstrates that project participants had been undertaking real and continuing actions in parallel with the implementation of the project activity, including their endeavours to register the project as the CDM project activity.

The project participants previously submitted the project for validation with a different DOE (TÜV Rheinland) and were not successful on the basis of evidence for prior consideration. ERM CVS was aware of this and has reviewed in detail all the supporting documentation (see below). Based on the evidences relating to the starting date of the project, date and basis of the investment decision and their continuous and real action, ERM CVS was able to confirm that CDM was indeed a decisive factor in developing the project activity. This is further confirmed by the results of the financial analysis of the project activity which further confirms that without CER revenues the project would not have been financially viable. The importance of the CDM revenues for the financial viability of the project activity is also confirmed from the independent Financial Audit Report of the project activity completed by 'Hunan Xianghua Public Accounting Co., Ltd. [Doc 7] that revenue from the sale of CERs is critical for the financial future of the project activity.

As part of the validation process, ERM CVS also undertook the detailed review of the validation opinion provided by TÜV Rheinland [Doc 64] for the project activity and carefully examined the basis of their opinion. This review highlighted that determination of starting date of the project activity and associated determination of prior consideration became the basis of validation opinion by the DOE. Having carefully examined the relevant evidences and requirements of the CDM, ERM CVS determined that, according to the 'glossary of CDM terms' starting date of a CDM project activity is the earliest date of real action with respect to the implementation of the project activity. A common and practical interpretation of this requirement is the determination of 'point of no return' i.e significant amount of funds have been committed and/or actions have been undertaken with would not allow the project participants to abandon the investment without serious financial penalties. Based on this interpretation, ERM CVS evaluated the claim made by project participants of the starting date in the revised PDD to be 08 December 2005, which is the date when the agreement for the first payment for the generator and turbine became effective [Doc 24]. The supporting documentation and evidences were checked in order to confirm and conclude that 08 December 2005 indeed is the earliest date of real action with respect to the implementation of the project activity.

ERM CVS further reviewed the series of events as well as their chronological order to determine the prior consideration of CDM and also whether a continuous and real action has been undertaken by the project participants in securing the CDM status in parallel to the implementation of the project activity. As presented in section 3.5 of this report that there is sufficient evidence to determine the prior and serious consideration of CDM by the project participants. Credibility of these evidences were thoroughly checked and confirmed in establishing the validation opinion. Furthermore, it is also evident that project participants have undertaken continuous and real action in securing their CDM status.

A further review of the previous validation report as well as interviews with project participants also showed signs of a certain level of misunderstanding and communication issues between the validating DOE and the project developer. It is observed that these communication issues, in particular, level of understanding of CDM requirements by local project hosts might have led the DOE in concluding its opinion.

While ERM CVS have taken into consideration the validation opinion of the previous DOE, it is emphasized that ERM CVS has carried out its validation process in an independent and objective manner. The validation opinion, findings and conclusions are based upon objective evidence checked and thoroughly confirmed and all activities in connection with this validation process are in accordance with the rules and procedures of the COP/MOP and the CDM Executive Board, as required by CDM validation verification manual..

Identification of alternatives:

In accordance with ACM0002 (version 11), the baseline for a grid-connected hydro electric project delivering electricity to the grid is as follows: electricity generated by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The methodology does not require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario. Following the requirement of the applied approved methodology as well as in accordance with the guidance in paragraph 104 of the VVM, no assessment of alternative baseline scenarios was conducted in the final PDD. ERM CVS has determined that the baseline scenario identified in the PDD is reasonable by validating the assumptions, calculations and rationales used in the determination of the combined margin emissions factor. The selected baseline is also in compliance with host country regulation and no national and/or sectoral policies and circumstances contradict the selected baseline scenario.

Furthermore, based on the validation team's local and sectoral knowledge, it is confirmed that the selected baseline scenario is the prevailing practice in the host country. The makeup of the CCPG is unlikely to shift away from being dominated by fossil fuel sources within the crediting period of the project activity. The PDD provides 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 proposed CDM project activity – details of the grid are given, and have been cross checked against the information provided by the DNA of PR China.

Additionality determination:

The additionality of the project activity has been demonstrated through application of the “Tool for the demonstration and assessment of additionality” (version 05.2).

Investment analysis is used to demonstrate additionality of the proposed CDM project activity. The project activity correctly adopts the ‘Tool for the demonstration and assessment of additionality’ (version 5.2) as required by ACM0002 (version 11). The PDD demonstrates that the project activity is not economically or financially feasible without the revenue from the sale of CERs, and thus the financial returns of the proposed CDM project activity would be insufficient to justify the required investment. The financial analysis was assessed by the validation team, including assessment of the spreadsheet and evidences relating to the input values to the financial analysis. The analysis was also assessed in detail against the ‘Guidelines on the assessment of investment analysis’ (version 3.1) by a financial expert contracted by ERM CVS, who has specific expertise in the assessment of financial analysis for CDM projects.

The project scenario as described in the PDD demonstrates that the project activity even after design changes and capacity expansions was not economically or financially viable, without the revenue from the sale of certified emission reductions (CERs) and thus the financial returns of the proposed CDM project activity would not have been sufficient to proceed with the investment.

Since the project activity has been operational for the last two years, the current financial status of the project was thoroughly validated by the ERM CVS validation team. According to the Financial Audit Report of Niaoerchao Hydropower Project completed by independent accountants - Hunan Xianghua Public Accounting Co., Ltd. - [Doc 7] the actual fixed asset investment of the project is already much higher than the project budget in the SPDR [Doc 1]. Considering an increase in the actual investment of the project another loan application was filed to the Agricultural Bank of China (ABC) for a loan on 22 October 2009. In reviewing the reply letter from ABC, it can be further confirmed that a loan by the ABC had been approved subject to revenues from the CDM [Doc 39]. This loan contract was signed by the project participants with ABC on 20 January 2010 [Doc 63]. The new bank loan obtained from ABC is used to repay all the original bank loans and interest from the China Construction Bank and to proceed with stage II of the construction on project.

From the above description, evidences and events it can be confirmed that CDM consideration was a decisive factor in proceeding with the investment in the project and the project participants have undertaken real and continuing actions in order to secure the CDM status and successfully implement the project activity.

Investment analysis:

Determine appropriate analysis method

The PDD adopts the benchmark analysis (option III), which is appropriate, since there are other economic benefits associated with the project activity in addition to CER revenues (i.e. from selling electricity), hence option I is not applicable. Option II is also not applicable as the alternative to the project activity, continuation of electricity supply by the existing generation mix operating in the grid, does not represent a comparable investment opportunity to the proposed project. The alternative to the project is to ‘do nothing’ i.e. the project developer would make no investment. Therefore investment comparison analysis is not applicable.

Apply Benchmark Analysis

- The financial indicator most suitable for the project type and decision context is the Internal Rate of Return (IRR). This is correctly identified in the PDD. The IRR is the financial indicator commonly used in the host country to assess the economic or financial feasibility of investment projects, and is also the financial indicator used by the government to determine investment thresholds or benchmarks for construction projects;
- A project IRR is calculated, as opposed to an equity IRR. This is considered appropriate as this is the common practice in the host country, based on ERM CVS's local and financial expertise. This is also in line with the benchmark selected.

Determination of the benchmark

The benchmark for the investment decision has been taken from the official source 'Economic Evaluation Code for Small Hydropower Projects (SL16-95)' [Doc 6] approved by Ministry of Water Resources of P. R. China. This had been confirmed against approved third party SPDR [Doc 1]. The applied IRR benchmark (after tax) for Chinese small hydropower projects (installed capacity less than 50 MW in rural areas) is 10%. The benchmark chosen for the project activity is set by the central government of P R China that regulates the electric power industry nationwide. The benchmark is relevant for the project activity given that it is specifically designed for small hydro power investments in China, and was the latest available such benchmark at the time of investment decision. Based on ERM CVS's sectoral and financial expertise, it is confirmed that this benchmark is widely applied in P R China and is considered conservative for renewable energy investments.

Given the benchmark is determined by the government and also taking into consideration its circumstances in the country and sector, it is reasonable to assume that no investments would be made at a rate of return lower than the benchmark. It may also be noted that these are the latest available guidelines on benchmarks in P R China and are widely adopted by project developers in assessing the economic and financial feasibility of their investments in the power sector. It may also be noted that this benchmark was used in assessing the feasibility of the project in the SPDR [Doc 1] by an independent institute and by the local government in approving the project [Doc 32].

Since a post-tax benchmark is applied, ERM CVS has ensured that actual interest payable is taken into account in the calculation of income tax, in accordance with paragraph 11 of the "Guidelines on the assessment of investment analysis". In the IRR spreadsheet [Doc 54], the total cost, which includes the cost of financial interest, is used to calculate income tax, hence leading to a lower income tax burden (and higher IRR). The interest rate and loan amount are specified in the SPDR of the project activity, which was developed by an independent third party using information on the prevailing interest rates in the region. The interest rate of 6.84% has been cross checked against the applicable interest rate at the time of the investment decision based on commercial lending from the publicly available information [Doc 55].

Based on ERM CVS's local, sectoral and financial expertise, this benchmark is widely adopted in the host country and is considered appropriate for evaluating this type of project in PR China.

Calculation and comparison of financial indicators

The PDD presents the key input parameters and results of the assessment of the IRR of the project activity. Financial review of the spreadsheet calculations by ERM CVS found that the computations are correctly presented, traceable, and consistent with the information presented in the PDD.

The calculations were carried out for a period of 23 years including 2 years of construction time. The technical lifetime of the project is 20 years which is based on the benchmark reference document (Economic Evaluation Code for Small Hydropower Projects (SL16-95) approved by Water Resources Ministry of P. R. China) [Doc 6]. As referenced in the document (SL16-95) [Doc 6] the investment horizon of the small hydropower project is 20 years and it is a common practice in the host country for small scale hydro projects. Further investigation of the issue with the project developer provided a clarification from the equipment manufacturers that lifetime of the equipment should be considered between 20 – 30 years [Doc 22].

The period of assessment is not shorter than the technical lifetime of the project activity and is consistent with the 'Guidance on the Assessment of Investment Analysis' (Version 03.1). The guidance proposes the assessment for a minimum period of 10 years and a maximum period of 20 years, as appropriate.

The IRR of the project activity (20 MW) without CDM revenues calculates as 8.51%, which is significantly below the benchmark of 10%, and hence it can be concluded that the project is additional. The IRR of the project activity (20 MW) with CDM revenues is 11.13%, which demonstrates that the project activity with CDM benefits becomes financially attractive.

Assessment of parameters and assumptions

All input parameters to the analysis are referenced to, and have been cross checked against, the approved third party SPDR for the project [Doc 1]. The values are found to be consistent. The key input parameters to the financial analysis were also cross checked against a number of other references, and were found to be reasonable. For further details please refer to the validation protocol in Appendix B below.

Financial analysis checklist:

The financial analysis has been assessed by the validation team, including a financial expert contracted by ERM CVS to assess the accuracy and conservativeness of the analysis. The following checklist highlights the key points that were checked:

Table 6: Validation of financial analysis

| Issue | Notes | Check | Cross check |
|---|---|---|---|
| Financial analysis method | Additionality tool followed. benchmark analysis used | Consistent with additionality tool | Consistent with Guidelines on the assessment of investment analysis |
| Benchmark type | Benchmark is appropriate for Project IRR | Project IRR calculation is used [Doc 54] | Consistent with host country guidelines [Doc 6] |
| Benchmark source & value | Third-party government benchmark taken from "Economic Evaluation Code for Small Hydropower Projects (SL 16-95)" [Doc 6] | Consistent with host country best practice. 3 rd party government source. | Used by other similar projects in the host country |
| Is the benchmark also applied in the SPDR? | Yes, it is applied | Yes. Consistent with 3 rd party SPDR | Used by other similar projects in the host country |
| Are the assumptions in the financial analysis consistent with the assumptions implicit in the chosen benchmark | Benchmark in [Doc 6] should be followed | Yes. Assumptions are consistent with SL16-95. | The benchmark is also widely applied by other projects in the host country. |
| If the benchmark is after tax, is actual interest payable taken into account in the calculation of income tax? Is this properly referenced and justified? | The benchmark is after tax. | Yes, interest payments are included in the IRR spreadsheet. These are referenced to the third party SPDR | [Doc 1] |
| Assessment period | 23 years including 2 years of construction period [Doc 1] | Consistent with 3 rd party SPDR | This is realistic based on sectoral and local knowledge |
| Inclusion of all costs and revenues | All relevant costs and revenues are included in the analysis | Yes. All relevant costs and revenues were included. No other potential revenue streams were identified for this type of project. | This is realistic based on sectoral and local knowledge. Local accounting practices were followed [Doc 56] |
| Annual net electricity generation – correct? | The plant load factor is determined from the third party SPDR and through coefficient of effective electricity generation for which the value is referenced from Third-party government benchmark taken from "Economic Evaluation Code for Small Hydropower Projects (SL 16-95)" [Doc 6]. | Consistent with 3 rd party SPDR, which was provided to the government for approval and was the basis for the investment decision in the proposed project. The annual power output of the project based on a long time-series (45 years) of hydrological data from the four local Hydrology Stations. | The annual output (electricity generation) is based on a load factor, calculated by the design institute, that was also presented to the government for approval and to investors (the SPDR). |
| Total investment | Total investment is 15803.83 Million RMB | Consistent with 3 rd party SPDR | Cross checked against actual investment expenditure on the project – determined by the independent Hunan Xianghua Public Accounting Co., Ltd. [Doc 7] |
| Fixed assets investment value | Fixed asset investment value is 14820.20 Million RMB. | Consistent with 3 rd party SPDR | Calculated correctly in line with Host country Accounting Practices [DOC/029] |

| Issue | Notes | Check | Cross check |
|----------------------|--|---|--|
| Depreciation | Less than 5 % applied to total fixed asset investment | Consistent with 3 rd party SPDR | Calculated correctly in line with Host country Accounting Practices [Doc 56] |
| Material cost | 5 RMB/KWH applied | Consistent with 3 rd party SPDR | Calculated correctly in line with Host country Accounting Practices [Doc 56]. O&M costs have been cross checked against similar projects in the region and are found to be consistent. |
| Other fees | | Consistent with 3 rd party SPDR | [Doc 1] |
| Electricity tariff | RMB 0.316/KWh is indicated in the PDD and used in the IRR calculation, for 20 MW capacity. | Consistent with 3 rd party SPDR | Consistent with the tariff regulations in the region [Doc 46] and other similar projects in the region. |
| Residual value | 5% of their original value after 20 years, which is in line with 3-5% recommended in <i>Economic Evaluation Code for Small Hydropower Projects</i> issued by the Ministry of Water Resources (SL 16-95), it is more conservative to select 5%. | Consistent with 3 rd party SPDR | Based on the sum of the 'fixed asset investment' and interest costs during the construction phase. Consistent with the Chinese regulations and is found to be conservative. |
| Income tax | The tax rate in the SPDR was 33%, which was the correct rate at the time of writing the SPDR. | Consistent with 3 rd party SPDR | Consistent with the Law of the People's Republic of China on Enterprise Income Tax [Doc 57]. |
| Sensitivity analysis | A variation of +/- 10 % is presented. | PDD shows variation needed to reach benchmark | Justification is provided for why such variation is unlikely, and is considered sufficient. See below. |
| Spreadsheet | Financial analysis and IRR calculation sheets are presented. | Traceable spreadsheet provided [Doc 54]. | Calculation is consistent with PDD and FSR |

Investment Costs:

Total investment costs amount to 15803.83 Million RMB and are consistent with the values provided in the SPDR [Doc1]. Review of the independent Financial Audit Report of the project activity completed by 'Hunan Xianghua Public Accounting Co., Ltd.', has shown that the actual fixed assets investment of the project until the end of 2008 was 199,847,571.37 RMB. The actual investment is thus already higher than the total investment budget in the SPDR. Therefore it can be confirmed that total investment assumed in the SPDR was conservative.

Operation and Maintenance Costs:

The operation and maintenance (O&M) costs have been reviewed by ERM CVS, including the breakdown of these costs in the SPDR.

The level of the O&M cost is considered reasonable as well as inclusion of 'other costs' in the financial analysis. Other costs represent miscellaneous costs incurred by all large investment projects, and it has been confirmed that inclusion of these costs is a common accounting practice in the country and it covers a variety of costs that are not accounted for in the main operation and maintenance costs, for example transport, insurance, advertising etc. It may be noted that level of O&M costs has no material impact on the IRR of the project activity. The IRR remains below the benchmark even if the O&M cost drops to zero, which is unlikely to happen. Hence, it is concluded that level of O&M cost does not pose any threat to the additionality of the project activity.

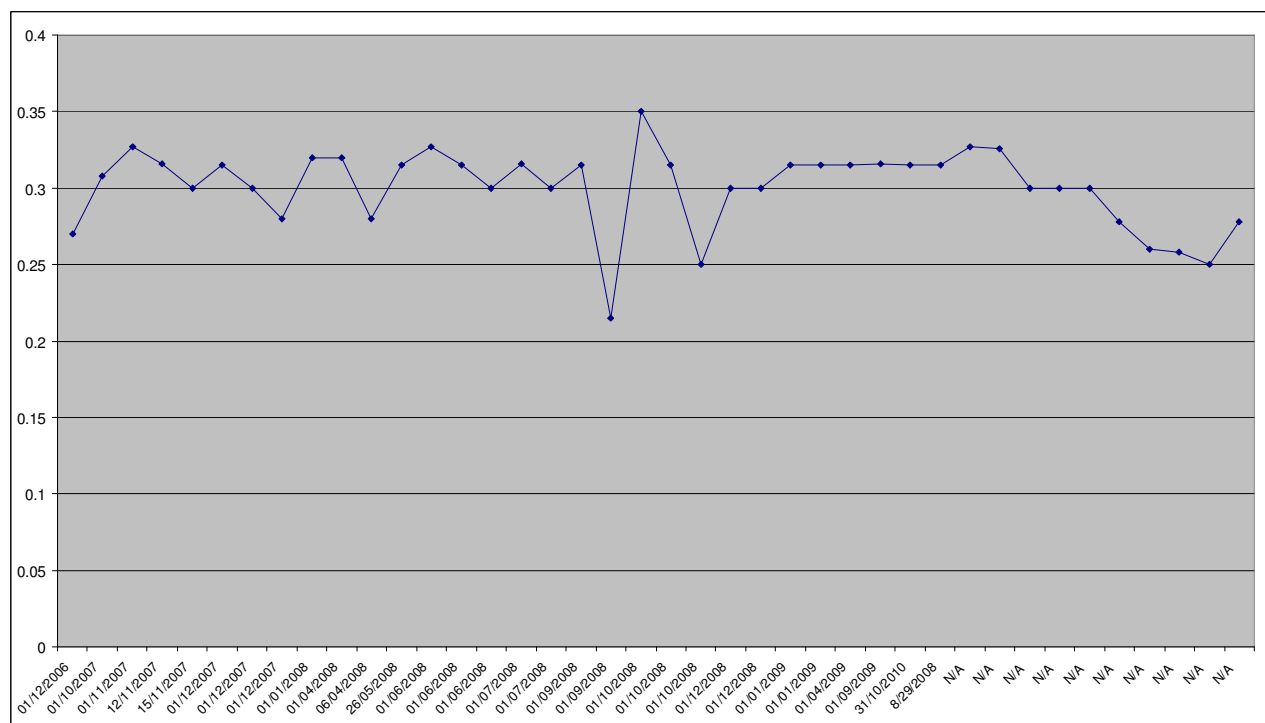
Electricity Tariff:

An electricity tariff of 0.316 RMB/Kwh has been applied in the financial analysis of the project activity. The applied tariff is found to be consistent with the SPDR [Doc1] and tariff regulations in the region [Doc 47]. Furthermore, according to the Notice about Further Adjustment of Electricity Tariff in Hunan Province (Xiangjiadian [2008] [Doc 48.], issued by Hunan Price Bureau on 22 October 2008, the actual specific electricity tariff for the project is listed as 0.316RMB/kWh in the document. Therefore the tariff actually received by the project is the same as that assumed in the SPDR and in the financial analysis.

A detailed review the tariffs awarded to registered hydro CDM project activities in Hunan province, PR China shows that the electricity tariff varies on a project to project basis. As evident from the below graph, the applied tariff for CDM projects (including VAT) has varied from 0.215 RMB/KWH (lowest) to 0.35 RMB/KWH (highest) without displaying a clear increasing (or decreasing) trend in the applied tariff over time. The x (horizontal) axis refers to the commissioning date of the project, and the Y (vertical) axis refers to the electricity tariff cited in the registered PDD of each project. The projects where data is available represent 40 projects. Projects with 'N/A' for the commissioning date represent projects where the commissioning date is in the future or where information on the commissioning date could not be found – therefore the graph should not be read to imply a decrease in electricity tariffs towards the end of the period. The project with the highest tariff was the Qi'nan hydro power project (UNFCCC reference number 2120) commissioned in October 2008, which had a tariff of 0.35 RMB/KWh including VAT. However it should be mentioned that this particular project is located in Hunan province but the project activity supplies electricity to the Southern China Power Grid, therefore the baseline scenario is different as compared to the proposed project. It had been confirmed from publicly available sources and registered CDM project activities¹ that the applicable tariff in Guangdong province for small hydro projects is much higher [Doc 59] than applicable tariff for similar size projects in Hunan province. It may also be noted that the rate of VAT for the Qi'nan hydro power project was 17% compared to this project activity which is subject to 6% VAT rate as per the local regulation. The tariff for Qi'nan, excluding VAT, is below 0.3 RMB/Kwh.

The highest applied tariff in the province was therefore 0.327 (inc VAT at 6%) for the Liyujiang Small Hydroelectric Project (LSHP). Applying this highest ever recorded tariff to the project results in an IRR of 8.94%, which is still below the benchmark. Therefore, it can be concluded that the tariff applied by the project activity is the actual tariff received by the project activity as cross-checked and confirmed through sale contract of electricity to the grid company [Doc 53]. It is also confirmed that because of applicable lower VAT rate for the project activity the highest ever applied tariff in the province will not raise the IRR of the project activity above the benchmark.

Figure 1: Registered CDM projects located in Hunan province and their applied tariff (information from registered projects on the CDM website)



¹ A review of five CDM registered projects located in Guangdong province (UNFCCC Ref: 1817, 1980, 2191, 2091 & 2213) shows that applied tariffs in these project activities are all well above 0.35 RMB/KWH.

As also evident from the sensitivity analysis that the project IRR will only become equal to the benchmark (10%) when electricity tariff is increased by 12.20 % i.e tariff reaching to 0.3544 RMB/kWh. The tariff in the region has demonstrated an increasing trend but the increase from 2004 to 2009 has been only 0.34%. Therefore an increase of 12.2% is considered unlikely.

Annual Electricity Output:

The expected total annual electricity generation of the project is 76,520 MWh and the annual net electricity supply delivered to the grid by the project is 72,331 MWh [PDD]. The PLF of the project activity is calculated as 43.68% (3826h/8760h). The net electricity supply has been calculated by taking into consideration the coefficient of electricity supply and internal electricity consumption of the plant along with transmission losses. The coefficient of effective electricity generation adopted in the SPDR as 0.95, is sourced from the Economic Evaluation Code for Small Hydropower Projects (SL16-95) [Doc 6]. The document specifies the range for the coefficient for effective supply to the grid to be used depending on the particular project circumstances. For grid connected, seasonal regulating hydro projects the range for coefficient is given as 0.90 -0.95. The project adopts the highest value for effective coefficient in the range given in the SL16-95 document. It may also be noted that the project IRR does not exceed the benchmark when the coefficient of effective electricity generation is set at the value of 1 which indicates that the annual net electricity supply of the electricity by the project activity is reasonable.

Furthermore, the project participants have demonstrated the validity of the PLF in accordance with the guidance provided by the Executive Board (EB 48, Annex 11, paragraph 3), i.e. the plant load factor was calculated by an independent third party design institute in the SPDR, and is the same value as that provided to the government for approval and to banks when applying for financing for the project. The annual operational hours of the project activity are calculated based on hydrological data for 45 years (1949 – 2003), collected by 4 local monitoring stations, which was confirmed by ERM CVS [Doc 1].

Other parameters:

Other critical parameters (tax rate, residual value & interest rates) which could potentially have an impact on the financial analysis and subsequently on the IRR of the project activity had been thoroughly reviewed and were found to be consistent with the values and information in the SPDR.

Sensitivity Analysis

The sensitivity analysis demonstrates the impact of variations of different input values on the IRR of the project activity and hence its financial attractiveness. The analysis covers four key parameters, namely: total investment, electricity tariff, net electricity supply and annual O&M costs. The inclusion of these four parameters is found to be reasonable due to their potential impact on the overall financial viability of the project activity. These four parameters represent more than 20% of costs or revenues, respectively. Similarly a range of +/- 10% is also found reasonable in consistent with the Guidelines on the assessment of investment analysis (v 3.1). The degree of variation in each parameter needed in order for the IRR to reach the benchmark was also presented, and the likelihood of such variation was assessed. The results of the variations in the sensitivity analysis are summarised below:

Total Investment: A decrease in the total investment by 11.30% will increase the IRR to reach the 10 % benchmark. Official statistical bulletins from the Statistics Bureau of Hunan Province for the period 2004 -2008 show that during the period 2004-2008 the average increase in process of industrial products and raw material have been 6.7 5% and 8.14 % respectively. Furthermore, the financial Audit Report of Niaoerchao Hydropower Project completed by the independent Hunan Xianghua Public Accounting Co., Ltd., shows that the actual fixed assets investment of the project are 199,847,571.37 RMB until the end of 2008 [Doc 7]. The actual investment is already much higher than the budget in the SPDR. Therefore, it can be confirmed by ERM CVS that the value for the total investment used in the investment analysis was conservative.

Electricity tariff: An increase of 12.20% in the electricity tariff will raise the IRR to the benchmark. The project activity has applied the highest tariff (0.316 RMB/KWH) for the period. As indicated above the highest applied tariff at the same VAT rate in the province was 0.327 (inc VAT at 6%) and applying this highest ever recorded tariff to the project results in an IRR of 8.94%, which is still below the benchmark. Although the electricity tariff in the province had not been applied in a consistent manner but an overall slight increasing trend can be witnessed. For hydropower plants (with installed capacity between 15 MW – 25 MW) in Hunan Province, demonstrates a slight increasing trend in recent years, however, the electricity tariff from 2004 until now has increased by only 0.32%. A 12.2% increase is considered unlikely given that the tariff only increased by 0.34% between 2004 and 2009.

Net electricity Supply: An increase of 12.28% in the net electricity generation will raise the IRR to the benchmark. The net electricity generation is dependent on hydrological resources availability, which is stable in the long term average. The electricity generation of the project has been calculated by the independent third party design institute based on a long times series (45 years) of hydrological data taken from 4 nearby monitoring stations, therefore it is considered unlikely that the electricity generation of the project could increase by 12.28% continuously over the entire crediting period.

O&M Costs: Even the reduction of O&M costs to zero will make the IRR to reach 9.96% which is lower than benchmark. Therefore, the O&M does not have any material impact on the IRR of the project activity.

Use of values from Feasibility Study Reports

In accordance with paragraph 54 of the report of the thirty-eighth meeting of the CDM Executive Board, in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, DOEs are required to ensure the following:

- (a) *The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed;*

The project activity had been subject to design changes taking into consideration poor financial returns and in order to optimise the use of available water resources. The FSR was completed in April 2005 and its approval took place in May 2005. The investment decision took place in August 2005 in director's meeting. The time gap between the finalisation of the FSR and the investment decision is sufficiently short. Subsequently PDR and SPDR were prepared in order to proceed with the implementation of the project activity in consideration to the revised project parameters.

- (b) *The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values;*

ERM CVS has confirmed that the values used in both the PDD and the spreadsheet and supporting documentation are fully consistent with the SPDR.

Details of any clarifications and corrections relating to the GSP PDD are provided in Appendix B (CDM Validation Protocol Checklist).

- (c) *On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.*

ERM CVS has confirmed on the basis of its local and sectoral expertise that the values are valid and applicable at the time of the investment decision, and are consistent with local accounting practices in China. Further details of the cross checks carried out are provided above, and in Appendix B (CDM Validation Protocol Checklist).

Common Practice Analysis

A common practice analysis has been carried out in order to complement the investment analysis presented in the PDD. The scope of the analysis is limited to Hunan province and projects which started construction after 2002, and with an installed capacity between 15MW-50MW. Those are considered justified based on the following considerations:

- Provinces in China are very large in terms of both geographical area and population size. Tariffs and regulatory environment vary significantly between provinces in China. Therefore the selection of the provincial level as the geographical region for analysis is considered reasonable.
- Projects developed before 2002 are not considered to be similar and applicable for the analysis given that they were developed before the reform of the power sector in China when the China State Power Corporation was diversified into five separate regional grids. This reform changed the tariff mechanisms and amounts of electricity allowed to be supplied to the grid. Therefore the inclusion of only projects developed after 2002 in the analysis is considered reasonable.
- As per the official classification of the Chinese government, small scale hydropower stations are defined hydropower stations with an installed capacity between 50 MW and 0.5 MW. Therefore 50MW is selected as the upper size threshold for comparison. Projects larger than 50MW face differences in the regulatory and approval regime. Projects below 15MW are not considered given that reliable publicly available information on these projects is not available in the region. Data on other power plants is taken from the China Water Resources Yearbooks, and this source does not include information on specific hydroelectric power plants below 15MW. ERM CVS was also able to confirm that no other publicly available and reliable sources of information were found that provide a complete list of hydro projects below 15MW installed capacity in the region. Therefore the inclusion of only projects between 15 and 50 MW installed capacity in the analysis is considered reasonable.

ERM CVS has used official sources and local and industry expertise to determine to what extent similar and operational projects (i.e. hydropower projects), other than CDM project activities, have been undertaken in Hunan. Based on publicly available information, and with reference to other CDM project documentation available on the UNFCCC website, it is confirmed that the projects shown in below table are similar to the project activity. ERM CVS can confirm that publicly available data is not available on projects below 15MW, therefore the analysis has been based on all projects between 15 and 50 MW [Doc 14].

Table 7 Hydro Projects between 15 – 50 MW

| No | The project name | Installed capacity (MW) | Operation time (year) | Investment per kWh (RMB /kWh) | IRR | Type of the project owner |
|----|------------------|-------------------------|-----------------------|-------------------------------|-----------|---------------------------|
| 1 | Yongxing II | 20.0 | 2005 | 1.85 | Above 10% | State owned enterprise |
| 2 | Chengjiangkou | 25.0 | 2006 | 1.96 | Above 10% | Private company |
| 3 | Yangmingshan II | 25.0 | 2004 | 1.21 | Above 10% | State owned enterprise |
| 4 | Leizhong | 40.5 | 2004 | 1.80 | Above 10% | State owned enterprise |

As evident from the above listed project activities that three out of four projects are state-owned projects and enjoy government support in developing and running the power plants [Doc 14]. This gives these projects superior access to capital and resources, such that the low financial rate of return, experienced by the proposed project activity, is less likely to prevent the implementation of those projects. Although the information on the exact internal rate of returns of these previous projects is not disclosed, from the publicly available information [Doc 51] it has been confirmed that the IRR of these projects is higher than 10%. Therefore the previous projects did not face the same hurdle to their implementation as the proposed project activity. It may also be noted that the investment per KWH for these projects is lower than that for the proposed project activity. Therefore, based on the available information, it can be concluded that these comparable projects benefited from more favourable financial rates of return and also low financial and investment risks because of government support and backing. It is highly unlikely for any private sector investor to enjoy similar investment facilities.

Based on above confirmed common practice analysis, ERM CVS concludes that the project is not common practice.

3.6. Calculation of GHG Emissions

The GHG emission reductions (ERy) achieved by the project activity is calculated in accordance with the methodology AMS.I.D (Version 15). ERy is equal to baseline emissions (BEy), minus project emissions (PEy) minus leakage emissions (Ly).

Baseline emissions: baseline emissions (BEy in tCO₂) are calculated as the quantity of electricity supplied by the project (EG_{BIy}, in MWh) multiplied by the baseline emissions factor of the grid (CCPG) (EF_{CO₂y} in tCO₂/MWh). EG_y = 72,331 MWh.

Grid emissions factor:

The grid emission factor of the CCPG is determined ex-ante for the 10 years crediting period following the tool to calculate the emission factor for an electricity system (version 02). In accordance with the tool the default weights (0.50:0.50) of the operating margin and the build margin are considered. The PDD, version 04, was published for GSP on 11 March 2010, and the calculation of the grid emission factor is calculated based on the latest data available published by the DNA of China at the time of validation based on the China Electric Power Yearbook and the China Energy Statistical Yearbook and applied in the NDRC guideline [Doc 21]

Operating Margin (OM): Method (a) (Simple OM) is used. This method is appropriate since low-cost/must run resources constitute less than 50% of the CCPG during the years 2003 to 2007. The Simple OM emission factor is calculated as the generation-weighted average emissions per electricity unit (tCO₂/MWh) of all generating sources serving the system, excluding low operating cost and must-run power plants.

Following the tool to calculate the emission factor for an electricity system (version 02), option B (based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system) has been used to calculate the grid emission factor operating margin. This option can be used if only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and off-grid power plants are not included in the calculation. As indicated, there isn't any nuclear power included in the grid (CCPG) at present and renewable power generation sources are considered as low-cost / must-run power sources in the CCPG. The quantity of electricity supplied to CCPG by these sources is known, and off-grid power plants are not included in the calculation. Given all this information option B is considered appropriate for calculating the operating margin grid emission factor. The values used and the calculation of the simple OM is considered to be reasonable, and is in line with official data published by the Government of China. The OM is calculated to be 1.1255 tCO₂/MWh.

Build Margin(BM): Following the tool to calculate the emission factor for an electricity system (version02), option 1 is chosen to calculate the build margin emission factor. Option 1 is to calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group at the time of CDM-PDD submission to the DOE for validation. Because of the unavailability of the data at the plant level in China, a deviation approach from EB 22 from methodology AM0005 has been applied for the calculations [Doc 60]. In accordance with this guidance, the build margin consists of the set of power capacity additions in the electricity system that comprises 20% of the generation capacity (in MW) of

the system, that have been built most recently, based on the aggregate incrementally installed capacity of all generation sources in year y , and the aggregate incrementally installed capacity of all generation sources in year $y-n$, where n represents the number of years of historical data that need to be considered in order for the sample group to comprise 20% of the total system generation capacity (in MW). The emissions factor of fossil fuel fired power generation in CCPG is calculated using the emission factors of the most advanced commercial generation technologies available in the host country (as published by the NDRC). Finally, the BM emission factor is calculated as the product of this emission factor of fossil fuel fired power generation and the proportion of fossil fuel fired power plants in the newly installed 20% capacity. The Build Margin emission factor is calculated by utilising an ex-ante 3 years data vintage for the CCPG. Following the tool and the deviation approach, the BM is calculated as 0.5802tCO₂/MWh.

Combined Margin(CM): The combined margin emissions factor is calculated as $0.50 \cdot EF_{grid,OM,y} + 0.50 \cdot EF_{grid,BM,y} = 0.85285 \text{ tCO}_2/\text{MWh}$. Therefore baseline emissions are calculated as $72,331 \text{ MWh} \cdot 0.85285 = 61,687 \text{ tCO}_2\text{e per annum}$.

Project Emissions:

In accordance with the approved methodology ACM0002 (Version 11), for hydro power project activities that result in new reservoirs, project proponents shall account for CH₄ and CO₂ emissions from the reservoir. If the power density of the project activity (PD) is greater than 10 W/m², as in the case of the proposed project activity, project emissions are equal to zero. The surface area of the reservoir when it is full, and the installed capacity of the project will be monitored as part of the monitoring plan however based on the detailed design of the project in the SPDR [Doc xx] the PD is not expected to fall below 10 w/m² and therefore project emissions are expected to remain as zero.

Leakage:

In accordance with the approve methodology ACM0002 (version 11), leakage emissions are not considered.

Parameters determined ex-ante

| | |
|--|--|
| $NCV_{i,y}$ | The net calorific value (energy content) per mass or volume unit of fuel i in year y |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | kJ/kg or kJ/m^3 - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China Energy Statistical Yearbook 2008 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes. The values have been verified against the data published by the DNA of China. |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|--|
| $EG_{Thermal,j,y}$ | The electricity generated by fuel-fired power plants in province j in CCPG in year y |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | MWh – Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China Electric Power Yearbook 2006-2008 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes. The values have been verified against the data published by the DNA of China. |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|--|
| <i>IPCR_{j,y}</i> | The internal power consumption rate of power plants in province j in CCPG in year y. |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | % - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China Electric Power Yearbook 2006-2008 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes. The values have been verified against the data published by the DNA of China. |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|--|
| <i>EF_{CO₂, i,y}</i> | The CO ₂ emission factor per unit of fuel i in year y |
| <i>Title in line with Methodology?</i> | Yes |
| <i>Data unit correctly expressed?</i> | tCO ₂ /TJ - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|---|
| <i>FC_{i, y}</i> | The quantity of fuel i (in a mass or volume unit) consumed by CCPG in year y |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | 104 t, 108 m ³ - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China Energy Statistical Yearbook 2006-2008 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|---|
| <i>CAP_{j, y}</i> | Installed capacities of province j in CCPG in years y |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | MW – Yes |
| <i>Appropriate description?</i> | Yes |

| | |
|--|---|
| <i>Source clearly referenced? (appropriate?)</i> | China Energy Statistical Yearbook 2006-2008 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|--|
| <i>GENE_{Coal,Adv}</i> | The power supply efficiency of coal-fired power plants with best technology commercially available |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | MW - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China's Regional Grid Baseline Emission Factors 2009 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|---|
| <i>GENE_{Oil,Adv,y}</i> | The power supply efficiency of oil/gas-fired power plants with best technologies commercially available |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China's Regional Grid Baseline Emission Factors 2009 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |
| <i>Measurement method correctly described?</i> | Not applicable |

| | |
|--|---|
| <i>EF_{grid,OM,y}</i> | Operating margin emission coefficient of CCPG |
| <i>Title in line with Methodology?</i> | <i>The parameter is specific to grid emissions factor calculations in China</i> |
| <i>Data unit correctly expressed?</i> | tCO ₂ e/MWh - Yes |
| <i>Appropriate description?</i> | Yes |
| <i>Source clearly referenced? (appropriate?)</i> | China's Regional Grid Baseline Emission Factors 2009 |
| <i>Correct value provided?</i> | Yes |
| <i>Has this value been verified?</i> | Yes |
| <i>Choice of data correctly justified?</i> | Yes |

| | |
|---|----------------|
| Measurement method correctly described? | Not applicable |
|---|----------------|

| | |
|---|--|
| <i>EF_{grid}, BM, y</i> | Build margin emission coefficient of CCPG |
| Title in line with Methodology? | The parameter is specific to grid emissions factor calculations in China |
| Data unit correctly expressed? | tCO ₂ e/MWh - Yes |
| Appropriate description? | Yes |
| Source clearly referenced? (appropriate?) | China's Regional Grid Baseline Emission Factors 2009 |
| Correct value provided? | Yes |
| Has this value been verified? | Yes |
| Choice of data correctly justified? | Yes |
| Measurement method correctly described? | Not applicable |

| | |
|---|--|
| <i>EF_{grid}, CM, y</i> | Combined margin emission coefficient of CCPG |
| Title in line with Methodology? | The parameter is specific to grid emissions factor calculations in China |
| Data unit correctly expressed? | tCO ₂ e/MWh - Yes |
| Appropriate description? | Yes |
| Source clearly referenced? (appropriate?) | China's Regional Grid Baseline Emission Factors 2009 |
| Correct value provided? | Yes |
| Has this value been verified? | Yes |
| Choice of data correctly justified? | Yes |
| Measurement method correctly described? | Not applicable |

3.7. Environmental and Sustainable Development Impacts

The Environmental Impact Assessment (EIA) Report was compiled by Huaihua Environment Protection Science Institute in May 2006. The project owner then obtained the EIA approval (Huaihuanhan [2006] No.57) from Huaihua Environmental Protection Bureau on 6 June 2006.[Doc 43]. Due to the change of the total installed capacity, the PP applied to Huaihua Environmental Protection Bureau for supplementary approval of the EIA and obtained the supplementary approval (Huaihuanhan [2006] No.68) from Huaihua Environmental Protection Bureau on 12 October 2006. The EIA identified several areas where there could be potential environmental impacts due to the implementation and operation of the project activity. The project proponents have identified the corrective measures which shall be undertaken and these measures are found to be satisfactory. It is confirmed that based on the EIA the project activity will not lead to significant environmental impacts.

The implementation of the project activity resulted in the inundation and resettlement of a total of 244 local villagers. The project developers ensured that resettled people received compensations according to host country Compensation Standards, and the local government supervised each payment. After meeting and interviewing the resettled villagers it can be confirmed that the resettled villagers interviewed were satisfied with the compensation provided by project developers. Furthermore, the letter of approval by the DNA of the host country confirms the contribution of the proposed CDM project activity to the sustainable development of the host Party.

3.8. Comments by Local Stakeholders

The project owner put up bulletins all around the project site and held a meeting for stakeholder consultation on December 3, 2006. Participants of the meeting included 46 people of different ages, different sex, different occupations and different educational backgrounds. Participants at the meeting made comments on the construction of the proposed project concerning compensation paid to resettled and affected people, impacts on water, air and noise during the construction, as well as water, soil and vegetation conservation. The stakeholders were concerned that the project did not have serious adverse effects on local people.


Project proponents took the due account of comments received from local stakeholders and implemented certain measures to ensure the concerns of the stakeholders were addressed, which included making compensation payments in accordance with national regulations and under the supervision of the local government, and ensuring that the environmental protection measures in the EIA are carried out.

In summary, it can be concluded that CDM and host country requirements for local stakeholder consultation were fulfilled.

3.9. Additional Findings

None

4. Conclusion and Validation Opinion

| | |
|---|--|
| Name of Project | China Niaoerchao Hydropower Project |
| Basis of validation | <p>ERM CVS based its validation work on:</p> <ul style="list-style-type: none"> • CDM approved monitoring methodology ACM0002 v 11 • Project Design Document version 04 dated 03 February 2010, and the revised PDD version 06 dated 05 May 2010 • CDM Validation and Verification Manual (EB 44 and updated at EB 51) • ERM CVS's internal CDM validation methodologies and protocols • CDM decisions and guidance issued by the CDM Executive Board • UNFCCC criteria for the Clean Development Mechanism • Host Country criteria for the Clean Development Mechanism |
| Responsibilities of ERM CVS | ERM CVS is responsible to provide an independent third party assessment of the proposed CDM project activity to ensure that the proposed CDM project activity meets all the identified and applicable criteria for registration of projects under the CDM. |
| Responsibilities of Project Participants | Hunan Guohong Investment Co., Ltd and Carbon Asset Management Sweden AB are responsible for preparing the PDD, supporting documentation and providing all necessary evidences to support the information included in the PDD. |
| Activities performed | ERM CVS conducted its activities in accordance with the CDM Validation and Verification Manual, approved at EB 44 and revised at EB 51. The validation consisted of a review of project documentation, a site visit, interviews with relevant personnel, cross checking and ascertaining information through other reliable sources and on its sectoral, regional and local expertise and resolution of CLs and CARs pertaining to the project activity. |
| ERM CVS Conclusion | <p>ERM Certification and Verification Services has performed the validation of the China Niaoerchao Hydropower Project against the criteria for the Clean Development Mechanism as set out by the Conference of the Parties and the UNFCCC CDM Executive Board, and host country criteria. The validation employed standard auditing techniques, and a validation protocol checklist was used to carry out the validation.</p> <p>The project is a newly built grid-connected hydroelectric project. The Annex 1 Party for the project activity is Sweden. The Party fulfils the criteria for participation in the CDM, and has issued a letter of approval for the project and authorised the project participants. The LoA of the host Party, China, confirms the contribution of the project towards sustainable development.</p> <p>The validation has provided sufficient evidence to demonstrate that the project activity is not the baseline scenario, and that emission reductions would be additional to what would have taken place in the absence of the CDM project activity. The project meets the applicability criteria and correctly applies the approved methodology ACM0002 version 11, and is therefore expected to result in real, measurable and long term reductions in greenhouse gas emissions. The monitoring plan provides for the collection and archiving of data sufficient to ensure that emission reductions can be verified. Nothing came to our attention to suggest that the project, if implemented as described, would not result in emission reductions of 61,687 tCO₂e per year on average over the crediting period.</p> <p>In summary, it is the opinion of ERM CVS that the China Niaoerchao Hydropower Project as described in the PDD version 06 of 05 May 2010, meets all stated criteria of the CDM, correctly applies the methodology ACM0002 version 11, and is expected to result in real, measurable and long term emission reductions, and the DNA of the host Party has confirmed that the project assists in meeting sustainable development criteria.</p> <p>ERM CVS therefore requests that the CDM Executive Board registers the project as a CDM project activity.</p> |
| Signed on behalf of ERM CVS |  |
| Name: | Melanie Eddis |
| Date: | 09 December 2010 |

Appendix A: Documents and Interviewees

DOCUMENT LIST

| Reference | Date | Document Title |
|-----------|-------------------|---|
| [Doc 1] | August 2006 | Hunan Yuanling Niaoerchao Hydropower Project Supplementary Preliminary Design report, Huaihua Institute of Hydroelectric Investigation |
| [Doc 2] | | Nameplate of Generator and Turbine, Fujian Nanping Hydropower Equipment Manufacture Co., Ltd. |
| [Doc 3] | | Nameplate of Transformer, Sanbian Technology Co., Ltd. |
| [Doc 4] | 2 July 2009 | China's Regional Grid Baseline Emission Factors 2009, NDRC |
| [Doc 5] | 12 January 2009 | Bulletin of Effective Water Resources Technology Standard, Ministry of Water Resources |
| [Doc 6] | 2 June 1995 | Economic Evaluation Code for Small Hydropower Projects (SL16-95), Ministry of Water Resources |
| [Doc 7] | | Financial Audit Report of Niaoerchao Hydropower Project, Hunan Xianghua Public Accounting Co., Ltd |
| [Doc 8] | September 2009 | Producer Price Indices for Manufactured Goods by Category in China Statistical Yearbook 2009, National Bureau of Statistics of China |
| [Doc 9] | 30 April 2004 | Reply Letter about Electricity Tariff of Yuanmushan Hydropower Plant (Xiangjiahan [2004] No.55) http://wj.jueyang.gov.cn/newCenterView.do?id=543 , Hunan Price Bureau |
| [Doc 10] | 11 June 2004 | Reply Letter about Electricity Tariff of Helv Hydropower Plant (Xiangjiahan [2004] No.81), Hunan Price Bureau |
| [Doc 11] | 4 August 2004 | Notice about Adjustment of Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2004] No.114), Hunan Price Bureau |
| [Doc 12] | 23 August 2005 | Notice about Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2005] No. 129), Hunan Price Bureau |
| [Doc 13] | 28 July 2006 | Notice about Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2006] No.111), Hunan Price Bureau |
| [Doc 14] | | Investigation Report on Hydropower Plants with Installed Capacity of over 15MW in operation since 2002 in Hunan Province, Hunan Hydro & Power Design Institute |
| [Doc 15] | April 2005 | Feasibility Study Report of Yuanling County Dongting River Niaoerchao Hydropower Project, Huaihua Institute of Hydroelectric Investigation |
| [Doc 16] | 26 May 2005 | Approval of Feasibility Study Report of Yuanling County Dongting River Niaoerchao Hydropower Project (Huaifagaineng[2005]No.10), Development and Reform Commission of Huaihua City |
| [Doc17] | 21 June 2005 | Meeting Minutes of Yuanling County Government (No. 9), Yuanling County Government |
| [Doc 18] | 5 August 2005 | Minutes of Director Meeting of Hunan Guohong Investment Co., Ltd., Hunan Guohong Investment Co., Ltd |
| [Doc 19] | 30 September 2005 | 1st Bank Loan Agreement signed with China Construction Bank Changsha Huaxing Branch |
| [Doc 20] | February 2006 | Draft Supplementary Preliminary Design Report of Hunan Province Yuanling County Niaoerchao Hydropower Project approval, Huaihua Institute of Hydroelectric Investigation |
| [Doc 21] | 7 November 2005 | Notice about Application CDM Project from Development and Reform Commission, Development and Reform Commission of Hunan Province & Science and Technology Department of Hunan Province |
| [Doc 22] | 16 November 2005 | Generator and Turbine Purchase Agreement signed with Fujian Nanping Hydropower Equipment Manufacture Co., Ltd. |
| [Doc 23] | 9 December 2005 | Record of First CDM Training Course in Hunan Province, Science & Technology Department of Hunan Province |
| [Doc 24] | 8 December 2005 | 1st payment receipt for Generator and Turbine Agreement from China Construction Bank |
| [Doc 25] | 5 January 2006 | 2nd Bank Loan Agreement signed with China Construction Bank |
| [Doc 26] | 13 January 2008 | Loan agreement between project owners and Agricultural Bank of China |
| [Doc 27] | April 2006 | Final version of Preliminary Design Report of Hunan Province Yuanling County Niaoerchao Hydropower Project, Huaihua Institute of Hydroelectric Investigation |
| [Doc 28] | 15 May 2006 | Approval Letter of Preliminary Design Report of Hunan Province Yuanling County Niaoerchao Hydropower Project (Huaishuidianzi[2006]No.50), Water Resources Bureau of Huaihua City |
| [Doc 29] | 17 June 2006 | Supplementary Generator and Turbine Purchase Agreement, Fujian Nanping Hydropower Equipment Manufacture Co., Ltd. |
| [Doc 30] | 23 June 2006 | Letter of Intent of Emission Reductions signed with Carbon Asset Management Sweden |

| Reference | Date | Document Title |
|-----------|--------------------------------|---|
| | | AB |
| [Doc 31] | 29 September 2006 | Emission Reductions Purchase Agreement signed with Carbon Asset Management Sweden AB |
| [Doc 32] | 22 November 2006 | Approval Letter of Supplementary Preliminary Design Report (Huaihuidian [2006] No.139), Water Resources Bureau of Huaihua City |
| [Doc 33] | 10 December 2006 | Construction Order, Engineering Supervision Department |
| [Doc 34] | 16 April 2007 to 20 April 2007 | Monitoring Training Record, Hunan Guohong Investment Co., Ltd. |
| [Doc 35] | 5 June 2007 | 3rd Bank Loan Agreement signed with China Construction Bank |
| [Doc 36] | 20 November 2007 | CDM Letter of Approval issued by Swedish DNA, Swedish Energy Agency |
| [Doc 37] | 17 December 2007 | CDM Letter of Approval issued by Chinese DNA, NDRC |
| [Doc 38] | 13 August 2008 | 4th Bank Loan Agreement signed with China Construction Bank |
| [Doc 39] | 15 December 2009 | Bank Loan Reply Letter from Agricultural Bank of China |
| [Doc 40] | 20 January 2010 | Bank Loan Agreement signed with ABC |
| [Doc 41] | | Handbook of Monitoring and Management for Niaoerchao Hydropower Project , Hunan Guohong Investment Co., Ltd. |
| [Doc 42] | May 2006 | Environmental Impact Assessment Report of Niaoerchao Hydropower Plant , Huaihua Environment Protection Science Institute |
| [Doc 43] | 6 June 2006 | Approval Letter of Environmental Impact Assessment Report of Niaoerchao Hydropower Plant (Huaihuannan [2006] No.57), Huaihua Environmental Protection Bureau |
| [Doc 44] | 12 October 2006 | Supplementary Approval Letter of Environmental Impact Assessment Report of Niaoerchao Hydropower Plant (Huaihuannan [2006] No.68), Huaihua Environmental Protection Bureau |
| [Doc 45] | 3 December 2006 | Stakeholders Consultation Meeting Minutes of China Niaoerchao Hydropower Project , Hunan Guohong Investment Co., Ltd. |
| [Doc 46] | 27 October 2006 | Notice about Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2006] No.148), Hunan Price Bureau |
| [Doc 47] | 2 July 2007 | Approval about Electricity Tariff of Newly Built and Retrofit Power Plants in Hunan Province (Xiangjiachong [2007] No.85), Hunan Price Bureau |
| [Doc 48] | 22 October 2008 | Notice about Further Adjustment of Electricity Tariff in Hunan Province (Xiangjiadian [2008] No.158), Hunan Price Bureau |
| [Doc 49] | 2003 | Classification & Design Safety Standard of Hydropower Projects (DL5180-2003) |
| [Doc 50] | 2006 | China Water Resources Yearbook 2006 |
| [Doc51] | 2004~2008 | China Electric Power Yearbook Committee, China Electric Power Yearbook |
| [Doc 52] | | project layout maps |
| [Doc 53] | May 2008 | Sale contract of electricity to the grid company |
| [Doc 54] | | IRR calculation spreadsheet |
| [Doc 55] | 1997-2008 | Historical data of bank loan interest rate in China |
| [Doc 56] | 13 December 1993, | <i>Enterprise Income Tax Law of the People's Republic of China</i> (promulgated on Document Order of the President of the People's Republic of China (No. 137) |
| [Doc 57] | 2008 | People's Republic of China on Enterprise Income Tax |
| [Doc 58] | 1994 | Hydroenergy Design Code for Small Hydropower Projects (SL76-94) |
| [Doc 59] | | http://www.gdpc.gov.cn/detail.jsp?id=120756 |
| [Doc 60] | EB 22 | http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZA_K6V5YXPQKK7WYJ |
| [Doc 61] | 09 February 2010 | Water Diversion Tunnel Construction Contract of Liujingtian Dam |
| [Doc 62] | 15 December 2009 | Bank loan reply letter from confirming CDM as a factor to approve the loan |
| [Doc 63] | 20 January 2010 | Bank loan agreement with Agriculture Bank of China |
| [Doc 64] | 15 June 2009 | Validation report: China Niaoerchao Hydropower Project, issued by TUV Rheinland |
| [Doc 65] | November 2005 | Draft Preliminary Design Report of Hunan Province Yuanling County Niaoerchao Hydropower Project , Huaihua Institute of Hydroelectric Investigation |

List of Interviewees

| Date | Name | Position |
|------|------|----------|
|------|------|----------|

| | | |
|----------------------|-----------------|---|
| 18 and 19 March 2010 | Xu, Guowu | Director of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Tang, Yongji | Operation manager of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Huang, Bingying | Shift manager of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Yang, Liuhua | Shift manager of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Li, Daohu | Shift manager of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Zhang, Xianghao | Office manager of Niaoerchao Hydro Station |
| 18 and 19 March 2010 | Xu, Hengzhi | Technical Department of Tricorona |
| 18 and 19 March 2010 | Dong, Nanya | Consultant in CDM centre of Hunnan |

Appendix B: CDM Validation Protocol

DR = Document Review (refers to number on Document List)

SV = Site Visit

IV = Interview (refers to number on List of Interviewees)

FAR = Forward Action Request

NA = Not Applicable

OK = acceptable

CAR = Corrective Action Request

CL = Clarification Request

| | Checklist Question | Reference | Comment | Draft Conclusion | Final Conclusion |
|-----------|---|-----------|--|--------------------------------|------------------|
| 1. | PDD Format (CDM VVM para. 55 and 56) | | | OK/CAR/CL | OK/ NOT OK |
| 1.1 | Is the PDD prepared in accordance with the latest template and guidance by the CDM EB? http://cdm.unfccc.int/Reference/PDDs_FORMS/PDDs/index.html | | Yes - the PDD used is in accordance with the latest template (version 03: effective from 28 July 2006) and guidance by the CDM-EB. | OK | OK |
| 1.2 | Does the language make sense and is it clear? | | No, several minor issues on clarity of the language and consistency of the information in the PDD had been raised. Please refer to the CARs and CLs below. | OK | OK |
| 2. | Project Title | PDD A.1 | | | |
| 2.1 | Does the project title enable the identification of the unique CDM project activity? | | Yes, the project title is clear and indicates the unique identification of the project. | OK | OK |
| 2.2 | Is the version number and date of the PDD clearly indicated? Is this consistent with the project's timeline? | | No, version of the PDD is not correct. A clarification request (CL 1) has been raised indicating to check the version number of the PDD. | CL 1 | OK |
| 3. | Project Description (CDM VVM para. 58-64) | PDD A.2 | | | |
| 3.1 | Does the PDD contain a clear description of the project activity, with regard to its nature and technical implementation? Does Section A2 include: a. A brief summary of A4, particularly A4.3, b. A summary of B.3, sources and gases c. The PP's opinion regarding the contribution of the project to sustainable development | | No, project description, type of the project and its technical specifications are not clear. Clarification request (CL 2) has been raised relating to the clarity of the project description and type of the project activity. a. No, CL 3 has been made for information on two reservoirs; b. Yes, section A.2 describes the emission reductions expected to result from the implementation of the project; c. Yes, there is indication of contribution of the | CL 2 CL 3 | OK OK |

Validation Report



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| | | | project activity to the sustainable development, such as, reducing emissions, creation of local job opportunities and maintenance of infrastructure at the project site. | | |
| 3.2 | Does the description deliver a transparent overview of the project activity and does it cover all relevant elements? | | No, there are several elements in the project description that require revision or clarification, including project type, technical information, inclusion of submerged area of the reservoir and CL2, CL 4 & CL 5 have been raised. CL 4 , annual utilization hours stated in the PDD was not consistent with the supplementary design report (SPDR). CL 5 , the submerged area of the second reservoir should be included in the PDD | CL 2 CL 4 CL 5 | OK OK OK |
| 3.3 | Has a physical site inspection been undertaken to confirm that the description in the PDD reflects the proposed CDM project activity? | | Yes, physical site inspection was undertaken on 18 March and it is confirmed that PDD reflects the proposed CDM project activity. | OK | OK |
| 3.4 | Does section A.2 also indicate the baseline situation, and the historical situation at the facility, if this is different to the baseline? If the proposed CDM activity involves the alteration of an existing installation or process, does the description clearly state the differences to the pre-project situation? | | Yes, section A2 indicates the baseline as displacing part of the electricity generated by the project activity in the grid. The indicated baseline is in accordance with the approved baseline methodology ACM0002 (v 11). The project is a newly built hydro activity so it does not involve alteration of any existing installation or processes. | Ok | OK |
| 3.5 | Is all information provided in the project description consistent with information provided in later sections of the PDD? | | No, there are some inconsistencies identified and correction action requests and clarification requests have been raised. For details, see CL 4 and CL 5 . | CL 4 CL 5 | OK OK |
| 4. | Technical Description | PDD A.4 | | | |
| | Location of Project | PDD A.4.1 | | | |
| 4.1 | Does the information provided on the location of the project activity allow for a clear identification of the site(s)? How was the site location confirmed? (e.g. site visit, planning documents) | | Project site and location was confirmed by site inspection and cross-checking against the associated documentation, such as supplementary project design report (SPDR), FSR, site maps and planning documents. The project includes two dams (Niaoerchao & Liujingtian) on two different rivers (Dongtingxi & Wangjiayi). It is confirmed that construction of Niaoerchao dam is at an advanced stage whereas construction on the Liujingtian dam has just started. The distance between two dams is not identified in the PDD, therefore a clarification request has been made (CL 6). | CL 6 | OK |
| | Category/ Sectoral Scope | PDD A.4.2 | | | |
| 4.2 | Is the category (sectoral scope) of the project activity indicated | | The project activity is a hydro electricity project and is | CL35 | OK |

Validation Report



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| | and correct? | | associated with Sectoral Scope 1. Energy Industries (renewable/non-renewable sources). The PDD incorrectly makes reference to the categories for small scale projects in section A.4.2. A clarification request (CL 35) has been raised. | | |
| | Technology to be Employed by the Project Activity | PDD A.4.3 | | | |
| 4.3 | <p>Is there a clear description of the baseline scenario, as identified in section B.4? This should include:</p> <ol style="list-style-type: none"> An indicative list of the equipment(s) and systems that would have been in place in the absence of the project activity (if any) Information about the age and average lifetime of the baseline facility based on manufacturer's specifications and industry standards (if applicable) Installed capacities, load factors and efficiencies of the baseline facility (if applicable) An explanation of how the same types and levels of services provided by the project activity would have been provided in the baseline scenario. | | <p>Yes, the baseline scenario is in accordance with the approved methodology ACM0002 (v 11). The project is a newly built hydro electricity project connected to the grid. The baseline scenario is electricity delivered to the grid by the project that would have been otherwise generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM).</p> <ol style="list-style-type: none"> Not applicable Not applicable Not applicable Section A.4.3 does not contain this information. Explanation on how the same types and levels of services provided by the project activity would have been provided in the baseline scenario is not provided. A clarification request (CL 36) has been raised. | CL 36 | OK |
| 4.4 | If the scenario existing prior to the start of the implementation of the project activity is different from the selected baseline scenario, is there a clear description of the pre-existing scenario, with a list of the equipment(s) and systems in operation at that time? | | Not applicable | | |
| 4.5 | <p>Is the technology to be employed by the project activity clearly described and is it consistent with information provided elsewhere in the PDD? The description should include:</p> <ol style="list-style-type: none"> List of main technologies involved List of main equipment and installations The lifetime of the project equipment Capacities, load factors and efficiencies (where relevant) The emissions sources and the greenhouse gases involved in the project activity Existing and forecast energy and mass flows and balances Interaction with processes/equipment outside the project boundary, if any, is stated. | | <p>Main technical parameters for the project include: Construction of two dams, two reservoirs, two water diversion tunnels and a powerhouse.</p> <p>Electrical equipments include two turbines and generators. The PDD provides descriptions of the technological parameters and lists the main technical equipments and their specifications. Some inconsistencies in the values of the parameters as provided in the PDD were found and clarification requests had been raised as follows.</p> <ol style="list-style-type: none"> Yes, the main technologies has been discussed in A4.3; Yes, table 1 lists the main equipments, however the specification of the equipments detailed in table 1 was not consistent with the name plate of the actual installation observed onsite (CL 7); details of the main transformer, and references for the information provided in the table should also be included in the equipment list (CL 8) | CL 4 CL 3 CL 7 CL 8 CL 9 | OK |

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| | | | <ul style="list-style-type: none"> c. No, CL 9, life time of the project equipment should be included in the PDD d. No, see CL 4 e. Yes, no project emissions are involved. The proposed project is a hydro electricity project so no emission sources are expected from the project activity. According to the methodology (ACM0002 - v11), for new hydroelectric power projects with reservoirs, if the power density of the project is greater than 10W/m2, then project emissions should be considered zero. For the proposed project, the power density is 12.05 W/m2, greater than 10 W/m2, thus project emissions are zero. However, please refer to CL 5 regarding the power density calculation. f. Total electricity generation, net electricity supplied to the grid, and an explanation and justification for the difference between these two values shall be given in section A.4.3.(CL 4) g. Not applicable | | |
| 4.6 | Does the description of the technology to be applied provide sufficient and transparent input/ information to evaluate its impact on the greenhouse gas balance? | | Yes, the project is renewable energy hydro project and there are no emission sources associated with the project or the technology to be employed by the project. | Ok | OK |
| 4.7 | Does the implementation of the project activity require any technology transfer from annex-I-countries to the host country(ies)? | | No, all technology employed and technical equipments installed are locally manufactured. | OK | OK |
| 4.8 | Does the project use state of the art technology and / or does the technology result in a significantly better performance than any commonly used technologies in the host country? Is the technology implemented by the project activity environmentally safe? | | Information on the performance and efficiency of the installed technologies is not provided. The PDD indicates that the technology is environmentally safe and that strict environmental protection measures will be implemented. However, a clarification request had been raised to provide more information on the environmental safety of the technology employed by the proposed project (CL 10). | CL 10 | OK |
| 4.9 | Is the project technology likely to be substituted by other or more efficient technologies within the project period? | | No, it is not likely to happen. Hydro technology is not only widely applied in China but in other parts of the world as well. Improvements in the technology over the period are not likely to have an impact on the technology employed by the proposed project. | OK | OK |
| 4.10 | Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period? Is information available on the demand and requirements for | | No, only training requirements are foreseen are on the monitoring aspects. A training program on the monitoring requirements has been indicated which includes training on CDM knowledge, the operational regulations, quality control | OK | OK |

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|------|--|-----------|---|-------|----|
| | training and maintenance? | | (QC), data recording requirements and the management rules. | | |
| 4.11 | Is a schedule available for the implementation of the project and are there any risks for delays? | | <p>According to the SPDR, the construction of the project was estimated to last three years. The construction of the project started on 12 December 2006 and was expected to be completed in 2009.</p> <p>Stage I of the project construction, including the first dam, the reservoir and the equipment including two power generators and two turbines and one main transformer have been installed at the time of site visit.</p> <p>The operation started in August 2008, and the project is only operating at 30 % of its designed capacity the time of site visit.</p> <p>The construction of stage II of the project (including second tunnel, second dam and the water channel) had only started in March 2010, due to extreme weather conditions in late 2007 and early 2008 throughout southern China. Stage II of the construction is expected to be completed by the end of 2011. This slight delay of the project is considered to have no impact on the operation of the overall project once complete.</p> <p>However, emission reductions in 2011 are the same as emission reductions in later years even though the project is not expected to be fully completed until the end of 2011. The emissions reduction estimates should be corrected to take into account the delays in project construction. A clarification request (CL 36) has been raised.</p> | OK | OK |
| | Public Funding from Annex I country | PDD A.4.5 | | CL 10 | OK |
| 4.12 | Is the information provided on public funding provided in compliance with the actual or planned situation, based on the available evidence? | | Review of the supporting documentation and confirmation by the PPs (FSR, PDR, financial analysis, it is confirmed that no public finding is involved in the implementation of the proposed project. | Ok | OK |
| 4.13 | If the project involves public funding from an Annex 1 country, have the annex 1 parties involved provided an affirmation that such funding does not result in a diversion of official development assistance? | | Not applicable | Ok | OK |
| 5. | Approval and Participation (CDM VVM EB 44 para.44 – 50 and para. 51 - 54) | PDD A.3 | | | |
| 5.1 | <p>Are project participants listed in tabular form in section A.3 of the PDD?</p> <p>Is this information consistent with the contact details provided in Annex 1 of the PDD and other project documentation (Letters of Approval and Modalities of Communication)?</p> | | <p>Yes, the PPs are listed in a tabular format in section A.3</p> <p>And this information is consistent with the contact details provided in annex 1 of the PDD.</p> | OK | OK |

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| 5.2 | Has the Host Party provided a Letter of Approval (LoA) with clear referencing and supporting documentation? Does the LoA confirm: <ul style="list-style-type: none"> o Ratification of the Kyoto Protocol o Voluntary Participation o Contribution to Sustainable Development o Reference to the precise project title in the PDD | | Yes, a LoA from People's Republic of China has been provided. The LoA confirms that; <ul style="list-style-type: none"> o P. R. China has ratified the Kyoto Protocol; o Its participation in the CDM is voluntary; o Proposed project contributes to its sustainable development; and o There is reference to the precise project title as listed in the PDD. | Ok | OK |
| 5.3 | Was the LoA received directly from the DNA or from the project participants? Has the Host Party LoA been issued by the respective DNA? How has this been confirmed? | | Yes, the LoA has been issued by the DNA of the host Party. The authenticity of the LoA is not doubted as the project can be found on the website of the China DNA as approved. | OK | OK |
| 5.4 | Has the Annex I Party provided a Letter of Approval (LoA) with clear referencing and supporting documentation? Does the LoA confirm: <ul style="list-style-type: none"> a. Ratification of the Kyoto Protocol b. Voluntary Participation c. Contribution to Sustainable Development d. Reference to the precise project title in the PDD | | Yes, it is checked that LoA from the Swedish Energy Agency (DNA) contains and confirms: <ul style="list-style-type: none"> o Its ratification of the Kyoto Protocol; o Its voluntary participation in the CDM; o There is reference to the precise project title in the PDD. The contribution of the project to sustainable development is confirmed by the host party. | OK | OK |
| 5.5 | Was the LoA received directly from the DNA or from the project participants? Has the Annex I Party LoA been issued by the respective DNA? How has this been confirmed? | | Yes, it is confirmed that LoA was received directly from the PPs. The authenticity of the letter had been confirmed from the information on the Swedish DNA (Swedish Energy Agency. The date of issuance of the LoA by the Swedish DNA is 20 November 2007. [http://www.energimyndigheten.se/Global/Internationellt/CDM/%20och%20JI/CDM_LoA_02.pdf] | OK | OK |
| 5.6 | If either LoA contains additional specification or conditions of the project activity, then has the request for registration been based on the documents specified in the LoA? | | No additional specification and/or conditions relating to the project activity had been found in the LoAs. | Ok | OK |
| 5.7 | If the LoA references a specific version of the Validation Report or PDD and this version cannot be submitted, then has either of the following been submitted? <ul style="list-style-type: none"> a) a statement indicating final LoA has not been received, or b) an updated Validation Report/ PDD | | No such references to the specific version of the validation report and/or PDD are found in LoAs. | Ok | OK |
| 6. | Baseline and Monitoring Methodology (CDM VVM EB 44 (para. 65-92)) | PDD B | | | |
| | <i>Title and reference of the approved baseline and monitoring methodology?</i> | PDD B.1 | | | |
| 6.1 | Are the number, version and title of the methodology clearly and correctly stated? Is the version of the methodology valid at the time of validation submission? | | Yes, ACM0002 'Consolidated baseline methodology for grid-connected electricity generation from renewable sources' (version 11) is clearly and correctly stated. Version 11 of the methodology is applicable to the proposed project. | Ok | OK |

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| 6.2 | Are the Tools applicable to the methodology correctly referenced, including the correct version number(s) valid at the time of registration submission? | | <p>Yes, the PDD correctly refers to two below mentioned tools as referred in the methodology:</p> <p>Tool for the demonstration and assessment of additionality (Version 05.2)</p> <p>Tool to calculate the emission factor for an electricity system (Version 02)</p> <p>Versions numbers of both tools are correct.</p> | Ok | OK |
| | Justification for the choice of methodology and why it is applicable | PDD B.2 | | | |
| 6.3 | Have any sources of greenhouse gas emissions been identified by the DOE ,within the project boundary following project implementation, which are expected to contribute more than 1% of the overall expected average annual emissions reductions, and which are not addressed by the applied methodology? | | <p>The proposed project is a hydro electricity project so no emission sources are expected and included in the project boundary.</p> <p>According to the methodology (ACM0002 -v11), for new hydroelectric power projects with reservoirs, if the power density of the project is greater than 10W/m², then project emissions should be considered zero. For the proposed project, the power density is 12.05 W/m², greater than 10 W/m², thus project emissions are zero. (However please refer to CL 5 concerning the calculation of the power density)</p> <p>No emissions sources were identified within the project boundary following project implementation which are expected to contribute more than 1% of the overall expected average annual emissions reductions, and which are not addressed by the applied methodology.</p> | OK | OK |
| 6.4 | <p>Is the methodology fully applicable to the proposed project? For each of the applicability criteria:</p> <ol style="list-style-type: none"> Is the criterion discussed in the PDD? Is compliance provable? Is evidence provided in the PDD to prove applicability? Has compliance with the criterion been verified (by checking evidence provided, sector/ local knowledge etc)? | | <p>Yes, ACM0002 (v 11) is fully applicable to the proposed project activity and fulfils the applicability criteria. The PDD lists the applicability conditions and provides justifications for their application to the project activity. However, evidence relating to the one of the criteria for the geographic and system boundaries of the grid is not provided and a clarification request has been raised (CL 11).</p> <ol style="list-style-type: none"> Yes, the criteria is discussed in the PDD; Compliance had been checked through site visit and checking supporting documentation; Yes, the PDD prove applicability except information relating to grid; Yes, it has been verified by supporting documentation. | CL 11 | OK |

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| 6.5 | Was there a request for clarification, revision or deviation made for the adopted methodology in relation to the proposed project activity? If so, were the correct procedures provided by the CDM EB followed? | | No request for clarification, revision or deviation has been made. | Ok | OK |
| | Description of sources and gases included in the project boundary | PDD B.3 | | | |
| 6.6 | Does the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity, in compliance with the requirements of the selected baseline methodology, and is this consistent with site observations and other documentation provided? | | Yes, project boundary is clearly described. However, characteristics of the Central China Power Grid (CCPG) are not clearly described and further information is requested (CL 12). | CL 12 | OK |
| 6.7 | Baseline emissions: Have all sources and GHGs required by the methodology been included within the project boundary? For each potential source: a. Are source(s) and gases discussed by the PDD? b. Is inclusion / exclusion justified? c. Is explanation/ justification sufficient? d. Is the inclusion/ exclusion consistent with the monitoring plan? | | Following the methodology (ACM0002 v 11), only CO2 emissions are to be accounted for in the baseline scenario. The proposed project is a hydro electricity project with power density of more than 10MW/m2, therefore, no CH4 emissions shall have to be accounted for. a. Sources and gases are included and discussed in the PDD; b. Exclusion of N ₂ O and CH ₄ emissions is justified; c. Explanations are sufficient, justified and in accordance with the methodology; d. Yes, monitoring plan is specific to the CO ₂ emissions. Parameter of installed capacity of the hydro power plant after the implementation of the project activity (CapPJ) not included. A corrective action request (CAR 10) has been raised. | CAR 10 | OK |
| 6.8 | Project emissions: Have all sources and GHGs required by the methodology been included within the project boundary? For each potential source: a. Are source(s) and gases discussed by the PDD? b. Is inclusion / exclusion justified? c. Is explanation/ justification sufficient? d. Is the inclusion/ exclusion consistent with the monitoring plan? | | Following the methodology (ACM0002), only CO2 emissions are to be accounted for in the project scenario. The proposed project is a hydro electricity project with power density of more than 10MW/m2, therefore, no CH4 emissions are zero. The PDD (section B.3, table 3) states that emissions of CH4 from the reservoir are not to be included, since they are expected to be zero. however ACM0002 requires this to be monitored, and CH4 emissions will have to be accounted for if the power density goes below 10 w/m2. Therefore this emission source should be included in the boundary (even if it is expected to be zero). A corrective action request (CAR 6) is raised. | CAR 6 | OK |

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| | | | <p>e. Sources and gases are included and discussed in the PDD;</p> <p>f. Exclusion of N₂O and CH₄ emissions is justified;</p> <p>g. Explanations are sufficient, justified and in accordance with the methodology;</p> <p>h. Yes, monitoring plan is specific to the CO₂ emissions</p> | | |
| 6.9 | For large scale projects, is a diagram given to illustrate the project boundary, including all the key equipment, systems and flows of mass and energy, as well as the emissions sources and gases included in the project boundary? | | Yes, a diagram has been provided in the PDD which illustrates project boundary and key equipments and installations including the grid. | Ok | OK |
| | Description of how the baseline scenario is identified and description of the identified baseline scenario | PDD B.4 | | | |
| 6.10 | Does the PDD clearly identify the baseline, a scenario that represents the anthropogenic emissions by sources of GHG that would occur in the absence of the proposed CDM project activity? | | <p>Yes, in accordance with the approved methodology ACM0002 (v11) for newly constructed renewable power plants the baseline is:</p> <p>Electricity delivered to the grid that would other have been generated by operation of grid-connected power plants and by the addition of new power sources.</p> <p>The PDD identifies the baseline following the methodology.</p> | Ok | OK |
| 6.11 | <p>a. Have the procedures/ steps to identify the most reasonable baseline scenario, as required by the methodology and applicable tools, been documented clearly in the PDD? Are all feasible and credible alternatives identified, including but not limited to all the potential scenarios listed in the methodology?</p> <p>b. Are all considered alternatives assessed for consistency with (enforced) mandatory laws and regulations?</p> <p>c. Does the list of alternatives include the project activity undertaken without being registered as a CDM project?</p> <p>d. If alternatives are excluded:</p> <ul style="list-style-type: none"> Is sufficient evidence/ justification provided to support every exclusion of alternatives? Is it reasonable? Is it shown that at least one credible and feasible alternative does not face a barrier? Is this reasonable? <p>e. If Investment Analysis is used to exclude baseline alternatives, has it been correctly applied? Are assumptions and input values reasonable and sufficiently justified?</p> | | <p>In case of ACM0002, its not required to identify the alternatives and justify the choice of the methodology. However, a clarification request has been raised to provide more information on the reasons why identification of alternatives is not needed.</p> | Ok | OK |

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| 6.12 | Have all relevant national and/or sectoral policies and circumstances been taken into account? Are they listed in the PDD? | | The baseline is in compliance with all national laws and regulations. | OK | OK |
| 6.13 | Does the PDD provide a verifiable description of the baseline scenario, including a description of the technology/ activities that would have been employed in the absence of the CDM project? | | Yes, a verifiable description of the baseline scenario is provided. 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, as reflected in the combined margin (CM) calculations in B.6.1. | OK | OK |
| 6.14 | Does the identified baseline scenario reasonably represent what would occur in the absence of the proposed project activity? | | Yes, the baseline scenario is provided in the approved baseline methodology. | Ok | OK |
| 7. | Additionality (CDM VVM EB 44 (para.93-119)) | PDD B.5 | | | |
| | a) Prior consideration of the CDM | PDD C.1.1 | | | |
| 7.1 | Is the start date defined in accordance with the "Glossary of CDM terms"? What evidence is provided to verify that this was the official start date? Is this considered reliable and reasonable? | | Yes, the start date (8/12/2005) is the date of the first payment for the generator and turbine purchase agreement that is the date the contract. It is in accordance with the glossary of CDM terms. The evidence of this payment had been checked. | OK | OK |
| 7.2 | Is it a new project activity (start date on or after August 2008) or an existing project? | | No, it's a project activity start date before August 2008. | OK | OK |
| 7.3 | For a new project which does not require a new methodology and has not published its PDD for stakeholder comments prior to the start date, then: a. Have the project proponents informed the DNA and/or UNFCCC secretariat in writing? How has this notification been verified? (i.e. confirmation from the DNA or UNFCCC) b. Was the notification made within 6 months of the project activity start date? c. Does the letter/ notification indicate the precise geographic location and provide a brief description of the proposed project? d. Have the project proponents informed the DNA and/ or UNFCCC secretariat of the progress of the project activity every subsequent two years after the initial notification? | | Not applicable. | n/a | |
| 7.4 | For an existing project which has a start date prior to the publication of the PDD for global stakeholder comments, has the project proponent provided the following: a. Evidence of awareness of the CDM prior to the project activity start date and that the benefits of the CDM were a decisive factor in the decision to proceed with the project? (e.g. Board minutes, notes etc) Is this sufficient? | | The start date of the proposed project activity is prior to the publication of the PDD and evidences relating to the awareness of the CDM prior to the decision to proceed with project have been checked. a. With respect to awareness of the CDM, following evidences have been checked: o The minutes of Yuanling County government | | |

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| | <p>b. Reliable evidence that demonstrates real actions were taken to secure CDM status in parallel with the project's implementation? (e.g. contracts with consultants for CDM/PDD/methodology services, ERPAs, correspondence with CER buyers, DOEs, DNAs or the UNFCCC). Is this sufficient?</p> | | <p>meeting;</p> <ul style="list-style-type: none"> ○ Director meeting for decision of CDM consideration; ○ Notice about Application CDM Project from Development and Reform Commission from Development and Reform Commission of Hunan Province & Science and Technology Department of Hunan Province. <p>b. With respect to real actions to secure CDM status in parallel with project implementation, following evidences had been checked:</p> <ul style="list-style-type: none"> ○ Preliminary Design Report for 16 MW capacity (11/2005) ○ Approval of Preliminary Design Report (11/2005); ○ Notice about Application CDM Project from Development and Reform Commission from Development and Reform Commission of Hunan Province & Science and Technology Department of Hunan Province (7/11/2005) ○ Supplementary Equipment Purchase Agreement for 20 MW capacity. Due to geological problems and also to optimise the utilisation of water resources the installed capacity of the proposed project was enhanced from 12 to 16 and finally to 20 MW. ○ Signature of Generator and Turbine Purchase Agreement for 16 MW capacity (16/11/2005) ○ Attend the training course held by Science & Technology Department of Hunan Province (09/12/2005) ○ First draft of Supplementary Preliminary Design Report for 20 MW capacity (01/2006). ○ Approval of Preliminary Design Report for 20 MW capacity (15/05/2006) ○ Supplementary Equipment Purchase Agreement for 20 MW (17/06/2006) ○ Letter of Intent of emission reductions signed with Carbon Asset Management Sweden AB (23/06/2006) ○ Final version of Supplementary Preliminary Design Report for enhanced installed of 20MW | <p>CL 13 CL 14</p> | <p>OK OK</p> |
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| | | | <p>(08/2006)</p> <ul style="list-style-type: none"> Signature of CDM Emission Reductions Purchase Agreement with Carbon Asset Management Sweden AB (29/09/2006) Approval of Supplementary Preliminary Design Report (22/11/2006) Construction Permission (10/12/2006) Training of relevant staff on monitoring aspects of the project activity (16-20/04/2007) <p>A clarification request (CL 13) had been raised to include the timeline till date, and also the actual date of the construction start date and other key project implementation timelines. CL 14, to include the further justification of the financial status up to date</p> | | |
| | b) Identification of alternatives (Additionality Tool) | <i>PDD B.5</i> | | | |
| 7.5 | Is the assessment of alternatives in compliance with the requirements of the methodology and the relevant tool(s) (e.g. the Tool for the demonstration and assessment of additionality)? Is the assessment consistent with section B.4? | | No alternatives identified, as per the methodology. However, a clarification request (CL 15) had been raised to explain the reason to skipping identification of alternatives. | CL 15 | OK |
| | c) Investment Analysis | | | | |
| 7.6 | Has an investment analysis been used to demonstrate additionality? | | Yes, following the tool for the demonstration and assessment of additionality investment analysis has been used. | OK | OK |
| 7.7 | Has the appropriate analysis Option been chosen? | | Yes, benchmark analysis has been chosen which is applicable to the proposed project activity. | OK | OK |
| 7.8 | If Option I is chosen (simple cost analysis), is it demonstrated that the activity produces no economic benefits other than CDM income? | | Not applicable | n/a | |
| 7.9 | If Option II is chosen: Is the most suitable financial indicator clearly identified (Project IRR, Equity IRR, NPV, cost benefit ratio, or (levelised) unit cost)? | | Not applicable. | n/a | |
| 7.10 | Benchmarks - If Option III is chosen: <ol style="list-style-type: none"> Does the proposed baseline scenario leave the project participant no other choice than to make an investment to supply the same (or substitute) products or services? Is the most suitable financial indicator clearly identified (Project IRR, Equity IRR, NPV, cost benefit ratio, or (levelised) unit cost)? Is the suitability of the selection reasonable and adequately justified? Is an appropriate benchmark chosen that is relevant for the project activity (sector, investment, investor, country, risk of project, time of investment decision)? | | <ol style="list-style-type: none"> No, the baseline alternative (continuation of electricity supply from the grid) means the project participant may choose to make no investment – i.e. continuation of the current situation. Thus the use of benchmark analysis is appropriate. Yes, project IRR (internal rate of return) as the financial indicator for the benchmark is used. This is suitable for investment decisions in China as it is commonly used by project developers in making investment decisions and is comparable with the | CL 16 | OK |

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| | <p>d. Is the choice of benchmark appropriate to the type of IRR calculated? (e.g. a Project IRR benchmark is appropriated for a WACC or Project IRR analysis; an Equity IRR benchmark is appropriate for an Equity IRR analysis)</p> <p>e. Is the chosen benchmark appropriate in comparison with other publicly available comparable benchmarks?</p> <p>f. Is the chosen benchmark appropriate and in line with other benchmarks used in current or previous projects by the same investor?</p> <p>g. Is the choice of benchmark justified with supporting evidence for its appropriateness?</p> | | <p>benchmarks set out by the government of China. It is in line with the Project IRR benchmark used.</p> <p>c. A benchmark of 10% (after tax) for projects below 25 MW capacity had been used. The benchmark has been taken from the 'Economic Evaluation Code for Small Hydropower Projects' (SL16-95) issued by the Ministry of Water Resources and this benchmark is extensively used for hydro projects in China. This is the latest available guidance on benchmarks for this sector in China and is specifically intended for projects in this sector (hydroelectricity) and of this scale (under 50 MW). A clarification request (CL 16) had been raised to provide evidence that the benchmark of 10% is extensively applied for those type of project.</p> <p>d. Yes, choice and calculation of the benchmark is appropriate. The benchmark is designed for project IRR calculations.</p> <p>e. The benchmark is determined by the government and is widely applied for similar and comparable projects.</p> <p>f. The benchmark is determined by the government and is widely applied. It has been confirmed that the investor does not have any other similar or comparable investments.</p> <p>g. A clarification request (CL 16) had been raised to provide evidence of the benchmark of 10% is extensively applied for these type of projects.</p> | CL 16 | OK |
| 7.11 | If the project can be developed by an entity other than the project participant, is the benchmark based on publicly available data sources? Have these data sources been validated? | | <p>Yes, the benchmark is determined by the government to be used for any investor in similar kind of projects in the region. The benchmark is based on a publicly available data source, the <i>Economic Evaluation Code for Small Hydropower Projects</i> issued by the Ministry of Water Resources (Document No. SL 16-95). The source has been reviewed by ERM CVS, and is widely used for similar projects in the host country.</p> <p>The same assumptions underlying the benchmark have been used in the financial analysis for the proposed project. The financial analysis was developed by an independent third party design institute, who applied the benchmark and the guidelines from the <i>Economic Evaluation Code for Small Hydropower Projects</i> issued by the Ministry of Water Resources (Document No. SL 16-95). This has been validated by reviewing the PDR. The source of information on wider applicability of the benchmark is to be validated through</p> | CL 16 | OK |

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| | | | CL 16. | | |
| 7.12 | If an internal company benchmark has been used: a. Is the project participant the only possible investor in the project? b. Is it sufficiently demonstrated that the internal benchmark has been used for similar projects with similar risk or would have been used for similar projects in the same sector and country/region? c. How has this been validated? | | Not applicable. | n/a | |
| 7.13 | If risk premiums are applied in the development of the benchmark, are they reasonable and justified? | | The benchmark was determined by the Chinese government. No additional risk premiums were added. | OK | OK |
| 7.14 | Has a lower benchmark been used in previous investment decisions by the project participant? If so, are there verifiable circumstances that have led to a change in the benchmark? | | It had been indicated that there are no other and previous investments by the project participant. The choice of benchmark is the accepted source for all hydro investments below 50 MW in the host country. | OK | OK |
| 7.15 | Overall, is the choice of benchmark reasonable? Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark? | | Yes, the choice of benchmark seems reasonable and it had been applied by other CDM projects as well. But evidence has been requested on the extensive use of this benchmark through CL 16 . | CL 16 | OK |
| | Calculations | | | | |
| 7.16 | General remarks on calculations Is the period of assessment appropriate? | | The investment analysis and calculation table (table 4) in the PDD is based on the 12 MW capacity whereas the capacity of the project has been enhanced to 20 MW. A clarification request (CL 17) had been raised to include the actually installed capacity of 20 MW and modify the calculation sheet and other associate sections in the table. A further clarification request (CL 18) is made to provide a comparison between 12MW and 20MW in presenting the IRR calculations in the PDD. The period of assessment is 20 years plus construction period. The lifetime of the project is 20 years. So the period of the assessment is reasonable. However, information to substantiate the expected lifetime of the equipment (such as equipment warranties, industry experience etc) had not been provided. A clarification request (CL 19) is raised to request this information. | CL 17 CL 18 CL 19 | OK OK OK |
| 7.17 | Is any residual value of the project activity assets included in the analysis? Are residual value calculations reasonable and justified and consistent with local accounting rules or international best practice? | | A residual or scrap value of 5% is added in the final year which is based on the sum of the 'fixed asset investment' and interest costs during the construction phase. Inclusion of residual value is in line with the Chinese regulations and is | OK | OK |

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| | | | found to be conservative. According to Chinese financial regulation, the interest cost during construction should be included in the calculation of depreciation, and this is also considered as a more conservative approach, as if the interest cost during construction is excluded, the residual value will decreased and the total investment will be lower and the income tax will be higher, so the IRR will be lower. | | |
| 7.18 | Are the depreciation and major maintenance costs consistent with the assessment period and the residual values? | | No, depreciation and residual value has been applied to total fixed asset investments including interest costs. It should only be applied to that portion of investment costs that require repairs (i.e. machinery and equipment) | OK | OK |
| 7.19 | Are depreciation and other non-cash items related to the project activity deducted from net profits used for calculating the financial indicator (e.g. IRR, NPV)? | | Depreciation is only used in the calculation of tax. depreciation is correctly accounted for. | OK | OK |
| 7.20 | Is the treatment of taxation consistent with the chosen benchmark? (i.e. taxation should only be treated as an expense in the IRR/NPV calculation if the chosen benchmark is intended for post-tax calculations? | | Yes, profits in years 4, 5 and 6 not taxed and taxed at only half rate in year 7 and Year 8. This is in accordance with the tax incentives by the government for investments in this kind of project. It was checked in the local tax regulations. | OK | OK |
| 7.21 | Recommended project: If the implementation of the project ceased and then recommenced due to consideration of the CDM, then: a. Are input values valid and applicable at the time of making the decision to recommence the project? b. Are capital costs incurred prior to the revised project activity start date input as the recoverable value of the assets (limited to the potential reuse/ resale of tangible assets)? c. How has the fair market value of the capital expenditures been calculated and validated? (e.g. by chartered specialists). Is this fair market value reasonable and justified? | | Not applicable. | n/a | |
| 7.22 | Has the project participant supplied unprotected and traceable spreadsheet versions of all investment analysis? | | Yes, excel sheets had been provided. All calculations have been subject to financial review and found correct. | OK | OK |
| 7.23 | From the investment analysis provided, is it possible to reproduce the results? | | Yes, however, the 'Financing' worksheet is not completely linked regarding loaned amount and equity amount (not linked to 'fixed asset investment'). A clarification request (CL 20) has been raised to provide the financing worksheet linked so that results could be reproduced. | CL 20 | OK |
| 7.24 | If a Project IRR has been used, are the costs of financing | | A project IRR has been used and the costs of financing (loan | CL 21 | OK |

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| | expenditures (i.e. loan repayments and interest) included in the calculation of project IRR? | | <p>repayments and interest costs) are excluded from Net Cash Flow and hence calculation of IRR. Interest payments should be included in the calculation of tax. A clarification request (CL 34) has been raised.</p> <p>However, no IRR for the initial design of the project, i.e. 12 MW, was discussed as a comparison of the IRR from 20 MW installation (CL 21).</p> | | |
| 7.25 | If an Equity IRR has been used, is the debt portion of the investment cost included as a cash outflow? (i.e. as well as interest costs and principle repayments – double counting) | | Not applicable | n/a | |
| 7.26 | <p>Sensitivity analysis:</p> <ol style="list-style-type: none"> Are all variable and critical costs and revenues in the analysis included in the sensitivity analysis? Is the assessed range of variations reasonable in light of the reliability of the estimated input values and the likely range? If some variations create scenarios that change the conclusion/ result of the analysis, how likely/ probable is such a scenario (in the opinion of the DOE)? Is the sensitivity analysis possible to reproduce? | | <ol style="list-style-type: none"> Yes, electricity tariff, O& M costs and total static investment are all included in the sensitivity analysis in the PDD. However, with spreadsheet calculations for 20 MW capacity values shall have to be updated and it will change. See CL 17. A range of 10% variations is analysed but the threshold values are also calculated. Following variations in values can change the calculations: <ul style="list-style-type: none"> Electricity output – the BM>10% if net electricity output increases by 13%. This is considered unlikely because output was calculated by the independent third party design institute based on a long time-series (45 years) of hydrological data from the four local Hydrology Stations. ERM CVS has confirmed this in the SPDR. The annual output (electricity generation) is based on a load factor, calculated by the design institute, that was also presented to the government for approval and to investors (the SPDR). Electricity tariff – the BM>10% if the tariff increases by 12.5%. <p>CL 22, More information should be provided on electricity tariff and the tariff trend.</p> | <p>CL 17 CL 22 CL 23</p> <p>CL 38</p> | <p>OK OK OK</p> <p>OK</p> |

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| | | | <p>CL38 Timing of the investment decision is 5 August 2005 and indicated applicable tariff in the year 2005 is 0.316 RMB KWH, whereas tariff applied in the calculations is 0.315 RMB KWH. It should be clarified why the applicable tariff at the time of the investment decision is not used for the calculating the IRR of the project.</p> <ul style="list-style-type: none"> o Total fixed investment costs have to decrease by 11% to get an IRR>10%. Could costs be over-estimated by this amount? Are there any sunk costs? <p>CL 23, to include the figures of actual investment based on the financial audit report for comparison</p> <ul style="list-style-type: none"> o Even a 100% reduction in O&M costs does not yield an IRR>10% so this is not a critical variable <p>d. Yes, it is reproducible.</p> <p>Concurrent changes in both output and investment costs would effect the IRR most. A concurrent 6% increase in output and decrease in investment cost would result in an IRR > 10%.</p> <p>The range of sensitivity analysis for 12 MW is not presented correctly. A corrective action request (CAR 9) is raised.</p> | CAR 9 | |
| 7.27 | Are input values used in all the investment analysis valid and applicable at the time of the investment decision taken by the project participant? | | <p>No, timing of the investment decision is not clear. A clarification request (CL 24) had been raised to indicate the time when the investment decision was made.</p> <p>Tariff used had been cross-checked with values in the FSR but a clarification request (CL 25) had been made to include the information on the change of tariff in the last three years.</p> <p>The O&M costs for 12 MW design in GSP PDD is inconsistent with the FSR. A corrective action request CAR 8 is raised.</p> | <p>CL 24</p> <p>CL 25</p> <p>CAR 8</p> | <p>OK</p> <p>OK</p> <p>OK</p> |
| 7.28 | Have the listed input values been consistently applied in all calculations? | | There are some inconsistencies which had been identified. | OK | OK |
| 7.29 | Are all references made in the investment analysis correctly referenced/ sourced? Have these sources been verified? | | Yes, | Ok | OK |
| 7.30 | Have financial calculations been verified by: assessing all parameters and assumptions against the available evidence and expertise; cross-checking the parameters against 3 rd party or publicly available sources; reviewing feasibility reports, public | | Yes, all financial calculations, references and input values had been verified. | OK | OK |

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| | announcements and annual financial reports; assessing the correctness of computations and the sensitivity analysis? | | | | |
| 7.31 | Have values from a feasibility study report (FSR) approved by national authorities been used? If so: <ul style="list-style-type: none"> a. Has the FSR been the basis of the decision to proceed with the investment in the project? How has this been verified? b. Are the values used in the PDD and associated annexes valid and consistent with the FSR? c. At the time of the investment decision, are the input values from the FSR valid and applicable (based on specific local and sectoral expertise and knowledge)? | | Yes, values from FSR and SPDR are approved by the local authorities. However, the following issues require clarification <ul style="list-style-type: none"> a. Due to capacity changes of the proposed project there had been supplementary FSRs and project design reports (PDRs). In the financial calculations its not clear which FSR and PDR the values and the investment decision is based on. See CL 17 for details. b. No, see CL 17. c. Timing of the investment decision is not clear. See CL 24. | CL 17 | OK |
| | d) Barrier Analysis (VVM para. 113 – 116) | <i>PDD Step 3</i> | | | |
| 7.32 | Has a barrier analysis been used? | | No. | n/a | |
| 7.33 | Is a complete list of barriers that prevent the relevant alternatives and the proposed CDM project activity from occurring identified? | | Not applicable. | n/a | |
| 7.34 | Do any such identified barriers have a clear and direct impact on the financial returns of the project activity? (these are not barriers and should be assessed in the investment analysis) | | Not applicable. | n/a | |
| 7.35 | Are the identified barriers real and substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics? | | Not applicable. | n/a | |
| 7.36 | Does an identified barrier or set of barriers prevent the implementation of the proposed CDM project activity? How has this been validated? | | Not applicable. | n/a | |
| 7.37 | Do the identified barriers not equally prevent at least one of the possible alternatives (i.e. the baseline scenario)? How has this been validated? | | Not applicable. | n/a | |
| 7.38 | Is it clearly explained how the approval of the project in the CDM would enable the proposed project activity to surmount the barrier? Is the rationale reasonable and justified with evidence? | | Not applicable. | n/a | |
| 7.39 | Overall, is the Barrier Analysis presented credible and compliant with the applicable Tools? | | Not applicable. | n/a | |
| | e) Common Practice Analysis (VVM para. 117 – 119) | <i>PDD Step 4</i> | | | |
| 7.40 | Is the proposed project activity a 'first of its kind'? Has sufficient evidence been provided to validate this claim? | | No, the project is not claimed to be first of its kind. | Ok | OK |
| 7.41 | Has common practice analysis been undertaken? | | Yes, | Ok | OK |
| 7.42 | Is the geographical scope of the common practice analysis appropriate for the assessment, considering the project activity's technology or industry type? | | Yes, four comparable hydro projects have been chosen in Hunan province. So the geographical scope is fine. | OK | OK |

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| 7.43 | Have all comparable projects been included in the common practice analysis? How was this assessed (by the DOE)? If some projects have been excluded as non-comparable, is the exclusion reasonable and justified? | | <p>Four projects have been listed in the analysis and their comparability had been demonstrated through:</p> <ul style="list-style-type: none"> Public accessibility of the information on similar type of hydro projects; Projects with installed capacity between 15 MW to 50 MW. In China, hydropower projects with a installed capacity of below 50MW are defined as small hydropower projects. An inconsistency on the definition of small hydropower projects in the indicated reference. A clarification request (CL 23) had been raised. Other CDM projects in the region are not included in the analysis. <p>Information on essential distinctions with the CDM project activity is not correctly reflected Furthermore, Projects below 15 MW capacity are excluded from the analysis and justification for exclusion is not found justified. A corrective action request (CAR 7) has been raised. .</p> | <p>CL 23</p> <p>CAR 7</p> | <p>OK</p> <p>OK</p> |
| 7.44 | Have similar and operational projects, other than CDM project activities, been undertaken in the region? | | Yes, these projects are listed in the analysis. | OK | OK |
| 7.45 | Are these widely observed and commonly carried out? If so: a. How have the essential distinctions with the proposed CDM project activity been assessed? b. Are such distinctions justified with sufficient evidence? c. If inaccessibility of data is the reason why some projects have not been included in the analysis, is justification of this claim provided? | | <p>Yes</p> <p>a. Yes, essential distinctions between the proposed project activity and previous projects are described. The main differences are the favourable hydrological conditions experienced by the other projects, and their consequent lower construction costs (technical and economic indicators).</p> <p>b. Investment per unit KWh needs to be assessed by the financial calculations for 20 MW. Also, sufficient references for the information stated in the common practice analysis are not provided in the PDD. See CL 17.</p> <p>c. All hydropower plants with the installed capacity between 15 MW and 50 MW (not including 15MW) as the similar projects in Hunan province constructed before 2006, which is considered as in the same period of the project, are included in the PDD for common practice analysis.</p> | CL 17 | OK |
| 7.46 | Overall, is the proposed CDM project activity considered common practice? | | As only four projects had been included in the analysis and the information on these projects is not consistent a CL and a | <p>CL 23</p> <p>CL 17</p> | <p>OK</p> <p>OK</p> |

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| | | | CAR were raised. See CL 23 and CAR 7 . Furthermore, financial analysis for investment per unit KWH (CL 17) was also not available to determine that proposed project indeed bears higher investment costs which distinguish it from other comparable projects. Therefore based on the available information in the PDD it is not possible to conclude whether the proposed project can be considered as common practice in the region. | | |
| 8. | Emissions Reductions (CDM VVM para. 88) | PDD B.6 | | | |
| | <i>Explanation of methodological choices</i> | | | | |
| 8.1 | Is it explained how the procedures provided in the Methodology and applicable Tools are applied by the proposed project activity? (i.e. Are the required steps clearly followed?) | | Yes, steps from the tool to calculate the emission factor for an electricity system (Version 02)" had been followed. It had been cross-checked with the methodology, tool and the PDD. | Ok | OK |
| | <i>Project emissions:</i> | | | | |
| 8.2 | Is every choice of options for calculating project emissions offered by the methodology correctly justified? Is this justification in line with the situation as evidenced by site visits, local knowledge and supporting documentation? | | Yes, project emissions are zero. In accordance with the approved methodology ACM002 project emissions for renewable energy projects are considered to be zero. | Ok | OK |
| 8.3 | Are the formulae and parameters required for the determination of project emissions correctly presented, enabling a complete identification of parameters to be used and / or monitored? | | Yes, formulae are correctly applied and only parameters to be measured in the project scenario are import and export of electricity. | Ok | OK |
| | <i>Baseline emissions:</i> | | | | |
| 8.4 | Is every choice of options for calculating baseline emissions offered by the methodology correctly justified? Is this justification in line with the baseline scenario? | | Yes, calculation of baseline emissions are correctly applied and justified. It had been cross-checked with the methodology, tool and the PDD. | Ok | OK |
| 8.5 | Are the formulae and parameters required for the determination of baseline emissions correctly presented, enabling a complete identification of parameters to be used and / or monitored? | | Yes, formulae and required parameters are correctly presented in the PDD. All the steps from the tool are followed to calculate the operating and build margin emissions factors and to calculate the combined margin. Choices of methods of calculations are appropriate and justified and correctly applied. Reference to the source of information on low-cost/must run resources for the CCPG is sought through the clarification request (CL 26). | OK Ok CL 26 | OK OK OK |
| 8.6 | Are the applicable Tools and methods to calculate parameters correctly applied? | | Yes, tool to calculate the emission factor for an electricity system (Version 02)" and the steps in the tool are correctly applied. | Ok | OK |
| | <i>Leakage:</i> | | | | |

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| 8.7 | Are all potential sources of leakage correctly identified in accordance with the applied Methodology? | | In accordance with the methodology leakage is to be considered zero for renewable energy projects, hence, no leakage is considered in the proposed project. | Ok | OK |
| 8.8 | Are the formulae and parameters required for the determination of leakage emissions correctly presented, enabling a complete identification of parameters to be used and / or monitored? | | Not applicable. | n/a | |
| 8.9 | Are the applicable Tools and methods for calculating leakage correctly applied? | | Not applicable. | n/a | |
| | <i>Emissions Reductions:</i> | | | | |
| 8.10 | Are the parameters and equations used to calculate emission reductions correct? | | Yes. calculation of emission reductions is in accordance with the methodology ACM0002 (v11) and tool to calculate emission factor for an electricity system (V02). The calculations are based on the government published data (China Energy Statistical Books for the years 2005 to 2008 & China Electrical Power Books for the years 2005 to 2008). | Ok | OK |
| | Data and Parameters | PDD B.6.2 | | | |
| 8.11 | Is the list of parameters presented in chapter B.6.2 of the PDD considered to be complete with regard to the requirements of the applied methodology and any applicable tools? | | Yes, list of parameters are complete with respect to the ACM0002. | OK | OK |

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|-----------------------|--|--|---|-------------|--|----|--|----|--|----|--|----|---|----|---|----|--|----|---|----|---|-----------------------|--|----|--|----|--|----|--|----|---|----|---|----|--|----|---|----|---|-----------------|--|----|--|----|--|----|--|--|----|
| 8.12 | For each parameter: <div><div>a. Title in line with Methodology?</div><div>b. Data unit correctly expressed?</div><div>c. Appropriate description?</div><div>d. Source clearly referenced? (and appropriate?)</div><div>e. Correct value provided?</div><div>f. Has this value been verified?</div><div>g. Choice of data correctly justified?</div><div>h. Measurement method correctly described?</div></div> | | <table><tr><td>$NCV_{i,y}$</td><td>The net calorific value (energy content) per mass or volume unit of fuel i in year y</td></tr><tr><td>a.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>d.</td><td>Yes, the data source is clearly referenced.</td></tr><tr><td>e.</td><td>Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</td></tr><tr><td>f.</td><td>Yes, the data has been verified against official data.</td></tr><tr><td>g.</td><td>Yes, the data are from official statistics.</td></tr><tr><td>h.</td><td>Not applicable since the data are from official statistics.</td></tr></table> <table><tr><td>$EG_{T_{herma}l,j,y}$</td><td>The electricity generated by fuel-fired power plants in province j in CCPG in year y</td></tr><tr><td>a.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>d.</td><td>Yes, the data source is clearly referenced.</td></tr><tr><td>e.</td><td>Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</td></tr><tr><td>f.</td><td>Yes, the data has been verified against official data.</td></tr><tr><td>g.</td><td>Yes, the data are from official statistics.</td></tr><tr><td>h.</td><td>Not applicable since the data are from official statistics.</td></tr></table> <table><tr><td>$IPC_{R_{j,y}}$</td><td>The internal power consumption rate of power plants in province j in CCPG in year y.</td></tr><tr><td>a.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodological tool.</td></tr></table> | $NCV_{i,y}$ | The net calorific value (energy content) per mass or volume unit of fuel i in year y | a. | Yes, it is in line with the methodological tool. | b. | Yes, it is in line with the methodological tool. | c. | Yes, it is in line with the methodological tool. | d. | Yes, the data source is clearly referenced. | e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | f. | Yes, the data has been verified against official data. | g. | Yes, the data are from official statistics. | h. | Not applicable since the data are from official statistics. | $EG_{T_{herma}l,j,y}$ | The electricity generated by fuel-fired power plants in province j in CCPG in year y | a. | Yes, it is in line with the methodological tool. | b. | Yes, it is in line with the methodological tool. | c. | Yes, it is in line with the methodological tool. | d. | Yes, the data source is clearly referenced. | e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | f. | Yes, the data has been verified against official data. | g. | Yes, the data are from official statistics. | h. | Not applicable since the data are from official statistics. | $IPC_{R_{j,y}}$ | The internal power consumption rate of power plants in province j in CCPG in year y. | a. | Yes, it is in line with the methodological tool. | b. | Yes, it is in line with the methodological tool. | c. | Yes, it is in line with the methodological tool. | | OK |
| $NCV_{i,y}$ | The net calorific value (energy content) per mass or volume unit of fuel i in year y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d. | Yes, the data source is clearly referenced. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, the data has been verified against official data. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| g. | Yes, the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| h. | Not applicable since the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $EG_{T_{herma}l,j,y}$ | The electricity generated by fuel-fired power plants in province j in CCPG in year y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d. | Yes, the data source is clearly referenced. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, the data has been verified against official data. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| g. | Yes, the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| h. | Not applicable since the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $IPC_{R_{j,y}}$ | The internal power consumption rate of power plants in province j in CCPG in year y. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | <table><tr><td>d.</td><td>Yes, the data source is clearly referenced.</td></tr><tr><td>e.</td><td>Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</td></tr><tr><td>f.</td><td>Yes, the data has been verified against official data.</td></tr><tr><td>g.</td><td>Yes, the data are from official statistics.</td></tr><tr><td>h.</td><td>Not applicable since the data are from official statistics.</td></tr></table> | d. | Yes, the data source is clearly referenced. | e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | f. | Yes, the data has been verified against official data. | g. | Yes, the data are from official statistics. | h. | Not applicable since the data are from official statistics. | | | | | | | | | | |
| d. | Yes, the data source is clearly referenced. | | | | | | | | | | | | | | | | | | | | | | |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, the data has been verified against official data. | | | | | | | | | | | | | | | | | | | | | | |
| g. | Yes, the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | |
| h. | Not applicable since the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table><tr><td>$EF_{C_{i,y}}$</td><td>The CO2 emission factor per unit of fuel i in year y</td></tr><tr><td>a.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>d.</td><td>Yes, the data source is clearly referenced.</td></tr><tr><td>e.</td><td>Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</td></tr><tr><td>f.</td><td>Yes, the data has been verified against official data.</td></tr><tr><td>g.</td><td>Yes, the data are from official statistics.</td></tr><tr><td>h.</td><td>Not applicable since the data are from official statistics.</td></tr></table> | $EF_{C_{i,y}}$ | The CO2 emission factor per unit of fuel i in year y | a. | Yes, it is in line with the methodological tool. | b. | Yes, it is in line with the methodological tool. | c. | Yes, it is in line with the methodological tool. | d. | Yes, the data source is clearly referenced. | e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | f. | Yes, the data has been verified against official data. | g. | Yes, the data are from official statistics. | h. | Not applicable since the data are from official statistics. | | |
| $EF_{C_{i,y}}$ | The CO2 emission factor per unit of fuel i in year y | | | | | | | | | | | | | | | | | | | | | | |
| a. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| d. | Yes, the data source is clearly referenced. | | | | | | | | | | | | | | | | | | | | | | |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, the data has been verified against official data. | | | | | | | | | | | | | | | | | | | | | | |
| g. | Yes, the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | |
| h. | Not applicable since the data are from official statistics. | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table><tr><td>$FC_{i,y}$</td><td>The quantity of fuel i (in a mass or volume unit) consumed by CCPG in year y</td></tr><tr><td>a.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodological tool.</td></tr><tr><td>d.</td><td>Yes, the data source is clearly referenced.</td></tr><tr><td>e.</td><td>Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</td></tr><tr><td>f.</td><td>Yes, the data has been verified against official data.</td></tr></table> | $FC_{i,y}$ | The quantity of fuel i (in a mass or volume unit) consumed by CCPG in year y | a. | Yes, it is in line with the methodological tool. | b. | Yes, it is in line with the methodological tool. | c. | Yes, it is in line with the methodological tool. | d. | Yes, the data source is clearly referenced. | e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | f. | Yes, the data has been verified against official data. | | | | | | |
| $FC_{i,y}$ | The quantity of fuel i (in a mass or volume unit) consumed by CCPG in year y | | | | | | | | | | | | | | | | | | | | | | |
| a. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodological tool. | | | | | | | | | | | | | | | | | | | | | | |
| d. | Yes, the data source is clearly referenced. | | | | | | | | | | | | | | | | | | | | | | |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, the data has been verified against official data. | | | | | | | | | | | | | | | | | | | | | | |

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| g. | Yes, the data are from official statistics. |
| | h. Not applicable since the data are from official statistics. |
| <div> <div> CA $P_{j,y}$ </div> <div> Installed capacities of province j in CCPG in years y. </div> </div> | |
| a. | Yes, it is in line with the methodological tool. |
| b. | Yes, it is in line with the methodological tool. |
| c. | Yes, it is in line with the methodological tool. |
| d. | Yes, the data source is clearly referenced. |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. |
| f. | Yes, the data has been verified against official data. |
| g. | Yes, the data are from official statistics. |
| h. | Not applicable since the data are from official statistics. |
| <div> <div> GE NE_C $coal,Ad$ v </div> <div> The power supply efficiency of coal-fired power plants with best technology commercially available </div> </div> | |
| a. | Yes, it is in line with the methodological tool. |
| b. | Yes, it is in line with the methodological tool. |
| c. | Yes, it is in line with the methodological tool. |
| d. | Yes, the data source is clearly referenced. |
| e. | Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA. |
| f. | Yes, the data has been verified against official data. |
| g. | Yes, the data are from official statistics. |
| h. | Not applicable since the data are from official statistics. |

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| | | | <p><i>GE</i> <i>NE</i> <i>Oil,A</i> <i>dy,y</i></p> <p>The power supply efficiency of oil/gas-fired power plants with best technologies commercially available</p> <p>a. Yes, it is in line with the methodological tool.</p> <p>b. Yes, it is in line with the methodological tool.</p> <p>c. Yes, it is in line with the methodological tool.</p> <p>d. Yes, the data source is clearly referenced.</p> <p>e. Yes, the values are detailed provided in Annex 1 of the PDD and are consistent with the official data published by Chinese DNA.</p> <p>f. Yes, the data has been verified against official data.</p> <p>g. Yes, the data are from official statistics.</p> <p>h. Not applicable since the data are from official statistics.</p> | | |
| 8.13 | Will the data and parameters result in a conservative estimate of emissions reductions? | | Yes, data and calculations had been cross-checked. | Ok | OK |
| | Ex-ante calculation of emission reductions | PDD B.6.3 | | | |
| 8.14 | Is the projection based on the same procedures as used for future monitoring? | | Yes, however, it shall be clarified that these calculations are based on 20 MW capacity of the proposed project activity. A clarification request (CL 27) had been raised. | CL 27 | OK |
| 8.15 | Are the GHG calculations documented in a complete and transparent manner? | | Yes, all calculations are found to be complete and transparent manner. | OK | OK |
| 8.16 | Are detailed calculations provided in a traceable spreadsheet showing relevant information? | | Detailed calculations are annexed to the PDD in tabular format. | Ok | OK |
| 8.17 | Can the calculation of baseline emissions be replicated using the data and parameters supplied in the PDD? | | Yes, calculations are replicable. | OK | OK |
| 8.18 | Is the data provided in this section consistent with data as presented in other chapters of the PDD? | | Yes, it had been confirmed that data is consistent. | Ok | OK |
| | Summary of ex-ante estimation of emission reductions | PDD B.6.4 | | | |
| 8.19 | Is the form/ table required for the indication of projected emission reductions correctly applied? And is the data provided in this section consistent with data as presented in other chapters of the PDD? | | Yes, it had been found to be correctly applied. | Ok | OK |

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| 8.20 | Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | Monitoring Plan (CDM VVM EB 44 (para.120-122)) | PDD B.7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | (a) Compliance of the MP with the methodology | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9.1 | Are all necessary parameters required for the type of project by the methodology and applicable tools contained in the monitoring plan? | | In accordance with the ACM0002, main parameter to be monitored is the electricity supplied to the grid. The PDD describes to monitor the quantity of net electricity generation supplied by the project to the grid (CCPG) by continuous measurement and monthly recordings. | Ok | OK | | | | | | | | | | | | | | | | | | | | | | | |
| 9.2 | For each parameter, is the: a. Title in line with methodology? b. Data unit correctly expressed? c. Parameter appropriately described? d. Source clearly referenced? e. Correct value provided for the purpose of PDD estimations? f. Has this value been verified? g. Measurement methods correctly described and in line with the methodology/tools? h. Correct reference to standards (i.e. for calibration and maintenance)? i. Indication of accuracy provided? j. QA/QC procedures described? k. QA/QC procedures appropriate? | | <table><tr><td>EG facility,y</td><td>Quantity of net electricity generation supplied by the project to the CCPG in year y.</td></tr><tr><td>a.</td><td>CAR 1, MWH/Y.</td></tr><tr><td>b.</td><td>Yes, it is in line with the methodology.</td></tr><tr><td>c.</td><td>Yes, it is in line with the methodology.</td></tr><tr><td>d.</td><td>CAR 2, Meter readings.</td></tr><tr><td>e.</td><td>CAR 3, value to be corrected.</td></tr><tr><td>f.</td><td>Yes, it is in line with the methodology.</td></tr><tr><td>g.</td><td>Yes, it is in line with the methodology.</td></tr><tr><td>h.</td><td>Yes, it is in line with the methodology..</td></tr><tr><td>i</td><td>Yes,</td></tr><tr><td>j</td><td>Yes</td></tr><tr><td>K.</td><td>Yes</td></tr></table> Parameters related to | EG facility,y | Quantity of net electricity generation supplied by the project to the CCPG in year y. | a. | CAR 1, MWH/Y. | b. | Yes, it is in line with the methodology. | c. | Yes, it is in line with the methodology. | d. | CAR 2, Meter readings. | e. | CAR 3, value to be corrected. | f. | Yes, it is in line with the methodology. | g. | Yes, it is in line with the methodology. | h. | Yes, it is in line with the methodology.. | i | Yes, | j | Yes | K. | Yes | |
| EG facility,y | Quantity of net electricity generation supplied by the project to the CCPG in year y. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. | CAR 1, MWH/Y. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. | Yes, it is in line with the methodology. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. | Yes, it is in line with the methodology. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d. | CAR 2, Meter readings. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e. | CAR 3, value to be corrected. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f. | Yes, it is in line with the methodology. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| g. | Yes, it is in line with the methodology. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| h. | Yes, it is in line with the methodology.. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| i | Yes, | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| j | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K. | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | <p>substation which measures the both import and export of the electricity to the grid. The location of the meter is not clear in the PDD. A clarification request (CL 28) has been raised to clarify the location of the installation of the main meter.</p> <p>The PDD refers to another backup meter which was not found at the site. A corrective action request (CAR 5) had been raised to indicating the inconsistency with the actual situation.</p> | CAR 5 | OK |
| 9.6 | Does the monitoring plan represent current good monitoring practice? | | No, see CL 26, CAR 4 and CAR 5 . | CL 26, CAR 4 and CAR 5 | OK |
| 9.7 | Are the means of implementation of the monitoring plan, including data management and QA/ QC procedures, sufficient to ensure that the emission reductions achieved can be reported ex-post and verified? | | Yes, good QA/AC procedures had been put into place and data managing and recoding procedures are sufficient. | OK | OK |
| 10. | Sustainable Development (CDM VVM EB 44 (para.123-125)) | | | | |
| 10.1 | Does the Letter of Approval from the Host Party confirm that the project activity contributes to the sustainable development of that country? | | Yes, a LoA had been provided by the Chinese DNA (National Development Reform Commission (NDRC)), dated December 2007. The letter confirms that the project activity contributes to the sustainable development of the country. | OK | OK |
| 11. | Environmental Impacts (CDM VVM EB 44 (para.129-131)) | PDD D. | | | |
| 11.1 | Has an analysis of the environmental impacts of the project activity been undertaken? Does the analysis conclude that the project will create any unacceptable adverse environmental impacts? | | Yes, an environmental impact assessment was undertaken by a third party (Huaihua Environment Protection Science Institute) to assess the project's environmental impact and obtained the Approval Letter (Huaihanhan [2006] No.57) from Environmental Protection Bureau of Huaihua City in June, 2006. However, a clarification request (CL 29) had been raised to provide further justification of the order of EIA preparation and approval letter obtained from the relevant authorities. | CL 29 | OK |
| 11.2 | In accordance with the laws and regulations in the Host Country, does this project require an EIA? If so, has a valid EIA been conducted? Has this EIA been approved? | | <p>Yes, an EIA was undertaken by Huaihua Environment Protection Science Institute. This had been verified by cross-checking the supporting documentation.</p> <p>The EIA was approved by Environmental Protection Bureau (EPB) of Huaihua City. It had been cross-checked.</p> <p>A clarification request (CL 30) had been raised to include a description of the supplementary EIA approval (issued by Huaihua EPB on 12 October 2006) for the change in the installed capacity of the proposed project from 16MW to 20MW in the PDD.</p> | CL 30 | OK |

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| 11.3 | Does the environmental analysis undertaken and presented for the project activity include an analysis of trans-boundary impacts? | | Not applicable. | | |
| 11.4 | Is the analysis in the PDD fully consistent with the findings of the EIA? Are all significant impacts and mitigation measures identified in the EIA mentioned in the PDD? | | <p>No, clarification requests (CL 32, CL 33 & CL 34) had been raised to check the consistency of the information in the PDD.</p> <p>CL 31, Check the language thought out the section</p> <p>CL 32, Inconsistent with EIA, the section should be rewrite according to the EIA and its approval</p> <p>CL 33, to clarify the submerged area stated in the PDD was not consistent with SPDR and project description.</p> <p>Clarification request (CL 34) had been raised to include the ecological impact of the proposed project.</p> <p>Furthermore, a forward action request (FAR 1) had been raised. The construction of the dam has not yet completed, therefore the ecological flow was not maintained as required in the Hunnan Yuanlin County Niaoerchao Hydro Station Water Resources Analysis Report Approval issued by Huaihua Water Bureau on 13 June 2005. the ecology flow should be 0.42m³/s.</p> | CL 31 CL 32 CL 33 CL 34 FAR 1 | OK OK OK OK |
| 12. | Local Stakeholder Consultation (CDM VVM EB 44 (para.126-128)) | PDD E. | | | |
| 12.1 | Have comments from relevant stakeholders been invited prior to the publication of the PDD on the UNFCCC website? | | Yes, a meeting with local stakeholders was held on December 3, 2006. A participant list of the meeting and records had been examined and checked. | Ok | OK |
| 12.2 | Have all relevant local stakeholders been included in the consultation? <ul style="list-style-type: none"> a. Have appropriate media been used to invite comments by local stakeholders? b. Have all stakeholder groups had access to information? c. Have all stakeholder groups had a reasonable chance to comment? | | Yes, cross-checking of the participant list of the local stakeholder meeting indicates participation of local stakeholders from difference backgrounds. <ul style="list-style-type: none"> a. Comments had been sought through direct interactive meetings. b. The record of the meeting indicates that necessary information on the construction of the project was made available to the stakeholders. c. Yes, it had been cross-checked that a number of concerns and issues were raised by the stakeholders. | OK | OK |
| 12.3 | Is the summary of comments received as provided in the PDD complete? | | Yes, however, a clarification request (CL 35) had been raised to check and improve the language of the section. | CL 35 | OK |
| 12.4 | Has due account been taken of any stakeholder comments received and is this adequately and clearly described in the PDD? | | Yes, comments from local villagers had been taken into account. | OK | OK |

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| | | | <p>The project also involves displacement and resettlement of 244 people from the project site. A visit was made to the settled families and interviews were held to find out their satisfaction with resettlement arrangements and compensations as required by the local regulations. All the interviewees expressed their satisfaction with the arrangements and confirmed that due compensations were paid and they were generally happy with the arrangements.</p> | | |
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Appendix C : Remediation Form

Request Protocols for Clarification (CL), Corrective (CAR) and Forward Action (FAR).

| Corrective action requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| CAR 1 In section B.7.1, in monitoring plan the data unit (MWH/Y) is not correct. | 9.2 | The data unit is corrected as MWh/yr in Section B.7.1 of the revised PDD. | OK |
| CAR 2 In the monitoring plan, section B.7.1, the source of data (Meter readings) is not correctly described. | 9.2 | The source of data will be monitored by meters at Wuqiangxi Substation and Qijiaping Substation (used in emergency situation, such as maintenance of power transmission line connected to Wuqiangxi Substation) respectively. The Section B.7.1 is corrected in the revised PDD | OK |
| CAR 3 In the monitoring plan, section B.7.1, the 'Value of data applied for the purpose of calculating expected emission reductions in section B.5' shall be corrected. | 9.2 | The 1 st column in Section B.7.1 indicates the "Value of data applied for the purpose of calculating expected emission reductions in section B.5". The value applied in Section B.5 is 72331 MWh, which is sourced from Supplementary Preliminary Design Report (SPDR). The actual value will be monitored by meters <i>ex-post</i> . The data is the difference between power exported to grid and power imported from grid. The above information is corrected in Section B.7.1 of the revised PDD. | OK |
| CAR 4 The chart showing the processes and management structure for monitoring purposes (section B.7.2) is not clear. Clearly indication of the management structure along with roles and | 9.4 | The monitoring management structure is revised as per the actual situation. The roles and responsibilities of each department/person are as follows: | OK |

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| responsibilities for monitoring tasks should be included. | | <p>General Manager is responsible for general management of the project. He/she is final approval of internal monitoring report.</p> <p>The CDM Project Group is consisted of Monitoring Personnel and Internal Verifier. The group is leaded by the General Manager.</p> <p>Monitoring Department is responsible for data monitoring, recording and reporting. The department is also responsible for regular operation of the project and maintenance of equipments.</p> <p>Internal Verifier is responsible for checking the monitoring data and financial settlement with grid company plus CERs calculation.</p> <p>The above information is corrected in Section B.7.2 of the revised PDD.</p> | |
| CAR 5 Section B.7.2 of the PDD refers to another backup meter which was not found at the site, indicating an inconsistency with the actual situation. The monitoring plan shall be corrected. | 9.5 | <p>There is no backup meter installed for the project. However, the backup meter is not mandatory as per the methodology ACM0002.</p> <p>The meters will be replaced when they are in malfunction.</p> <p>The backup meter is deleted in Section B.7.2 of the revised PDD.</p> | OK |
| CAR 6 The PDD (section B.3, table 3) states that emissions of CH4 from the reservoir are not to be included, since they are expected to be zero. however ACM0002 requires this to be monitored, and CH4 emissions will have to be accounted for if the power density goes below 10 | 6.8 | It is corrected in the revised PDD. | OK |

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| w/m2. Therefore this emission source should be included in the boundary (even if it is expected to be zero). | | | |
| CAR 7 In section B.5 of the PDD, in undertaking the common practice analysis the Information on essential distinction with the CDM project activity is not correctly reflected. Also the explanation and justification of exclusion of projects below 15 MW from the analysis is not found justified | 7.43 | <p>According to the regulation of UNFCCC, hydropower plants with the installed capacity of equal or below 15 MW are defined as small scale projects. Furthermore, there are no projects below 15 MW are listed in China Water Resources Yearbooks.</p> <p>According to the China Water Resources Yearbook 2006 and Investigation Report on Hydropower Plants with Installed Capacity above 15 MW in Operation Since 2002 in Hunan Province, there are 4 similar projects listed in the common practice. The essential distinctions among the similar projects and the CDM project activity are as follows:</p> <p>The similar projects were constructed earlier than the project. The project owners choose to develop projects with better financial indicators. The 4 similar projects' reservoirs are smaller than the project which lead to the submergences of 4 similar projects are much less than the project. There is a reservoir with seasonal pondage capacity and TWO dams constructed for the project, which cause the investment of the project is higher than similar projects.</p> <p>The above information is corrected in Step 4 of Section B.5 of the revised PDD.</p> | Ok |
| CAR 8 The O&M costs for 12 MW design in GSP PDD is inconsistent with the FSR | 7.27 | <p>The O&M costs for 12 MW design in GSP PDD is 253.9×10^4 RMB, which is a typo since the figure is O&M costs for 20 MW design. According to project FSR, the correct data should be 160.43×10^4 RMB for 12 MW design.</p> | Ok |

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| | | The correction of the figure does not lead to a different project IRR result for 12 MW design since it is just an editorial error. | |
| CAR 9 The range of sensitivity analysis for 12 MW is not presented correctly. | 7.26 | The range of sensitivity analysis for 12 MW is corrected in the revised PDD, i.e. -10% is revised to +10% while +10% is revised to -10%. | Ok |
| CAR 10 Installed capacity of the hydro power plant after the implementation of the project activity (CapPJ) not included. A corrective action request (CAR 10) has been raised. | 4.8 | Parameter has been included and PDD revised. | Ok |

| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
|--|---------------------------------|---|------------------|
| CL 1 The version number of the PDD in section A.1 shall be clarified. | 2.2 | The PDD version is revised in Section A.1 of the PDD. | OK |
| CL 2 Description of the project activity in section a.2 should be clarified with respect to type of the project activity | 3.1 | The project is a newly built storage type hydropower project with seasonal pondage reservoir. There are two dams constructed for the project, one is Niaoerchao dam, and another one is Liujingtian diversion dam (small dam with low height). The Liujingtian diversion dam is used to divert the water resources through tunnel to the Niaoerchao reservoir. The above information is added in Section A.2 and A.4.3 of the revised PDD. | OK |
| CL 3 Information on both reservoirs associated with the project shall be included in section A.4.3, and a brief summary of this shall be added to section A.2. | 3.2 | There is only one reservoir (Niaoerchao reservoir) constructed for the project. Liujingtian diversion dam is a small diversion dam which is used to divert the water resources through tunnel to the Niaoerchao reservoir. However, the Liujingtian diversion dam | Ok |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| | | <p>causes the 0.143 km² submergence area in upriver.</p> <p>The above information is added in Section A.2 and A.4.3 of the revised PDD.</p> | |
| <p>CL 4 Annual utilization hours stated in the PDD are not consistent with the SPDR. Also, total electricity generation, net electricity supplied to the grid, and an explanation and justification for the difference between these two values shall be given in section A.4.3.</p> | 3.2, 3.5, 4.5 | <p>The annual utilization hours in PDD submitted for validation are 3416h, which is a typo. The correct annual utilization hours of the project are 3826h, which is sourced from project SPDR. The corresponding plant load factor is 43.68% (3826h/8760h).</p> <p>The total annual electricity generation of the project is 76520 MWh and the annual net electricity supply of the project is 72331 MWh.</p> <p>According to SPDR, the net electricity supply of the project is calculated as:</p> <p>Net electricity supply=electricity generation×coefficient of effective electricity generation—plant internal electricity consumption—electricity transmission line loss=76520 MWh×0.95—363 MWh=72331 MWh</p> <p>The coefficient of effective electricity generation is adopted as 0.95 in SPDR.</p> <p>The justifications of difference between electricity generation and net electricity supply are as follows:</p> | Ok |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
|------------------------|---------------------------------|--|------------------|
| | | <p>1. The coefficient of effective electricity generation are specified in the "Economic Evaluation Code for Small Hydropower Projects (SL16-95)" dated on 1 July 1995, which is currently still valid. The project is a grid connected seasonal regulating hydropower plant. The coefficient of effective electricity generation for grid connected seasonal regulating hydropower plant is ranged from 0.90 to 0.95 according to SL16-95. The coefficient of effective electricity generation of 0.95 is used for the project in the SPDR and PDD, which is conservative since it adopts the upper limit of the corresponding range in the SL 16-95.</p> <p>2. According to the "Hydroenergy Design Code for Small Hydropower Projects (SL76-94)" issued by Ministry of Water Resources of People's Republic of China, the plant internal electricity consumption is shown as 0.5%-1%. Also, according to the article "The relationship between house service system and power generation output in hydraulic power plant issued in 2007, the internal consumption for hydropower plants is shown as 0.3%-2%. According to "Hydroenergy Design Code for Small Hydropower Projects (SL76-94)", the transmission line loss for hydropower plants should not be more than 11%. Combining above 2 points, the total sum of 0.47% (363 MWh/76520 MWh) for plant internal consumption and transmission line loss of the project is conservative.</p> <p>Therefore, the difference between electricity generation and net electricity</p> | |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| | | <p>supply is reasonable and conservative.</p> <p>The above information is added in the Section A.4.3 of the revised PDD.</p> <p>The project IRR is calculated as 9.22% when taking annual electricity generation (76520 MWh) for investment analysis. The recalculated project IRR (taking the annual electricity generation as net electricity supply) is still below the benchmark.</p> | |
| <p>CL 5</p> <p>Information on the submerged area of the second reservoir should be included in the PDD and the power density calculation should be corrected in section A.2 and A.4.</p> | 3.2 | <p>According to measurement result of the project provided by Huaihua Institute of Hydroelectric Investigation, the surface area of flooded area at the full reservoir level of Niaoerchao dam is 1.66 km², and the surface area of flooded area at the full reservoir level of Liujingtian diversion dam is 0.143 km². The total surface area of flooded area at the full reservoir level of the project is 1.803 km², the power density of the project is calculated as installed capacity/submerged area which is equal to 11.09 W/m². The power density of the project is greater than 10 W/m², the project emissions are not needed to be considered as per ACM0002.</p> <p>The above information is added in the revised PDD.</p> | OK |
| <p>CL 6</p> <p>The distance between two dams is not identified in the section A.4.1.4 of the PDD.</p> | 4.1 | <p>The distance between two dams is 8.6km.</p> <p>The distance is added in the revised PDD</p> | OK |
| CL 7 | 4.5 | The specifications of the equipments in | OK |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| The specification of the equipments detailed in table 1, section A 4.3 was not consistent with the name plate of the actual installation observed onsite | | the PDD submitted for validation are typo. The parameters are corrected in accordance with nameplates of generators and turbines in Section A.4.3 of the revised PDD. | |
| CL 8 The main transformer and reference of the table should also been included in the equipment list in table 1. | 4.5 | The information of main transformer based on nameplate is added in Section A.4.3 of the revised PDD. | OK |
| CL 9 Life time of the equipment should be included in the PDD. | 4.5 | The lifetime of the equipment is added in the revised PDD. | OK |
| CL 10 More information shall be provided on the environmental safety of the technology employed by the proposed project in section A 4.3. | 4.8 | It can be found from Environmental Impact Assessment (EIA) of the project that the project has little impact to local environment. The project does not lead to pollution, so the project is safe to environment. The information is added in the Section A.4.3 of the revised PDD. | OK |
| CL 11 Evidence relating to the one of the criteria of the application of the approved baseline methodology to the project activity for the geographic and system boundaries of the grid is not provided in the section B.2 of the PDD.. | 6.4 | It can be found from Grid Connection Agreement of the project that the generated electricity is delivered to Huaihua Power Grid. According to China's Regional Grid Baseline Emission Factors 2009 issued by Department of Climate Change, National Development and Reform Commission (NDRC) on 2 July 2009, the CCPG covers Huaihua Power Grid geographically and systematically. The above information is added in the revised PDD. | OK |
| CL 12 Characteristics of the Central China Power Grid (CCPG) are not clearly | 6.6 | According to China's Regional Grid Baseline Emission Factors 2009 issued by Department of Climate Change, National Development and Reform | OK |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| described and further information is requested. | | <p>Commission (NDRC) on 2 July 2009, the geographic extent of CCPG boundary includes Jiangxi Province, Henan Province, Hubei Province, Hunan Province, Sichuan Province and Chongqing Municipality.</p> <p>For further information about CCPG, please refer to Annex 3 of the PDD.</p> <p>The above information is added in the revised PDD.</p> | |
| CL 13 Please include the timeline of continuing actions to secure CDM status till date, and also the actual date of the construction start date and other key project implementation timelines. | 7.4 | <p>The actual construction starting date of the project is 10 December 2006, which can be evidenced by Construction Order issued by Engineering Supervision Department.</p> <p>Other key project implementation timelines of continuing actions to secure CDM status till date are added in the revised PDD.</p> | OK |
| CL 14 Please include the further justification of the financial status of the project up to date. | 7.4 | <p>According to the Financial Audit Report of Niaoerchao Hydropower Project completed by independent Hunan Xianghua Public Accounting Co., Ltd., the actual fixed assets investment of the project are 199,847,571.37 RMB until the end of 2008. The actual investment is already much higher than the budget in SPDR.</p> <p>Due to the actual investment of the project was increased, a bigger loan is needed. So the project owner applied to Agricultural Bank of China (ABC) for loan on 22 October 2009. According to the reply letter from ABC, it can be concluded that the economic benefits</p> | OK |

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| Clarification requests | Reference to checklist question | Summary of project participants' response | Final conclusion |
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| | | <p>of the project (20 MW) is poor, but considering that the revenue of the CERs will increase the repayment ability, the ABC decided to sign the loan with the PP. Then the PP signed the loan contract with ABC on 20 January 2010. The new bank loan obtained from ABC is used to repay all the original bank loans and interests from China Construction Bank and to proceed with project construction (Liujingtan diversion dam)</p> <p>It can be found from above description that the CDM is a decisive factor for project financing.</p> <p>The above information is added in the revised PDD.</p> | |
| CL 15 Please explain the reason for skipping the identification of baseline alternatives in section B. 4 of the PDD. | 7.5 | <p>According to methodology ACM0002 (Version 11) and Clean Development Mechanism Validation and Verification Manual (Version 01.1), the Alternative—Equivalent annual electricity generation supplied by the CCPG is the only realistic and credible alternative to the project activity that can be the baseline scenario.</p> <p>Therefore the identification of alternatives of the project is skipped in Step 1 of Section B.5 of the revised PDD.</p> | OK |
| CL 16 Please provide evidence that the benchmark of 10% is extensively applied for similar projects. | 7.10, 7.11, 7.15 | <p>According to the "Bulletin of Effective Water Resources Technology Standard" issued by Ministry of Water Resources on 12 January 2009, the benchmark reference (<i>Economic Evaluation Code for Small Hydropower Projects</i> (SL16-95)) is still valid until</p> | OK |

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| | | now. The above information is added in the revised PDD. | |
| CL 17 Please include an investment analysis for the project with the actual installed capacity of 20 MW, and modify the calculation sheet and other associate sections in the PDD including the table of key input parameters to the financial analysis. | 7.16, 7.31; 7.46, 7.45 | <p>The investment decision of the project was made on 5 August 2005, by when the FSR (12 MW) is only available financial reference. In order to be in line with paragraph 6 of "Guidelines on the assessment of investment analysis":</p> <p><i>6. Guidance: Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant...</i></p> <p>the financial parameters sources from FSR are presented in the PDD submitted for validation.</p> <p>In order to further maximize the water resources utilization of the project, the installed capacity of the project was expanded to 20 MW in SPDR. The actual installed capacity of the project is also 20 MW, which can be confirmed through nameplate of generator.</p> <p>In order to further substantiate the financial status of the actual installed capacity, the investment analysis and sensitivity analysis for 20MW is conducted in the revised PDD.</p> <p>It can be found from investment analysis for both installed capacities that the design change improves the</p> | OK |

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| | | financial parameters of the project (project IRR 7.55% for 12 MW and project IRR 8.51% for 2 0MW). The PDD is revised accordingly. | |
| CL 18 Please provide a comparison between the results of the financial analysis for an installed capacity of both 12MW and 20MW in the PDD. | 7.16 | Please refer to CL 17. | OK |
| CL 19 Please provide information on the expected lifetime of the equipment (such as equipment warranties, industry experience etc). | 7.16 | According to benchmark reference, the lifetime of the project is 20 years. According to Provisional Regulation of Financial Assessment for Hydroelectric Construction Project, the lifetime of the project is 20-30 years. Furthermore, according to clarification provided by equipment supplier, the lifetime of the equipment will be affected by external circumstance and uncertain factors, such as weather conditions, water quality, work load and actual operation status etc. The lifetime of the equipment will be 20-30 years. | OK |
| CL 20 Please provide a linked and traceable version of the IRR worksheet so that results could be reproduced. | 7.23 | The linked and traceable version of IRR worksheets are provided together with the revised PDD. | OK |
| CL 21 No IRR for the initial design of the project, i.e. 12 MW, had been discussed as a comparison of the IRR from 20 MW installations. | 7.24 | Please refer to CL17. | OK |
| CL 22 Further justification of the electricity tariff shall be given, including an analysis of | 7.26 | At the time of FSR completion, the electricity tariff is sourced from Notice about Adjustment of Electricity Tariff of | OK |

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| the trend in tariffs for previous projects in the region. | | <p>Power Plants in Hunan Province (Xiangjiachong [2004] No.114) issued by Hunan Price Bureau on 4 August 2004. The electricity tariff indicated in the document is 0.315 RMB/kWh.</p> <p>At the time of SPDR completion, electricity tariff is sourced from Notice about Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2005] No. 129) issued by Hunan Price Bureau on 23 August 2005. The electricity tariff indicated in the document is 0.316 RMB/kWh.</p> <p>Therefore, the electricity tariffs presented in the investment analysis are available at the time of FSR and SPDR completion.</p> <p>Furthermore, according to the Notice about Further Adjustment of Electricity Tariff in Hunan Province (Xiangjiadian [2008] No. 158) issued by Hunan Price Bureau on 22 October 2008, the actual specific electricity tariff for the project is listed as 0.316RMB/kWh in the document.</p> <p>The electricity trend in Hunan Province is added in the revised PDD.</p> <p>It can be found from electricity trend in Hunan Province that the highest ever approved tariff is 0.316 RMB/kWh (0.298 excluding VAT) for projects of similar size i.e. what this project itself received. Projects above 25 MW received as a maximum 0.326</p> | |

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| | | <p>RMB/kWh (0.279 excluding VAT), which would return a lower IRR because the VAT is 17% whereas for this project the VAT is only 6% (it can be confirmed through document Xiangjiadian [2008] No.158). So, in conclusion, this project would not cross the benchmark with the highest-ever approved tariff as it would need 0.3544 RMB/kWh including VAT (an increase of 12.20%) in order to do so.</p> <p>The above information is added in the revised PDD.</p> | |
| CL 23 Please further substantiate the investment costs by including the figures of actual investment incurred, based on the financial audit report, for comparison purposes. | 7.26, 7.43 | <p>According to the Financial Audit Report of Niaoerchao Hydropower Project completed by independent Hunan Xianghua Public Accounting Co., Ltd., the actual fixed assets investment of the project are 199,847,571.37 RMB until the end of 2008. The actual investment is already higher than the total investment budget in SPDR (158,038,300 RMB).</p> <p>The above information is added in the revised PDD.</p> | OK |
| CL 24 The timing of the investment decision is not clear. Please indicate the time when the investment decision was made, with evidence. | 7.27 | The investment decision is made in director meeting on 5 August 2005. | OK |
| 25 Please include information on the change of tariff in the last three years. | 7.27, 7.31 | <p>Please refer to CL22, the electricity tariff for projects with installed capacity between 15MW-25MW remained unchanged since August 2005 (0.316 RMB/kWh, VAT is 6%).</p> <p>The electricity tariff for projects with installed capacity above 25MW in 2007</p> | OK |

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| | | <p>is 0.316 RMB/kWh, the tariff is increased to 0.326 RMB/kWh from October 2008 until now.</p> <p>However, the VAT for electricity tariff 0.326 RMB/kWh is 17%, which means that the actual electricity tariff (excluding VAT) for 0.326 RMB/kWh (0.279 RMB/kWh excluding) is lower than 0.316 RMB/kWh (0.298 RMB/kWh excluding VAT).</p> | |
| CL 26 Reference to the source of information on low-cost/must run resources for the CCPG should be provided. | 8.5, 9.6 | <p>The information on low-cost/must run resources for the CCPG is sourced from China Electric Power Yearbook 2004~2008.</p> <p>The data in China Electric Power Yearbook are also quoted in China's Regional Grid Baseline Emission Factors issued by Chinese DNA.</p> | OK |
| CL 27 Please clearly indicate that calculations are based on 20 MW capacity of the proposed project activity. | 8.14 | It is indicated in the revised PDD. | OK |
| CL 28 The location of the electricity meter is not clear in the PDD. Please clearly indicate the location of the main meter. | 9.5 | <p>The electricity generated by the project will be supplied to Wuqiangxi Substation and Qijiaping Substaion (used in emergency situation, such as maintenance of power transmission line connected to Wuqiangxi Substation). There is one meter installed at each substation for monitoring purposes.</p> <p>The above information is added in the revised PDD.</p> | OK |
| CL 29 Please provide further explanation on | 11.1 | It is further justified in the revised PDD. | OK |

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| the justification for the EIA preparation and the approval letter obtained from the relevant authorities in section D of the PDD. | | | |
| CL 30 Please include a description of the supplementary EIA approval (issued by Huaihua EPB on 12 October 2006) for the change in the installed capacity of the proposed project from 16MW to 20MW in the PDD. | 11.2 | It is added in the revised PDD. | OK |
| CL 31 Check Please revise the language of section D as it is currently not clear. | 11.4 | Language check is conducted in the revised PDD. | OK |
| CL 32 Section D of the PDD is inconsistent with the EIA. The section should be rewritten according to the EIA and its approval. | 11.4 | The EIA section is rewritten as per EIA and its approval in the revised PDD. | OK |
| CL 33 Please clarify the submerged area stated in the PDD, as the figure stated is not consistent with the SPDR and project description | 11.4 | The data presented in the PDD submitted for validation is newly increased submerged area. The total surface area of flooded area at the full reservoir level of the project is 1.803km ² . The data is corrected in the revised PDD. | OK |
| CL 34 Please include information on the ecological impacts of the proposed project. | 11.4 | The ecological impact of the project is added in the revised PDD. | OK |
| CL 35 The project activity is a hydro electricity project and is associated with Sectoral Scope 1. Energy Industries | 4.2 | The project falls into: Sectoral Scope 1: Energy industries (renewable sources) | OK |

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| (renewable/non-renewable sources). The PDD in section A.4.2 incorrectly makes reference to the categories for small scale projects in section A.4.2. | | The category of the project is corrected in the revised PDD. | |
| CL 36 Explanation on how the same types and levels of services provided by the project activity would have been provided in the baseline scenario is not provided. | 4.3 | <p>The baseline scenario of the project is equivalent annual electricity supplied by CCPG, which is the continued operation of the existing power plants and the addition of new generation sources on the CCPG to meet the electricity demand. The project involves of construction a hydropower plant by using energy water resources for power generation. The project emission is not considered when calculating the emission reductions since the power density of the project is greater than 10 W/m². Thus the emission reductions of the project are equal to baseline emission.</p> <p>The above information is added in the revised PDD.</p> | OK |
| CL38 Timing of the investment decision is 5 August 2005 and indicated applicable tariff in year 2005 is 0.316 RMB KWH, whereas tariff applied in the calculations is 0.315 RMB KWH. It should be clarified why the applicable tariff at the time of the investment decision is not used for the calculating the IRR of the project. | 7.26 | <p>The Notice about Adjustment of Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2004] No. 114) issued by Hunan Price Bureau on 4 August 2004. The electricity tariff is indicated as 0.315 RMB/kWh for projects above 15 MW.</p> <p>The Notice about Electricity Tariff of Power Plants in Hunan Province (Xiangjiachong [2005] No. 129) was issued by Hunan Price Bureau on 23 August 2005. The electricity tariff is indicated as 0.316 RMB/kWh for projects above 15 MW. The tariff is also the one presented in FSR.</p> | OK |

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| | | <p>It can be found from above events that Xiangjiachon [2004] No. 114 (0.315 RMB/kWh) was available at the time of investment decision (5 August 2005) while Xiangjiachong [2005] No. 129 (0.316 RMB/kWh) was not available at investment decision since it was issued later than 5 August 2005.</p> <p>Therefore, the tariff used for calculating the IRR of the project (12 MW) is correct.</p> | |
| | | | |

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| FAR 1 The construction of the Niaoerchao dam has not yet been completed, therefore the ecological flow was not maintained as required in the Hunnan Yuanlin County Niaoerchao Hydro Station Water Resources Analysis Report Approval issued by Huaihua Water Bureau on 13 June 2005. the ecology flow should be 0.42m ³ /s. | 11.4 | | To be addressed at first verification |

| MINOR ISSUES | Reference to checklist question | Summary of project participants' response | Final conclusion |
|--------------|---------------------------------|---|------------------|
| None | | | |