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# VALIDATION REPORT

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## SICHUAN LIANGTAN HYDROPOWER STATION SECOND PHASE PROJECT IN CHINA

REPORT No. 2007-4201

REVISION No. 03

DET NORSKE VERITAS



# VALIDATION REPORT

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|                                    |   |
|------------------------------------|---|
| Date of first issue:<br>2008-02-19 | Project No.:<br>63602346                        |
| Approved by:<br>Michael Lehmann    | Organisational unit:<br>Climate Change Services |
| Client:<br>EcoSecurities Group PLC | Client ref.:<br>Mr Yang Yi                      |

**Project Name:** Sichuan Liangtan Hydropower Station Second Phase Project  
**Country:** China  
**Methodology:** ACM0002  
**Version:** 08  
**GHG reducing Measure/Technology:** Power generation from hydro resources from an existing reservoir  
**ER estimate:** 82 392 tCO<sub>2</sub>/year

## Size

☒ Large Scale

☐ Small Scale

## Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

## Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the "Sichuan Liangtan Hydropower Station Second Phase Project", as described in the project design document, version 10 dated 10 February 2009, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0002, version 08. Hence, DNV requests the registration of the Sichuan Liangtan Hydropower Station Second Phase Project as a CDM project activity.

|  |                                      |                |
|--|--------------------------------------|----------------|
| Report No.:<br>2007-4201   | Date of this revision:<br>2009-02-13 | Rev. No.<br>03 |
| Report title:<br>Sichuan Liangtan Hydropower Station Second Phase Project in China |                                      |                |
| Work carried out by:<br>Zhang Xiaojun Johnsen; Deng Cuiping; Michael Lehmann       |                                      |                |
| Work verified by:<br>Mathsy Kutty  |                                      |                |

Key words:

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

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### Abbreviations

|                   |   |
|-------------------|---|
| BM                | Build Margin  |
| CAR               | Corrective Action Request                             |
| CCPG              | Central China Power Grid                              |
| CDM               | Clean Development Mechanism                           |
| CER               | Certified Emission Reduction                          |
| CL                | Clarification request                                 |
| CO <sub>2</sub>   | Carbon dioxide  |
| CO <sub>2</sub> e | Carbon dioxide equivalent                             |
| DNV               | Det Norske Veritas                                    |
| DNA               | Designated National Authority                         |
| EF                | Emission Factor                                       |
| EIA               | Environmental Impact Assessment                       |
| EPB               | Environmental Protection Bureau                       |
| GHG               | Greenhouse gas(es)                                    |
| IPCC              | Intergovernmental Panel on Climate Change             |
| LHS               | the original Liangtan Hydroelectric Station           |
| LoA               | Letter of Approval                                    |
| MP                | Monitoring Plan                                       |
| NCV               | Net Calorific Value                                   |
| NDRC              | National Development and Reform Commission            |
| NGO               | Non-governmental Organisation                         |
| NPV               | Net Present Value                                     |
| ODA               | Official Development Assistance                       |
| OM                | Operating Margin                                      |
| PDD               | Project Design Document                               |
| PDR               | Preliminary Design Report                             |
| SCE               | Standard coal equivalent                              |
| UNFCCC            | United Nations Framework Convention on Climate Change |




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Appendix A: Validation Protocol

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### 1 EXECUTIVE SUMMARY – VALIDATION OPINION

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

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

*The host Party is China and the Annex I Party is Sweden. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA of China confirmed that the project assists in achieving sustainable development.*

*The project correctly applies ACM0002 Version 08: “Consolidated baseline & monitoring methodology for grid connected electricity generation from renewable sources.*

*By generating renewable energy which will displace electricity in the Central China Power Grid (CCPG), the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefit to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the project are estimated to be on the average 82 392 tCO<sub>2</sub>/year over the selected 7 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

*The monitoring methodology ACM0002 has been correctly applied and the monitoring plan sufficiently provides for collection of data to determine the project’s emission reductions. Adequate training and monitoring procedures have been implemented.*

*In summary, it is DNV’s opinion that the “Sichuan Liangtan Hydropower Station Second Phase Project” in China, as described in the PDD version 10 dated 10 February 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002. DNV thus requests the registration of the project as a CDM project activity”.*



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## 2 INTRODUCTION

EcoSecurities Group Plc has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the Sichuan Liangtan Hydropower Station Second Phase Project in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

### 2.1 Objective

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

### 2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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



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### 3 METHODOLOGY

The validation consisted of the following three phases:

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

The following sections outline each step in more detail.

#### 3.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

- /1/ EcoSecurities Group Plc, PDD of Sichuan Liangtan Hydropower Station Second Phase Project; version 5 of 31 October 2007; version 6 of 28 May 2008; version 7 of 12 September 2008; version 9 dated 27 October 2008 and version 10 dated 10 February 2009
- /2/ Letter of Approval issued by Chinese DNA on 10 September 2007.
- /3/ Letter of Approval issued by the DNA of Sweden on 25 March 2008.
- /4/ Preliminary Design Report of July 2005 by Institute of Nanchong Water and Electricity Design and the approval letter by Guan An City Water Resources Bureau of 26 July 2005. [2005]No.88
- /5/ Sichuan Province Water Resources and Hydropower Survey & Design Institute. Environmental impact assessment report of December 2003 and the approval letter by Guan An City Environmental protection Bureau on 18 December 2003. [2003]No.219
- /6/ The resettlement contract between Sichuan Guang'an AAA Public Co., Ltd. and key engineering leading organization on 18 April 2005. Contract No. 200516
- /7/ Sichuan Guang'an AAA. Public Co., Ltd at the Temporary Shareholder Convention for CDM consideration on 31 July 2005.
- /8/ The intend lending letter from Guang'an Branch Bank of China Agriculture Bank after knowing CDM consideration for Liangtan Hydro Power Station Second Phase Project on 6 August 2005.
- /9/ Letter from Guang'an Branch Bank of China Agriculture Bank and Lending contract from Guang'an Branch of China Agriculture Bank on 27 June 2006 No.51101200700004889
- /10/ Project construction starting command by Guan'an city water management Bureau, 6 September 2005.
- /11/ The Project Certificate by Institute of Water Conversation & Hydroelectric Engineering Exploration & Design, Nanchong on 5 July 2007 (The original plant started operation in 1985 and is expected to continue operating until 2032)
- /12/ The electricity data by local grid company for the original Liangtan Hydroelectric Station from 2002 to 2006



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- /13/ The personnel training plan for Sichuan Liangtan Hydropower Station Second Phase Project
- /14/ The Management and Operation Manual for Sichuan Liangtan Hydropower Station Second Phase Project
- /15/ "Economic Evaluation Code for Small Hydropower Projects SL16-95" issued by the Ministry of Water Resources in 1995 (Document No. SL16-95)  
(<http://www.cws.net.cn/guifan/bz%5CSL16-95>)
- /16/ The Research and Design Institute of No.14 China Hydro Engineering Bureau and the National Research Institute for Rural Electrification, accredited by the Chinese Government, both claim that SL 16-95 is still used by design institutes when assessing the financial feasibility of small hydropower projects.
- /17/ Notification of Current Effective Water Conservancy Technical Standards by The Ministry of Water Resource of PRC,  
<http://www.mwr.gov.cn/tzgg/qt/20060926000000479251.aspx>
- /18/ The Power Purchase contract between the project owner and Guang'an AAA Public Electricity Co., Ltd. signed in September 2007.
- /19/ CDM Executive Board, Validation and Verification Manual. Version 01
- /20/ CDM Executive Board, ACM0002 Approved methodology, "Consolidated methodology for grid-connected electricity generation from renewable sources", version 08
- /21/ CDM Executive Board, Tool for the demonstration and assessment of additionality, version 05.2
- /22/ Chinese DNA's guidance for the determination of grid boundaries and emission factors (9 August 2007),  
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf>  
OM: <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1358.xls>  
BM: <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf>
- /23/ China Electric Power Yearbook 2002-2006
- /24/ China Energy Statistical Yearbooks 2004, 2005 and 2006
- /25/ China NDRC, the statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005, and NDRC official website  
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2006/20061215144747182.pdf>
- /26/ IPCC: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual.
- /27/ The announcement about strictly forbid the construction of the thermal power station with the installed capacity lower than 135WM published by the state council office, The General Office of the State Council [2002] No.6
- /28/ The reform program for the electricity industry system published by State Department of China on 11 April 2002.





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- /29/ The Paper of Upgrade Hydro Power Station in Sichuan Province provided by Sichuan Local Electricity Power Bureau 28 August 2007 (for common practice analysis)
- /30/ Answered questionnaires for the stakeholder comments by project owner dated May 2007.
- /31/ The Letter of Intent for the Grid Connection of Liangtan Hydro Power Station on 30 July 2005 and Price notice document from Guang'an Price Bureau issued on 14 June 2005
- /32/ Report submitted of compensation investment for repairing the road to power station.
- /33/ Sichuan Local Electric Power Bureau notice on CDM meeting on 26 October 2005; the contract between project developer and Sichuan Huayuan Country Electrification Development Co., Ltd introducing a Carbon Buyer on 8 December 2005
- /34/ CDM Emission Reduction Purchase Agreement (ERPA) was signed on 19 October 2006
- /35/ Approval by NDRC as CDM project for Liangtan Hydropower Station Second Phase Project Liangtan on 13 July 2007
- /36/ IRR spreadsheet dated 9 December 2008
- /37/ CDM EB, Tool to calculate the emission factor for an electricity system, version 01.1.

Main changes between the version of the PDD published for the 30 days stakeholder consultation period and the version of the PDD submitted for registration:

- Changes related to the CARs and CLs identified in the DNV's draft validation report and related to the latest EB Guidelines on financial analysis, project starting date and CDM consideration (EB38-EB41);
- Changes due to the revisions to ACM0002 version 08.

### 3.2 Follow-up Interviews with Project Stakeholders

On 2007-12-21, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. DNV did not perform a site visit to Sichuan Liangtan Hydropower Station Second Phase Project since the documents provided, such as the design report /4/, was sufficient to verify project design and its implementation. The proposed project activity did not result in any irreversible impact on physical aspects of the original LHS /11/.

|      | Date       | Name   | Organization                | Topic   |
|------|------------|--|-----------------------------|---|
| /38/ | 2007-12-21 | Mr. Li<br>Jianguang<br>Mr.ZhangW<br>enyi<br>Ms.Zhang<br>Yan<br>Ms. Tan<br>Fang | EcoSecurities<br>Group Plc. | <ul style="list-style-type: none"> <li>➤ Baseline determination of the project</li> <li>➤ Applicability of selected methodology ACM0002</li> <li>➤ Issues related to the additionality</li> <li>➤ Common practice analysis</li> <li>➤ Emission reductions calculation</li> <li>➤ Emission reduction monitoring plan and project management</li> </ul> |
| /39/ | 2007-12-21 | Mr. Li<br>Chenglin   | Manager<br>Sichuan          | <ul style="list-style-type: none"> <li>➤ Information of project construction</li> <li>➤ The development of hydropower project in Sichuan</li> </ul>   |



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|  |  |                    |                               |   |
|--|--|--------------------|-------------------------------|---|
|  |  | Mr. Wang Jianqiang | Guang'an AAA Public Co., Ltd. | province<br>➤ The approval status (incl. EIA approval, the feasibility study report approval, CDM project approval)<br>➤ Project management<br>➤ Emission reduction monitoring plan<br>➤ Consulting process for stakeholder's comments<br>➤ Investment risks and barriers |
|--|--|--------------------|-------------------------------|---|

### 3.3 Resolution of Outstanding Issues

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

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

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "Sichuan Liangtan Hydropower Station Second Phase Project" is enclosed in Appendix A to this report.

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

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

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

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

  

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

  

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

**Figure 1 Validation protocol tables**



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### 3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3.5 Validation Team

| <i>Role/Qualification</i>             | <i>Last Name</i> | <i>First Name</i> | <i>Country</i> | <i>Type of involvement</i> |                         |           |                     |                  |              |
|---------------------------------------|------------------|-------------------|----------------|----------------------------|-------------------------|-----------|---------------------|------------------|--------------|
|                                       |                  |                   |                | Desk review                | Site visit / Interviews | Reporting | Supervision of work | Technical review | Expert input |
| Project Manager / CDM validator       | Zhang            | Xiaojun, Johnsen  | China          | √                          | √                       | √         |                     |                  |              |
| CDM validator / technical team leader | Deng             | Cuiping           | China          |                            |                         |           | √                   |                  |              |
| Sector expert / Methodology expert    | Michael          | Lehmann           | Noway          |                            |                         |           |                     |                  | √            |
| Technical Reviewer                    | Kutty            | Mathsy            | India          |                            |                         |           |                     | √                |              |

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



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### 4 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation of version 10 dated 10 February 2009.

#### 4.1 Participation Requirements

The project participants are Sichuan Guang'an AAA Public Co., Ltd. of China and EcoSecurities Group Plc. of Sweden. The host Party China and Annex I Party Sweden meet the requirements to participate in the CDM.

The letter of approval (LoA) from the DNA of China, authorizing Sichuan Guang'an AAA Public Co., Ltd as the project participant and confirming that the project assists Chinese sustainable development, was issued on 10 September, 2007./2/

The letter of approval (LoA) from the DNA of Sweden, authorizing EcoSecurities Group Plc. as project participant, is on 25 March 2008.

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

#### 4.2 Project Design

The "Sichuan Liangtan Hydropower Station Second Phase Project" involves installation of a hydropower station with an installed capacity of 20MW. The hydropower station is located on the other side of the dam from the original Liangtan Hydro Station (LHS) which has an installed capacity of 8.6MW prior to the implementation of the project activity. The project activity shares the water resources from the same existing reservoir.

The original LHS started operation in 1985 and is expected to continue operating until 2032 as assessed and reported by the Institute of Water Conversation & Hydroelectric Engineering Exploration & Design, Nanchong /11/ and will continue to provide electricity to the grid at historical average levels.

The proposed project will include building an independent powerhouse, new channel, new turbines and new generators with a total capacity of 20 MW consisting of two 10 MW turbines/4/. As a hydropower project with existing reservoirs where the volume of the reservoir is not increased, the proposed project will generate zero carbon emission electricity for the Central China Power Grid (CCPG).

The proposed technology is similar to the technology commonly used in existing hydropower projects and represents current good practice.

A detailed analysis in the PDR /4/ confirms that enough water available in the reservoir to meet the demand of both the new and old hydropower station.

Based on the information contained in the PDR/4/, DNV was able to verify that net electricity generation to the grid will be 84 544 MWh/year (the difference between estimated total



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electricity of 132 437 MWh/year to the grid by both power stations and  $EG_{\text{historical}}$ , being 47 893 MWh/year).

The expected operational lifetime of the project activity is 23 years, and the estimated total GHG emission reductions are 82 392 tCO<sub>2</sub>/year during a 7 years renewable crediting period which will start on 1 June 2009.

This project started construction in September 2005 /10/ after CDM was taken into account in July 2005 /7/. The first generator of the project started operation on 6 September 2007.

### 4.3 Baseline Determination

The “Sichuan Liangtan Hydropower Station Second Phase Project” applies the approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 08. The chosen methodology is applicable as the project activity fulfils the following criteria:

- The project is a renewable electricity generation plant, in the form of a hydropower plant which is modified without inundating any new area;
- The project activity is implemented in an existing reservoir, with no change in the volume of reservoir;
- The project is a grid-connected hydro power project which is connected with a regional power grid, the Central China Power Grid;
- The project is not an activity that involves switching from fossil fuels to renewable energy at the site of the project activity.

The baseline scenario is that the existing facility would continue to provide electricity to the grid ( $EG_{\text{baseline}}$ , in MWh/year) at historical average levels ( $EG_{\text{historical}}$ , in MWh/year) in the absence of the CDM project activity, until the time at which the generation facility would be likely be replaced or retrofitted in the absence of the CDM project ( $DATE_{\text{BaselineRetrofit}}$ ).

The baseline emission reduction is the electricity (kWh) produced by the renewable power generating unit (i.e. the difference  $EG_y - EG_{\text{baseline}}$ , where  $EG_y$  is electricity supplied by the project activity to the grid and  $EG_{\text{baseline}}$  is the baseline electricity supplied to the grid in the case of modified or retrofit facilities) multiplied by an emission coefficient (kg CO<sub>2</sub>e/kWh) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved baseline methodology ACM0002 /22/.

In accordance with ACM0002, the electricity baseline emission factor is determined ex-ante as the weighted average of the OM emission factor and the BM emission factor. The default weights for hydro power projects of 50% OM and 50% BM have been selected according to ACM0002. The ex-ante estimation method was selected for the OM /22/ and BM /22/ emission factor based on the most recent information available for the years 2002-2005, which was the most recent data available at the time of PDD submission.

The spatial extent of the project boundary is clearly defined as the site of project activity and all power plants connected physically to the Central China Power Grid (CCPG) to which the project is connected.

The selected sources and gases are justified for the project activity. Emission sources and gases included in the project boundary are:



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|                           | <i>GHGs involved</i> | <i>Description</i>  |
|---------------------------|----------------------|---|
| <b>Baseline emissions</b> | CO <sub>2</sub>      | The combined margin (CM) of the project is 0.97455tCO <sub>2</sub> /MWh. Thus, the baseline emissions are expected to be 82 392 tCO <sub>2</sub> /year. |
| <b>Project emissions</b>  | Zero                 | According to ACM0002, being a hydropower renewable energy project, there are no project emissions.  |
| <b>Leakage</b>            | Zero                 | According to ACM0002, being a hydropower project with utilizing resources from an existing reservoir, no leakage is accounted for.                      |

### 4.4 Additionality

The additionality of “Sichuan Liangtan Hydropower Station Second Phase Project”, as required by ACM0002, is demonstrated by applying the “Tool for demonstration and assessment of additionality” version 05.2 as follows:

#### 4.4.1 CDM consideration and continued action to secure CDM status

The project activity start date considered is the date of the construction start permits by construction supervision engineering Co. Ltd. of Gansu Huayan on 6 September 2005 /10/ and the commencement of validation (date of publication of the PDD for stakeholder) was on 10 November 2007. The project participants upon the request by DNV provided information on the action undertaken to secure CDM status of the project during the more than 2 years time period from project start date to the commencement of validation. DNV reviewed the provided evidence for serious CDM consideration for the project activity prior to the project start date and for demonstrating that real action to secure CDM status were undertaken:

- The preliminary design report (PDR) by Guan'an City Water Resources Bureau on 26 July 2005 /4/ based on assumptions provided in the PDR indicated the proposed project is feasible at the tariff of 0.39 RMB/kWh;
- The tariff for the project was found to be only 0.36 RMB/kWh as per the Letter of Intent for the Grid Connection of Liangtan Hydro Power Station on 30 July 2005 /31/ and price notice document from Guang'an Price Bureau issued on 14 June 2005 /31/. Using this approved tariff, the project IRR of the proposed project activity turned out to be 8.43% /36/, below the benchmark of 10% /15/;
- Board of Directors held a temporary shareholder convention for CDM consideration on 31 July 2005 /7/ to overcome the financial barrier;
- The project received the permit to start construction from the Guan'an city water management on 06 September 2005 /10/;
- The project developer engaged an intermediary named Sichuan Huayuan County Electrification Development Co., Ltd to introduce a Carbon Buyer in December 2005 /33/.
- Emission Reduction Purchase Agreement (ERPA) was signed on 19 October 2006 /34/ with EcoSecurities Group Plc;
- The project was approved by NDRC as CDM project on 13 July 2007 /35/.

The proposed project received the construction start permit on 6 September 2005 /10/. The preliminary design report (PDR) by Guan'an City Water Resources Bureau of 26 July 2005 /4/ assumed a tariff of 0.39 RMB/kWh /4/ for the financial and technical feasibility of the project. However, as per the Letter of Intent for the Grid Connection of Liangtan Hydro





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Power Station of 30 July 2005 /31/ and the price notice document from Guang'an Price Bureau issued on 14 June 2005 /31/, the tariff for the project was found to be only 0.36 RMB/kWh. This made the project IRR to be 8.43%.

The project proponent thus considered revenues from CDM during a temporary shareholder convention for CDM consideration on 31 July 2005 /7/ to overcome the financial barrier. After a CDM conference held by the Sichuan Local Electric Power Bureau, the project developer engaged an intermediary named Sichuan Huayuan County Electrification Development Co., Ltd to introduce a Carbon Buyer in December 2005 /33/. Nearly one year of negotiation and investigation followed, including detailed screening of the project. Further to this, a CDM Emission Reduction Purchase Agreement (ERPA) was signed on 19 October 2006 /34/ with EcoSecurities Group Plc. The work on the PDD was initiated and the Chinese PDD was submitted to NDRC in May 2007. The project was approved by NDRC as CDM project on 13 July 2007 /35/. The LoA from the DNA of China was obtained on 10 September 2007 /2/. The English PDD was submitted to DNV in October 2007 and project validation was initiated.

CDM benefits were thus seriously considered in the decision to proceed with the project activity, and real and continuous actions were undertaken to secure CDM status in parallel with the implementation of the project.

### 4.4.2 Identification of alternatives to the project activity

Four realistic and credible alternatives to the project activity are considered:

*Alternative 1:* Construction of an upgrade hydroelectricity generation plant with installed capacity of 20 MW connected to the local grid, implemented without considering CDM revenues.

*Alternative 2:* Supply of equivalent annual power output by the Grid (CCPG).

*Alternative 3:* Construction of fuel fired power plants with 20 MW or the same annual power output.

*Alternative 4:* Construction of a power plant using another renewable energy resource with the same installed capacity or the same annual power output.

The installed capacity for wind and solar energy in Sichuan is 0 MW between 2003 and 2006, which is after the power industry in China underwent a significant suite of reforms in 2002 /28/. Therefore, *Alternative 4* is not considered to be realistic and credible and is not considered further in the assessment of the alternatives.

According to China's regulations, alternative 3) (construction of fuel fired power plants with unit capacity of equal or less than 135 MW) are prohibited in the areas which can be covered by large grids such as provincial grids. Except for the proposed activity not undertaken as a CDM project activity, the only realistic alternative consistent with current laws and regulations is "Supply of equivalent annual power output by the grid (CCPG)". It has been adequately demonstrated (see step 2 and 4 below) that the practical and feasible baseline scenario is alternative 2, "Supply of equivalent annual power output by the grid (CCPG)".

### 4.4.3 Investment analysis: Choice of approach

As the proposed project generates financial and economic benefits other than CDM related income through the sales of electricity, a simple cost analysis (option I) can not be applied. The alternative for the baseline scenario of the proposed project is not a similar investment project, so option II is also not an appropriate choice. Hence, a benchmark analysis (option III) is selected for conducting the investment analysis.





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### 4.4.4 Investment analysis: Benchmark selection

In China a project IRR of 10% with reference to the *Economic evaluation code for small hydropower projects (Document No. SL16-95)* /15/ is regarded as a benchmark for investments in small scale hydropower plants (the small scale hydropower plants can be categorised as all hydropower projects with an installed capacity below 25MW located in all regions, and also to hydropower projects with an installed capacity up to 50MW located in rural regions).

The 10% benchmark given in this regulation is the most specific benchmark for small hydropower projects and is representing the common Chinese practice for investment decision processes /16/. Although this regulation came into force already on 1 July 1995, it still in effect as verified by DNV from the announcement by *Ministry of Water Resource of PRC* of 09 September 2006 /17/.

### 4.4.5 Investment analysis: Input parameters

The main parameters used for the IRR calculations are derived from the PDR /4/, except for electricity tariff which is sourced from “*The Letter of Intent for the Grid Connection of Liangtan Hydro Power Station on 30 July 2005 and Price notice document from Guang’an Price Bureau issued on 14 June 2005* /31/ ”. The documents mentioned above have been assessed by DNV and were available at the time of the project start.

The preliminary design report of the project /4/ was developed by the Institute of Nanchong Water and Electricity Design and further approved by Guang’an City Water Resources Bureau on 26 July 2005 /4/. Similar to information contained in a feasibility study report, information contained in a PDR can thus be considered information provided by an independent and recognized source.

DNV compared the input parameters for the financial analysis included in the PDD with the parameters stated in the PDR and was able to confirm that the values applied are consistent with the value stated in the PDR. The IRR calculations have been verified by DNV.

The PDR was approved on 26 July 2005 /4/ and thus only 2 months prior to the decision to proceed with the project activity (i.e. the start date of the project) which was on 6 September 2005 /10/. Given this relative short period of time between approval of the PDR and the decision to proceed with the project activity it is unlikely in the context of the project that the input values would have materially changed and that it is thus reasonable to assume that the PDR has been the basis of the decision to proceed with the investment in the project.

Furthermore, the input parameters used in the financial analyses were compared to the proposed project with other hydro power projects developed in Sichuan province by comparing investment costs per MW, electricity tariff, percentage of O&M costs relative to total investment costs, etc. In addition, by applying our sectoral competence, DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

### 4.4.6 Investment analysis: Calculation and conclusion

The IRR calculations were provided in a spreadsheet. The calculations were verified and found to be correct by DNV. The assumptions used in the calculations were deemed to be correct by DNV. The project IRR without CDM revenues is 8.43% , which confirms that the project in the absence of CDM benefits and compared to the benchmark of 10% /15/ is not financially attractive. With CER revenues the project IRR increases to 10.97%, which is

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above the benchmark.

### 4.4.7 Investment analysis: Sensitivity analysis

A sensitivity analysis has been conducted with regards to the total investment, annual operation cost, annual electricity sales and operating hours. The required alteration needed in each parameter in order to reach the benchmark was assessed as below.

| <i>Key Indicators</i> | <i>Variation of the indicator needed to reach the benchmark</i> |
|-----------------------|---|
| Operating costs       | - 103.85%   |
| Investment costs      | - 12.01%  |
| Electricity tariff    | + 11.58%  |
| Operating hours       | + 11.34%  |

A 12.01% decrease in investment costs is very unlikely to happen, as it is much more likely that hydro power projects will experience cost *increases* rather than cost decreases during construction as China experiences CPI increase in all industry sectors. Furthermore, DNV was able to confirm that additional investment for repairing the road to power station was made /32/.

The project developer has signed letter of intent for the grid connection of Liangtan Hydro Power Station (LIGC) with the grid company, which fixed the tariff as 0.36 RMB/kWh /31/. Hence, an increase in the electricity tariff above 11.58% is not a probable scenario.

The expected operating hours are based on a 49 years (from 1954 to 2002) /4/ of hydrological statistics. So the operating hours are highly unlikely to fluctuate by a 11.34% increase and hence making it unrealistic.

Additionally with the operation and maintenance (O&M) costs, the IRR reaches the benchmark only at a 103.85% decrease in the O&M cost. This is not possible since, it is not credible to assume that there would be no operation and maintenance costs involved in the project.

Analysis above shows that very unrealistic favourable circumstances would be needed for the project IRR to reach the benchmark. Therefore, the project is not financially attractive.

The financial calculations and assumptions have been assessed and are considered correct and conservative.

#### *Step 3: Barrier analysis*

Not applicable (Only step 2 is selected).

#### *Step 4 – Common practice analysis:*

The common practice analysis is limited to the provincial level as the investment environment for each province differs (e.g. with regards to taxes, loan policy and electricity tariffs). 2002 was a landmark year for the power industry in China, and therefore only the capacity addition projects, which were developed after 2002 are considered in the common practice analysis below.



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### *Existing Upgrades of Hydro Power Stations in Sichuan Province*

| Name of Power Plant                         | Capacity (MW) | Operating Hours | Investor                                |
|---|---------------|-----------------|---|
| Niujiaowan Third- lever Hydro Power Station | 25            | 6127            | Sichuan Xichuan Electric Power Co., Ltd |
| Guanyinyan Hydro Power Station              | 17.5          | 5654            | Liangshan Anning Electric Power Co.,Ltd |
| Jiangjunpo Hydro Power Station              | 16            | 5160            | Sichuan Ya'an Electric Power Co., Ltd   |

*Data source: Sichuan Local Electricity Power Bureau*

There are distinctions between this proposed project activity and the other already operating hydropower projects with similar installed capacity in Sichuan Province. The annual operating hours of the Niujiaowan Third-level Hydro Power Station, Guanyinyan Hydro Power Station, and Jiangjunpo Hydro Power Station are higher than the operating hours of the proposed project activity (more than 5000 hours). DNV was able to confirm this against the paper “Upgrade Hydro Power Station in Sichuan Province” provided by the Sichuan local electricity power bureau 28 August 2007 /29/. The project’s shorter annual operating hours (4572hrs) implies that the proposed project will generate less income from less electricity generated, making it less financially attractive and more exposed to financial risks than the other four projects. .

Therefore, apart from the above project which has also applied for CDM, the current existing hydropower upgrade projects in Sichuan Province did not face the same barriers as the proposed project. In light of the above, it can be concluded that this proposed project cannot be considered common practice.

## 4.5 Monitoring

The project applies the approved monitoring methodology ACM0002 “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources” version 08. The selected monitoring methodology is applicable to the project. The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

Monitoring of sustainable development indicators is not required by the Chinese DNA. The environmental impacts are considered minor and will be monitored by the local environmental authority during the project lifetime.

### 4.5.1 Parameters determined ex-ante

The baseline grid emission factor will be determined *ex-ante*, based on the most recent information available, and is calculated as a combined margin, consisting of the combination of OM and BM emission coefficient. This combined margin emission coefficient will remain fixed during the first renewable crediting period. For more details, please refer to chapter 4.6.

The project activity is implemented in an existing reservoir, with no change in the volume of reservoir. Hence, the project emissions are zero.



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The historical data of original Liangtan is another parameter determined Ex-ante.

### 4.5.2 Parameters monitored ex-post

According to ACM0002, there are no project emissions since no change in the volume of reservoir and no leakage is required from the project. Thus, there are three *ex-post* parameters that have to be monitored:

- i)  $EG_y$  net electricity generated from both original and the proposed project activity monitored *ex-post*;
- ii)  $EG_{existing,y}$ : The actual, measured electricity supplied to the grid by existing units in year y (MWh).

DNV verified that the revenue meter at the sub-station is used to measure the electricity supplied to the grid, which gives the total energy exported to the grid. A cross-check meter installed at the project site will be used to cross-check the electricity to the grid.

Electricity generation will be measured continuously and recorded on an hourly basis and aggregated on a monthly basis. This data will be cross checked against the sales receipts from the grid operator.

According to national standards (GB/T 17215-2002, GB/T17882-1999, GB/T17883-1999, DL/T614-1997), meters will be calibrated periodically by a testing facility accredited under the Chinese law.

### 4.5.3 Management system and quality assurance

Staff involved in the CDM project will receive some relevant training either from EcoSecurities, a contracted consultant, or the relevant Chinese authorized company. The personnel training plan and management and operation manual, including responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and training, were verified.

The reading of the electricity meter will be done hourly and recorded monthly. The project developer will establish a CDM team, the outline of which is shown in the PDD, and a project management and operation manual as described below:

The operational manager will collect the information and data required by the monitoring plan. The collected information will be recorded and sent to the CDM project manager and the responsible staffs on a monthly basis. The CDM project manager will be in charge of the implementation of the monitoring plan and report to the general manager who will verify the calculations and reports.

The project management and operation manual contain procedures for tracking information. All paper-based information will be stored by the project owner. Detailed procedures are expected to be in place prior to the start of the crediting period to enable subsequent verification of emission reductions. The relevant documents will be kept for at least two years after the end of the crediting period

## 4.6 Estimate of GHG Emissions

The project will partly displace fossil fuel-based electricity generation in CCPG. The methodology complies with one of the approaches proposed for category ACM0002.

The emission reduction  $ER_y$ , calculations is estimated as:

$$ER_y = BE_y - PE_y - L_y$$

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Project emissions  $PE_y$ , are considered to be zero, given that there is no flooded area associated with the project activity, consequently it is not necessary to calculate the power density.

According to ACM0002, no leakage effects need to be considered. Hence,  $L_y = 0$ .

The “Sichuan Liangtan Hydropower Station Second Phase Project” is an addition of a hydro-power station with installed capacity of 20MW to the original Liangtan Hydro Station (LHS). Hence, emission reductions will only be claimed for electricity production above the average historic electricity generation amount from the original LHS.

Therefore the total emission reductions achieved by this project,  $ER_y$  is equal to

$$BE_y = (EG_y - EG_{baseline}) * EF_{grid,CM,y}$$

Where:

- $BE_y$  = Baseline emissions in year y (tCO<sub>2</sub>/yr)
- $EG_y$  = Electricity supplied by the project activity to the grid (MWh).
- $EG_{baseline}$  = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh).
- $EF_{grid,CM,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”.

According to the latest version of ACM0002,  $EG_{baseline}$  should be calculated as follows:

$$EG_{baseline} = \text{MAX}(EG_{historical}, EG_{existing}) , \text{ until } DATE_{BaselineRetrofit}$$

$$EG_{baseline} = EG_y , \text{ on/after } DATE_{BaselineRetrofit}$$

- $EG_{baseline}$  = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh).
- $EG_{existing}$  = The actual, measured electricity production of the existing units in year y (MWh).
- $EG_{historical}$  = Average of historical electricity delivered by the existing facility to the grid (MWh).  $EG_{historical} = 47\,893$  MWh/year
- $EG_y$  = Electricity supplied by the project activity to the grid (MWh).
- $DATE_{BaselineRetrofit}$  = Point in time when the existing equipment would need to be replaced in the absence of the project activity (date).

According to the feasibility study of the proposed project, the net electricity generated is approximately 132 437 MWh, i.e.  $EG_y = 132\,437 - 47\,893 = 84\,544$  MWh/year;

And  $EF_y = 0.97455$  tCO<sub>2</sub>/MWh as illustrated below;

The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

The baseline emission factor for the project is determined *ex-ante* in line with the Tool to calculate the emission factor for an electricity /37/ as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM).

The operating margin (OM) emission factor is calculated using the “simple OM” method which is justified because low cost and must run power plants constitute less than 50% of the total grid generation (CCPG).



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The baseline of the proposed project is calculated according to released documents by Chinese DNA on 9 August 2007.

For the calculation of the operating margin (OM) emission factor, the simple OM emission factor calculation method is selected because low cost must run projects constitute less than 50% of the total grid generation and data is not available for applying the dispatch data analysis. The aggregated generation and fuel consumption data are used due to the fact that more disaggregated data are not available in the CCPG. Country specific data for net calorific value ( $NCVi$ ) of each type of fossil fuel, the IPCC 2006 default values for the oxidation factor of each type of fossil fuel and the total electricity delivered to the CCPG are selected and are deemed reasonable. Vintage data for the years 2004-2006 /24/ from China Energy Statistics Yearbooks and China Electric Power Yearbooks 2002-2006 /23/ editions are used for operating margin calculation. The OM is calculated to be 1.2899tCO<sub>2</sub>/MWh /22/ as generation-weighted average for the three years.

Because plant specific fuel consumption and electricity generation data is not public available in China, the build margin is calculated as follows following the EB's guidance:

- Using the latest statistical data available from China Energy Statistical Yearbook 2006 to calculate the different CO<sub>2</sub> emission percentage ( $\lambda_i$ ) of solid, liquid and gas fuel in the total emission of Central China Power Grid in 2005.
- Based the emission percentage ( $\lambda_i$ ) of different kind fossil fuels and the corresponding emission factor ( $EFi$ ) according to the best technology commercially available in the China, the weighted emission factor of thermal power ( $EF_{thermal}$ ) is calculated.
- Using the latest statistical data available (from the China Electric Power Yearbook) determine one year from which the added generation capacity is equal to or just exceeds 20% of the capacity of the latest statistic year 2005. Regarding the added generation capacity above 20%, calculate the Build Margin through multiply the weighted emission factor of thermal power ( $EF_{thermal}$ ) by the capacity percentage of the thermal power among the about 20% new capacity of 2005.

With reference to the Notification on Determining Baseline Emission Factor of China's Grid, the weighted average fuel consumption for power generation of 30 sets of 600MW sub-critical coal-fired power generators built in 2005 (343.33 gce/kWh) and the 200 MW oil/gas based combined cycle power generators (258 gce/kWh) are taken as the efficiency level of the best technology commercially available in China. The IPCC 2006 value of 25.8tC/TJ and a carbon oxidation factor of 100% are used to calculate the BM emission coefficients.

- The  $EF_{BM}$  is calculated as 0.6592 t CO<sub>2</sub>/MWh.

The combined margin of 0.97455tCO<sub>2</sub>/MWh is fixed ex-ante for the entire first crediting period.

The selection of the parameters is complete and transparent. The total estimated emission reductions over the first crediting period are 576 746tCO<sub>2</sub>e. The GHG calculations are complete and transparent, and their accuracy has been verified.

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





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### 4.7 Environmental Impacts

The environmental impact assessment (EIA) for this project was carried out by Sichuan Province Water Resources and Hydropower Survey & Design Institute. The EIA report was approved by Guan An City Environmental protection Bureau on 18 December 2003 /5/.

The conclusion of the report has been described in the PDD. According to the environmental impact assessment required by China the impacts of the project are not considered significant.

### 4.8 Comments by Local Stakeholders

Local stakeholders were invited through a questionnaire to provide comments on the project. 55 questionnaires were sent to the stakeholders by the project developer and received 91 % participation (50 questionnaires returned out of 55). The stakeholders included local governmental officials (2 people), local residents (15 people) and related employees (33 peoples). The survey shows that the stakeholders believe that the CDM project activity will have positive impacts on the local ecological, environmental, employment and social life.

15 persons who were designated by Guangxing town government were assigned to consult the 172 persons that needed to resettle. All those households affected by power house construction were resettled nearby and 66 people were given jobs. So the project construction was supported by the local people. DNV was able to confirm this against the resettlement contract between Sichuan Guang'an AAA Public Co., Ltd. and key engineering leading organization on 18 April 2005 /6/.

DNV have checked all the questionnaires received. The survey shows that the proposed project receives support from local people.

### 4.9 Comments by Parties, Stakeholders and NGOs

The PDD of the "Sichuan Liangtan Hydropower Station Second Phase Project version 5 of 31 October 2007 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 10 November 2007 to 9 December 2007.

No comment was received.

The PDD of the "Sichuan Liangtan Hydropower Station Second Phase Project" version 7 of 12 September 2008 was again made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 18 September 2008 to 17 October 2008.

No comment was received.

## **APPENDIX A**

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### **CDM VALIDATION PROTOCOL**



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

| Requirement   | Reference   | Conclusion  |
|---|---|---|
| <b>About Parties</b>  |   |   |
| 1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.  | Kyoto Protocol Art.12.2   | OK  |
| 2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.  | Kyoto Protocol Art.12.2.  | OK  |
| 3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.  | Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a   | <del>CAR 1</del>  |
| 4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.  | Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a    | OK  |
| 5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties. | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2 | No public funding was found for this project.   |
| 6. Parties participating in the CDM shall designate a national authority for the CDM.   | CDM Modalities and Procedures §29                               | China: DNA - National Development and Reform Commission of the People's Republic of China<br>DNA of Sweden: Swedish Energy Agency |
| 7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.   | CDM Modalities §30/31a  | China and Sweden are Parties to the Kyoto   |

| Requirement   | Reference  | Conclusion   |
|---|--|--|
|   |  | Protocol and have ratified the same on 30 August 2002 and 31 May 2002, respectively. |
| 8. The participating Annex I Party's assigned amount shall have been calculated and recorded.   | CDM Modalities and Procedures §31b                           | OK   |
| 9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.  | CDM Modalities and Procedures §31b                           | OK   |
| <b>About additionality</b>  |  |  |
| 10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.                                    | Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43 | OK<br><del>CL7</del><br><del>CL8</del><br><del>CL9</del>                             |
| <b>About forecast emission reductions and environmental impacts</b>   |  |  |
| 11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.  | Kyoto Protocol Art. 12.5b                                    | OK   |
| <b>For large-scale projects only</b>  |  |  |
| 12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out. | CDM Modalities and Procedures §37c                           | OK   |
| <b>About stakeholder involvement</b>  |  |  |
| 13. Comments by local stakeholders shall be invited, a summary of these provided and  | CDM Modalities and   | <del>CL14</del>  |

| Requirement   | Reference   | Conclusion |
|---|---|------------|
| how due account was taken of any comments received.   | Procedures §37b                                       | OK         |
| 14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available. | CDM Modalities and Procedures §40                     | OK         |
| <b>Other</b>  |   |            |
| 15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.  | CDM Modalities and Procedures §37e                    | OK         |
| 16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.  | CDM Modalities and Procedures §45c,d                  | OK         |
| 17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.  | CDM Modalities and Procedures §47                     | OK         |
| 18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.   | CDM Modalities and Procedures Appendix B, EB Decision | OK         |
| 19. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.  | CDM Modalities and Procedures §37f                    | OK         |

**Table 2 Requirements Checklist**

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview   |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft Concl.</b> | <b>Final Concl.</b> |
|---|--|-------------|-------------|---|---------------------|---------------------|
| <b>A. General Description of Project Activity</b><br><i>The project design is assessed.</i>   |  |             |             |   |                     |                     |
| <b>A.1. Project Boundaries</b><br><i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>   |  |             |             |   |                     |                     |
| A.1.1. Are the project's spatial boundaries (geographical) clearly defined?   |  | /1/<br>/4/  | DR          | Yes. The project is located near Guangxing town, Guang'an City in Sichuan Province, People's Republic of China.<br>The Project's location is on the middle reaches of the Qujiang River, a tributary of the Jialing River, 60km away from Guang'an City. The exact location of the project is defined using GPS coordinates N30°38'56"Latitude, E106°54'28"Longitude.<br>Furthermore, an English map is needed. | <del>CL</del> 1     | OK                  |
| A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?   |  | /1/         | DR          | The project's system boundary has been defined to all the power plants that are connected to the Central China Power Grid, for the estimation purposes of the emission factor.<br>In addition to all plants, the project's system boundary should include all the facilities in the power plant.  | <del>CL</del> 2     | OK                  |
| <b>A.2. Participation Requirements</b><br><i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project</i> |  |             |             |   |                     |                     |

\* MoV = Means of Verification, DR= Document Review, I= Interview

| CHECKLIST QUESTION<br>* MoV = Means of Verification, DR= Document Review, I= Interview  | Ref.              | MoV* | COMMENTS   | Draft Concl.                            | Final Concl. |
|---|-------------------|------|--|---|--------------|
| Participant.  |                   |      |  |   |              |
| A.2.1. Which Parties and project participants are participating in the project?   | /1/<br>/2/<br>/3/ | DR   | Sichuan Guang'an AAA Public Co., Ltd. from the host country China and EcoSecurities Group Plc. from Sweden, the annex I Party are project participants for this project activity.<br><br>But Annex I to the PDD, shows in the address provided that the PP is from Ireland. Confirm which is the Party involved, Sweden or Ireland?  | <del>CL-3</del>                         | OK           |
| A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?                        | /1/<br>/2/<br>/3/ | DR   | The letter of authorisation and the letter of approval for the project and its participants from the DNA of China have been issued.<br><br>The letter of authorisation and the letter of approval for the project and its participants from Sweden need to be submitted.<br><br>But Annex I to the PDD, shows in the address provided that the PP is from Ireland. Confirm which is the Party involved, Sweden or Ireland? | <del>CAR-1</del><br><br><del>CL-3</del> |              |
| A.2.3. Do all participating Parties fulfil the participation requirements as follows:<br>- Ratification of the Kyoto Protocol<br>- Voluntary participation<br>- Designated a National Authority | /1/               | DR   | The Republic of China has ratified the Kyoto Protocol on 30 August 2002, and established a DNA; NDRC of the People's Republic of China.<br><br>The LoA from the DNA of China confirms voluntary participation.<br><br>DNA of Sweden: Swedish Energy Agency,  | <del>CL-3</del>                         |              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview   | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>  | <b>Draft Concl.</b> | <b>Final Concl.</b> |
|---|-------------|-------------|--|---------------------|---------------------|
|   |             |             | Department of Energy system Analysis and Climate Change on ratification of the Kyoto Protocol on 31 May 2002. The voluntary participation needs to be confirmed against the LoA from Sweden. | CAR-1               |                     |
| A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.  | /1/         | DR          | The initial validation of the project activity does not reveal any information indicating that the project can be seen as diversion of any ODA funding towards China.                        |                     | OK                  |
| <b>A.3. Technology to be employed</b><br><i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i> |             |             |  |                     |                     |
| A.3.1. Does the project design engineering reflect current good practices?  | /1/         | DR          | Yes. The project activity uses the widely used technology of turbines for electricity generation, which reflects the current good practice.  |                     | OK                  |
| A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?   | /1/<br>/4/  | DR          | The project uses state of the art technology with all the equipment produced domestically. The project developer is experienced in handling and operating this kind of operations.           |                     | OK                  |
| A.3.3. Does the project make provisions for meeting training and maintenance needs?   | /1/         | DR          | Yes. The project owner will make provisions for the training and maintenance needs before the operation of the project.  |                     | OK                  |

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|---|--|-------------|-------------|--|-------------------------|-------------------------|
| <b>A.4. Contribution to Sustainable Development</b><br><i>The project's contribution to sustainable development is assessed.</i>  |  |             |             |  |                         |                         |
| A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?   |  | /1/<br>/2/  | DR          | Yes, the LoA from the DNA of China has confirmed that the project assists it in achieving sustainable development.   |                         | OK                      |
| A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?   |  | /1/         | DR          | Yes. As a renewable energy project, it will produce positive environmental and economic benefits and contribute to the local sustainable development special on the alleviation of the strong electricity demand in the local areas, alleviation of poverty in the county, increasing of new job opportunities for the local people and simulating the economic development. |                         | OK                      |
| <b>B. Project Baseline</b><br><i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i> |  |             |             |  |                         |                         |
| <b>B.1. Baseline Methodology</b><br><i>It is assessed whether the project applies an appropriate baseline methodology.</i>  |  |             |             |  |                         |                         |
| B.1.1. Does the project apply an approved methodology and the correct version thereof?  |  | /1/         | DR          | Yes. The project apply the approved methodology ACM0002 "Consolidated methodology for grid connected electricity generation from renewable sources" version 07   |                         | OK                      |
| B.1.2. Are the applicability criteria in the baseline   |  | /1/         | DR          | The project does not involve switching from  |                         | OK                      |

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| methodology all fulfilled?   |                     |      | fossil fuels to renewable energy at the site. The project will be connected to the CCPG, the geographic and system boundaries of CCPG can be clearly identified and information on the characteristics of the grid is available.   |                 |                 |
| <b>B.2. Baseline Scenario Determination</b><br><i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i> |                     |      |  |                 |                 |
| B.2.1. What is the baseline scenario?  | /1/                 | DR   | <p>The baseline scenario is that in the absence of the project activity, an equivalent amount of annual electricity would have been supplied by the CCPG, that the project will be connected.</p> <p>The electricity generated by the existing Liangtan Hydroelectric Station (LHS) 8.6MW hydro-power station, will be deducted from the baseline emissions. Hence the energy generated over and above the existing facility (baseline levels) are accounted for in the emission reduction calculations.</p> |                 | OK              |
| B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?   | /1/<br>/20/<br>/21/ | DR   | Apart from the continuation of the current scenario (alternative 4), three other realistic and credible alternative scenarios have been  |                 | OK              |



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|---|-------------|-------------|--|---------------------|---------------------|
|   |             |             | <p>considered:</p> <p><i>Alternative 1:</i> The proposed project not taken as CDM project;</p> <p><i>Alternative 2:</i> Construction of a fossil fuel power plant with equivalent amount of annual electricity output;</p> <p><i>Alternative 3:</i> Construction of a power plant using another renewable energy resource with the same installed capacity or the same annual power output.</p> <p>For the wind and solar renewable energy, in Sichuan, capacity between 2003 and 2006 is 0 MW. Therefore, <i>Alternative 3</i> is not considered to be realistic and credible and is not considered further in the assessment of the alternatives.</p> <p><i>Alternative 4:</i> Continuation of the current situation, i.e. electricity will continue to be generated by the existing generation mix operating in the grid.</p> <p>1) has less financial attractiveness; 2) does not accord with the existing regulatory framework.</p> <p>In addition, the selection of the baseline scenario needs to include an alternative of power generation using other renewable sources.</p> | CL-4                |                     |

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|---|-------------------------------------|-------------|--|-------------------------|-------------------------|
| B.2.3. Has the baseline scenario been determined according to the methodology?  | /1/<br>/20/<br>/21/                 | DR          | Yes. "Supply of equivalent annual power output by the Grid (CCPG) where the proposed project is connected to." is the baseline scenario determined according to the methodology.   |                         | OK                      |
| B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?   | /1/<br>/20/<br>/21/<br>/22/<br>/25/ | DR          | OM and BM data sources are: Chinese DNA's guidance for the determination of grid boundaries and emission factors, <a href="http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf">http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf</a>  |                         | OK                      |
| B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations? | /1/                                 | DR          | Yes. All relevant national and sectoral policies, regulations and department rules and disciplines are considered such as the renewable energy law and the Western Development Strategy and policies by central government.  |                         | OK                      |
| B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?                       | /1/<br>/20/<br>/21/<br>/22/<br>/25/ | DR          | The baseline determination is compatible with the available data. The China Energy Statistical Yearbooks of the years 2004 to 2006 and China Electric Power Yearbooks of the years 2002 to 2006 are used for the calculation of the baseline.<br><br>Chinese DNA's guidance for the determination of grid boundaries and emission factors, <a href="http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf">http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf</a> |                         | OK                      |

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|---|-------------|-------------|---|-------------------------|-------------------------|
| B.2.7. Have the major risks to the baseline been identified?  | /1/<br>/4/  | DR          | Availability of water to operate throughout the crediting period is the probably the risk. Also, the water is first used by the existing plant and then by the PP, and hence, there is a risk of available water for power generation by the plant.<br><br>But in PDR, enough water is discussed to meet both projects.   | <del>CL-5</del>         | OK                      |
| <b>B.3. Additionality Determination</b><br><i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i> |             |             |   |                         |                         |
| B.3.1. Is the project additionality assessed according to the methodology?  | /1/<br>/21/ | DR          | The proposed project gained construction start permit on 6 September 2005 /10/. The preliminary design report (PDR) for the by Guan'An City Water Resources Bureau on 26 July 2005 /4/ based on assumptions provided in the PDR. However, the tariff of 0.39 RMB/kWh considered in PDR /4/ for the financial and technical feasibility of the project was not realised. As per the Letter of Intent for the Grid Connection of Liangtan Hydro Power Station on 30 July 2005 /31/ and price notice document from Guang'an Price Bureau issued on 14 June 2005 /31/, the tariff for the project was found to be only 0.36 RMB/kWh. This made the project NPV negative at -16 381 562 RMB. |                         | OK                      |

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|---|-------------|-------------|--|---|---------------------|
|   |             |             | <p>The project proponent thus considered revenues from CDM during a temporary shareholder convention for CDM consideration on 31 July 2005/7/ to overcome the financial barrier.</p> <p>The project NPV without CDM is negative. This indicates that CDM financing is required to improve proposed project's financial situation.</p>  | <del>CL-6</del><br><del>CL-7</del><br><del>CL-8</del> |                     |
| B.3.2. Are all assumptions stated in a transparent and conservative manner?                   | /1/         | DR          | Yes. All assumptions stated in a transparent and conservative manner.  |   | OK                  |
| B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?        | /1/<br>/4/  | DR          | <p>The “tool for the demonstration and assessment of additionality” <b>version 05.2</b> is applied.</p> <p>Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations:<br/> Alternatives 1(the project activity without CDM) and 2 (continuation of the current situation)identified above are in line with all applicable laws and regulations;<br/> The alternative 3 of construction of a fossil fuel plant with the equivalent annual electricity output is not up to the existing regulatory framework.</p> |   | OK                  |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft<br/>Concl.</b>                       | <b>Final<br/>Concl.</b> |
|---|-------------|-------------|---|---|-------------------------|
|   |             |             | <p>Step 2 – Investment analysis:<br/> Since the project will generate the economic benefit other than CDM-related income through the electricity sale and that the project developer does not have alternative and comparable investment choices, the benchmark analysis – option 3 is used to assess the financial viability of the project activity.<br/> Evidence should be provided for the incentive for consideration of CDM revenues at the project conceptualization?</p> <p>The project NPV without CDM is negative (-16 381 562 Yuan in RMB. This indicates that in comparison to other alternative investments, the project would not be financially feasible in the absence of CDM financing.</p> <p>In the sensitivity analysis, the value at which the IRR will be equal to the benchmark and then the likelihood of the parameter having this value to confirm that it is not likely that the IRR will become equal to the benchmark needs to be assessed.</p> <p>Step 3 –Barrier analysis: Not applicable(only step2 is selected)</p> | <p><del>CL-6</del></p> <p><del>CL-7</del></p> |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview  | <b>Ref.</b>                       | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft Concl.</b> | <b>Final Concl.</b> |
|--|-----------------------------------|-------------|---|---------------------|---------------------|
|  |                                   |             | <p>The PP has taken the tariff from the PPA for the financial analysis. However, the PPA was signed in Sept 2007. How did PP take this tariff for financials carried out in 2005?</p> <p>Step 4 – Common practice analysis:<br/>This analysis shows that all other similar hydropower projects started operation after 2002 in Sichuan province with existing upgrade hydro power stations. Comparing with the proposed project, the annual operating hours (more than 5000 hours) of the other three hydro power stations are higher than the operating hours of the proposed project activity. The project's shorter annual operating hours imply that the proposed project will generate less income from less electricity generated, making it less financially attractive and more exposed to financial risks than the other three projects.</p> | <del>CL-8</del>     |                     |
| B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity? | /1/<br>/4/<br>/9/<br>/10/<br>/11/ | DR          | <p>Before the project construction permit on 6 September 2005, Sichuan Guang'an AAA. Public Co., Ltd took consideration for CDM at the Temporary Shareholder Convention 31 July 2005.</p> <p>If CDM was considered in 2005 itself, why did the PP take more than two years to start validation?</p> <p>Guang'an Branch Bank of China Agriculture</p>  | <del>CL-9</del>     | OK                  |

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|---|-------------|-------------|---|-------------------------|-------------------------|
|   |             |             | Bank sent lending letter for Liangtan Hydro Power Station Second Phase Project on 6 Aug. 2005 after knowing CDM consideration.<br><br>But evidence should be provided for the incentive for consideration of CDM revenues at the project conceptualization? | CL-6                    |                         |
| <b>B.4. Calculation of GHG Emission Reductions – Project emissions</b><br><br><i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |             |             |   |                         |                         |
| B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?  | /1/<br>/11/ | DR          | The Project does not involve construction of a new dam or reservoir. The water will be diverted to the hydro power plant through an   |                         | OK                      |

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|---|---------------------|------|--|-----------------|-----------------|
|   | /20/<br>/21/        |      | open channel on the left bank of the existing reservoir. So it is not expected to result in project GHG emissions.   |                 |                 |
| B.4.2. Have conservative assumptions been used when calculating the project emissions?  | /1/                 | DR   | Yes.   |                 | OK              |
| B.4.3. Are uncertainties in the project emission estimates properly addressed?  | /1/                 | DR   | Yes.   |                 | OK              |
| <b>B.5. Calculation of GHG Emission Reductions – Baseline emissions</b><br><i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |                     |      |  |                 |                 |
| B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?  | /1/<br>/22/<br>/26/ | DR   | <p>The ex-ante emission reduction calculations are as follows:</p> $ER_y = BE_y - PE_y - L_y$ <p><math>PE_y = 0</math> Given that there is no flooded area associated with the project activity, consequently it is not necessary to calculate the power density. According to ACM0002, the leakage of the Project is not considered. No leakage is expected. Therefore, <math>L_y = 0</math>.</p> <p>So: The emission reduction of this upgrade</p> |                 | OK              |



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|---|-------------|-------------|--|-------------------------|-------------------------|
|   |             |             | <p>project is calculated as follows:<br/> <math>ER_y = BE_y = EG_y * EF_y</math><br/> <math>= (EG_y - EG_{historical}) * EF_y</math> (unitl DATE Baseli</p> <p>Where:<br/> <math>BE_y</math>: Baseline emissions (tCO<sub>2</sub>)<br/> <math>EG_y</math>: Electricity supplied by the project to the grid (MWh)<br/> <math>EG_{historical}</math>: Historical Electricity Production<br/> <math>EF_y</math>: baseline emission factor (tCO<sub>2</sub>/MWh)<br/> y: refers to a given year<br/> Estimated electricity supplied annually to the grid by both power stations (EGy) = 132,437 MWh<br/> <math>EG_{baseline} = 47,893</math> MWh/year<br/> Baseline emission factor with combined margin (<math>EF</math>) = 0.9687 tCO<sub>2</sub>e / MWh</p> <p>Please clearly state how the EGY for the CER calculation is taken?</p> <p>The baseline emission factor for the project is determined ex-ante as a combined margin, consisting of combination of the operating margin (OM) and build margin (OM).</p> <p>In PDD Version 5 on 10/31/2007, OM and Chinese DNA's guidance for the determination of grid boundaries and</p> | CL-10                   |                         |

| <b>CHECKLIST QUESTION</b>   |                     | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>  | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
|---|---------------------|-------------|-------------|--|-------------------------|-------------------------|
| * MoV = Means of Verification, DR= Document Review, I= Interview  |                     |             |             | emission factors,<br><a href="http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf">http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf</a>     |                         |                         |
| B.5.2. Have conservative assumptions been used when calculating the baseline emissions?   | /1/<br>/22/<br>/26/ | DR          |             | Same as above.   |                         | OK                      |
| B.5.3. Are uncertainties in the baseline emission estimates properly addressed?   | /1/<br>/22/<br>/26/ | DR          |             | Same as above.   |                         | OK                      |
| <b>B.6. Calculation of GHG Emission Reductions – Leakage</b><br><i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |                     |             |             |  |                         |                         |
| B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?  | /1/<br>/20/         | DR          |             | According to ACM0002, potential leakage effects, such as emissions arising from power plant construction and land inundation do not have to be considered. |                         | OK                      |
| B.6.2. Have conservative assumptions been used when calculating the leakage emissions?  | /1/<br>/20/         | DR          |             | Yes.   |                         | OK                      |
| B.6.3. Are uncertainties in the leakage emission estimates properly addressed?  | /1/<br>/20/         | DR          |             | Yes.   |                         | OK                      |
| <b>B.7. Emission Reductions</b>   |                     |             |             |  |                         |                         |

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|--|--|-------------|-------------|--|---------------------|---------------------|
| <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>  |  |             |             |  |                     |                     |
| B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.   |  | /1/<br>/11/ | DR          | The emission reductions are real, measurable and give long-term benefits related to the mitigation of climate change.<br>The electricity delivered to the grid will be monitored through the metering equipment at the substation. The cross check with the receipt is clearly identified here. The project is forecasted to reduce CO <sub>2</sub> emissions of 82 392 per year average over the crediting period by replacing the electricity generated from CCPG. |                     | OK                  |
| <b>B.8. Monitoring Methodology</b><br><i>It is assessed whether the project applies an appropriate monitoring methodology.</i>   |  |             |             |  |                     |                     |
| B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?   |  | /1/<br>/14/ | DR          | The monitoring plan is documented according to the approved monitoring methodology ACM0002 “consolidated monitoring methodology for zero emissions grid- connected electricity generation from renewable sources” and in a complete and transparent manner.  |                     | OK                  |
| B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later? |  | /1/<br>/14/ | DR<br>I     | The data will be kept for 2 years after the end of the crediting period.   |                     | OK                  |

\* MoV = Means of Verification, DR= Document Review, I= Interview

| CHECKLIST QUESTION  | Ref.               | MoV*    | COMMENTS   | Draft<br>Concl. | Final<br>Concl. |
|---|--------------------|---------|--|-----------------|-----------------|
| * MoV = Means of Verification, DR= Document Review, I= Interview  |                    |         |  |                 |                 |
| <b>B.9. Monitoring of Project Emissions</b>   |                    |         |  |                 |                 |
| <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>  |                    |         |  |                 |                 |
| B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period? | /1/<br>/4/<br>/20/ | DR<br>I | This Project does not involve construction of a new dam or reservoir. The water will be diverted to the hydro power plant through an open channel on the left bank of the existing reservoir. Thus, the project does not result in project GHG emissions. This is in line with the methodology, ACM0002. |                 | OK              |
| B.9.2. Are the choices of project GHG indicators reasonable and conservative?   | /1/<br>/14/        | DR      | The project does not result in project GHG emissions.  |                 | OK              |
| B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?  | /1/<br>/14/        | DR      | The project does not result in project GHG emissions.  |                 | OK              |
| B.9.4. Is the measurement equipment described and deemed appropriate?   | /1/<br>/14/        | DR      | The project does not result in project GHG emissions.  |                 | OK              |
| B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?  | /1/<br>/14/        | DR      | The project does not result in project GHG emissions.  |                 | OK              |
| B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?  | /1/<br>/14/        | DR      | The project does not result in project GHG emissions.  |                 | OK              |

| CHECKLIST QUESTION  |  | Ref.        | MoV*    | COMMENTS  | Draft Concl. | Final Concl. |
|---|--|-------------|---------|---|--------------|--------------|
| * MoV = Means of Verification, DR= Document Review, I= Interview  |  |             |         |   |              |              |
| B.9.7.  | Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?   | /1/<br>/14/ | DR<br>I | The project does not result in project GHG emissions.   |              | OK           |
| B.9.8.  | Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?                        | /1/<br>/14/ | DR<br>I | The project does not result in project GHG emissions.   |              | OK           |
| B.9.9.  | Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) | /1/<br>/14/ | DR      | The project does not result in project GHG emissions.   |              | OK           |
| B.10. Monitoring of Baseline Emissions<br><i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i> |  |             |         |   |              |              |
| B.10.1.   | Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period? | /1/<br>/14/ | DR      | The project uses the ex-ante determination approach to calculate the OM and BM. Only electricity generated and sold to the grid will be monitored ex-post. The project developer and the grid company will take a meter reading on a monthly basis. This number is confirmed in the form of an “Electricity Transaction Note” (ETN). The measurements will be archived electronically and by paper and will be stored during the crediting period and two years after that. The measurements will be cross checked with the electricity sales receipts.<br><br>Does the project have separate meters to |              | OK           |

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|--|-------------|-------------|--|--|-------------------------|-------------------------|
|  |             |             |  | monitor the readings at the existing as well as the new plant? | CL 11                   |                         |
| B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?  | /1/         | DR          | Yes.   |  |                         | OK                      |
| B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?                        | /1/         | DR          | The electricity generated delivered to the grid will be monitored directly.<br>Does the project have separate meters to monitor the readings at the existing as well as the new plant? |  | CL 11                   | OK                      |
| B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?  | /1/<br>/14/ | DR          | Yes. The electricity generated delivered to the grid will be monitored by metering equipment at the substation and double checked by electricity sales receipts.                       |  |                         | OK                      |
| B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements? | /1/<br>/14/ | DR          | Yes. Electricity meters should meet the relevant local standards at the time of installation (JJG596--1999).<br>But accuracy class of the meters should be                             |  | CL 12                   | OK                      |

\* MoV = Means of Verification, DR= Document Review, I= Interview

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|--|-------------|-------------|---|---------------------|-------------------------|-------------------------|
|  |             |             |   | clearly designated. |                         |                         |
| B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?  | /1/<br>/14/ | DR          | Yes.  |                     |                         | OK                      |
| B.10.7. Is the registration, <i>monitoring, measurement</i> and <i>reporting</i> procedure defined?  | /1/<br>/14/ | DR          | The procedures for records handling are identified in the monitoring plan.  |                     |                         | OK                      |
| B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?                        | /1/<br>/14/ | DR          | Yes. The maintenance of monitoring equipment and installations are according to the national industry standard. It will be calibrated based on the relevant national standard by a testing facility accredited under the Chinese law (GB/T 17215-2002, GB/T17882-1999, GB/T17883-1999, DL/T614-1997). |                     |                         | OK                      |
| B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) | /1/<br>/14/ | DR          | The procedures for records handling are identified in the monitoring plan in PDD.   |                     |                         | OK                      |
| <b>B.11. Monitoring of Leakage</b><br><i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>                       |             |             |   |                     |                         |                         |
| B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?  | /1/<br>/20/ | DR          | According to ACM0002, potential leakage effects, such as emissions arising from power plant construction does not have to be considered.<br><br>This Project does not involve construction of   |                     |                         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview   | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
|---|-------------|-------------|---|-------------------------|-------------------------|
|   |             |             | a new dam or reservoir. The water will be diverted to the hydro power plant through an open channel on the left bank of the existing reservoir.   |                         |                         |
| B.11.2. Are the choices of project leakage indicators reasonable and conservative?  | /1/<br>/20/ | DR          | Same as above.  |                         | OK                      |
| B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?   | /1/<br>/20/ | DR          | Same as above.  |                         | OK                      |
| <b>B.12. Monitoring of Sustainable Development Indicators/<br/>Environmental Impacts</b><br><i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i> |             |             |   |                         |                         |
| B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?  | /1/<br>/5/  | DR<br>I     | Yes. Monitoring of sustainable development indicators is not required by the Chinese DNA. The environmental impacts are identified in the EIA that was approved on 18 December 2003.                      |                         | OK                      |
| B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?   | /1/<br>/5/  | DR<br>I     | Chinese DNA, NDRC, does not require collection and archiving of data related to environmental, social and economic impacts. The environmental impacts will be monitored by local environmental authority. |                         | OK                      |
| B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host  | /1/<br>/5/  | DR<br>I     | Same as above.  |                         | OK                      |

\* MoV = Means of Verification, DR= Document Review, I= Interview



| CHECKLIST QUESTION  |  | Ref.        | MoV*    | COMMENTS   | Draft<br>Concl. | Final<br>Concl. |
|---|--|-------------|---------|--|-----------------|-----------------|
| * MoV = Means of Verification, DR= Document Review, I= Interview  |  |             |         |  |                 |                 |
| Country?  |  |             |         |  |                 |                 |
| <b>B.13. Project Management Planning</b><br><i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i> |  |             |         |  |                 |                 |
| B.13.1. Is the authority and responsibility of overall project management clearly described?  |  | /1/<br>/14/ | DR<br>I | The authority and responsibility of project management is described in the PDD and monitoring plan.  |                 | OK              |
| B.13.2. Are procedures identified for training of monitoring personnel?   |  | /1/<br>/14/ | DR<br>I | Yes.   |                 | OK              |
| B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?  |  | /1/<br>/14/ | DR<br>I | According to the actual status of the hydropower project, no emergency situation which can cause unintended emissions is expected from the project.                                    |                 | OK              |
| B.13.4. Are procedures identified for review of reported results/data?  |  | /1/<br>/14/ | DR<br>I | Data and records will be checked prior to being stored and archived.   |                 | OK              |
| B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?                                     |  | /1/<br>/14/ | DR<br>I | Detailed procedures will be in place and maintained and implemented at the latest prior to the start of the crediting period to enable subsequent verification of emission reductions. |                 | OK              |
| <b>C. Duration of the Project/ Crediting Period</b><br><i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>                   |  |             |         |  |                 |                 |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview   | Ref.       | MoV*    | COMMENTS   | Draft<br>Concl. | Final<br>Concl. |
|---|------------|---------|--|-----------------|-----------------|
| C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?  | /1/        | DR<br>I | The construction permit date of the proposed project construction is 6 September 2005. The expected project activity's operation lifetime is 23 years.<br>LHS, started operation in 1985 and is expected to continue operating until 2032(The Project Certificate by Institute of Water Conversation & Hydroelectric Engineering Exploration & Design, Nanchong on 5 July 2007). |                 | OK              |
| C.1.2. Is the start of the crediting period clearly defined and reasonable?   | /1/        | DR<br>I | A renewable crediting period of 7 years is selected, starting on 01/01/2008.<br>The date of registration of the CDM project activity can not be on 01/01/2008. Starting date of the first crediting period should be at least 8 weeks from the date of requesting the project for registration. Hence, the start date of the project activity needs to be revised.               | CL-13           | OK              |
| <b>D. Environmental Impacts</b><br><i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i> |            |         |  |                 |                 |
| D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?  | /1/<br>/5/ | DR<br>I | Yes. The environmental impacts are sufficiently described in EIA in Dec. 2003 and PDD, which includes the bio-environment, waste water, noise and waste slag.  |                 | OK              |
| D.1.2. Are there any Host Party requirements for an   | /1/        | DR      | Yes. The EIA was approved by Guan'an City  |                 | OK              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview   |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
|---|--|-------------|-------------|---|-------------------------|-------------------------|
| Environmental Impact Assessment (EIA), and if yes, is an EIA approved?  |  | /5/         |             | Environmental protection Bureau on 18 December 2003.  |                         |                         |
| D.1.3. Will the project create any adverse environmental effects?   |  | /1/<br>/5/  | DR<br>I     | The project will have positive impact to the local environment.<br>A resettlement plan was included as part of the Preliminary Design Report. The plan has also included a compensation policy for the affected stakeholders, including compensation for houses and land; the local government was responsible for carrying out all resettlement compensation measures. |                         | OK                      |
| D.1.4. Are transboundary environmental impacts considered in the analysis?  |  | /1/<br>/5/  | DR<br>I     | There is no foreseeable transboundary environmental impact in this project.   |                         | OK                      |
| D.1.5. Have identified environmental impacts been addressed in the project design?  |  | /1/<br>/5/  | DR<br>I     | Yes.  |                         | OK                      |
| D.1.6. Does the project comply with environmental legislation in the host country?  |  | /1/<br>/5/  | DR<br>I     | The EIA was approved.   |                         | OK                      |
| <b>E. Stakeholder Comments</b><br><i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i> |  |             |             |   |                         |                         |
| E.1.1. Have relevant stakeholders been consulted?   |  | /1/<br>/30/ | DR<br>I     | 55 questionnaires were sent to the stakeholders in May 2007 by the project developer. The stakeholders included local   |                         | OK                      |

\* MoV = Means of Verification, DR= Document Review, I= Interview

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>   | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
|---|--|-------------|-------------|---|-------------------------|-------------------------|
|   |  |             |             | governmental officials (2 people), local residents (15people) and related employees (33 peoples). 50 copies of reply were received. The relevant documents have been verified by DNV.<br><br>Clarification is required that if there were 172 people resettled as a part of the project, how have they been involved in the stakeholder consultation? | CL-14                   |                         |
| E.1.2.  | Have appropriate media been used to invite comments by local stakeholders?   | /1/<br>/30/ | DR<br>I     | The questionnaires were used to invite comments by local stakeholders.  |                         | OK                      |
| E.1.3.  | If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws? | /1/<br>/30/ | DR<br>I     | The stakeholder consultation process is in accordance with Chinese EIA regulations.   |                         | OK                      |
| E.1.4.  | Is a summary of the stakeholder comments received provided?  | /1/<br>/30/ | DR<br>I     | A summary of the stakeholder comments received is described in the PDD.   |                         | OK                      |
| E.1.5.  | Has due account been taken of any stakeholder comments received?   | /1/<br>/30/ | DR<br>I     | The due account will be taken according to the requirements from the EIA report and as described in the PDD.  |                         | OK                      |

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

| <b>Draft report clarifications and corrective action requests by validation team</b>  | <b>Ref. to checklist question in table 2</b> | <b>Summary of project owner response</b>  | <b>Validation team conclusion</b>   |
|---|--|---|---|
| CAR1<br>The letter of authorisation and the letter of approval for the project and its participants from Sweden need to be submitted.         | A.2.2  | Letter of Approval issued by Chinese DNA was on 26 August 2007 and the letter of approval (Annex 1 LOA) was issued on 25 March 2008.  | OK<br>The LoA of both parties have provided to DNV<br>The CAR is closed.          |
| CL1<br>An English map is needed.  | A.1.1  | See part A.4.1.4 of revised PDD, an English map is added.   | OK<br>This has been added in newly revised PDD.<br>CL1 is closed.                 |
| CL2<br>The project's system boundary should be defined to include the facilities in the power plant.  | A.1.2  | See part B3 of the revised PDD, the sentence "The spatial extent of the project boundary includes the facilities (original plant and new plant) in project power plant and all power plants connected physically to the Central China Power Grid to which the Project is connected" has been added. | OK<br>The system boundary is clearly defined.<br>CL2 is closed.                   |
| CL3<br>Annex I to the PDD, shows in the address provided that the PP is from Ireland. Confirm which is the Party involved, Sweden or Ireland? | A.2.1  | The project participant is EcoSecurities Group PLC based in Ireland. However, the letter of approval may be given by a different EU country. EU DNAs are authorised to give a LoA for companies based in other EU states.   | OK<br>CL3 is closed.  |
| CL4<br>The selection of the baseline scenario needs to include an alternative of power generation using other renewable sources.              | B.2.2  | See part B4 of the revised PDD, analysis about alternative 4 is added.  | OK<br>The option for power generation using other renewable sources is discussed. |

| Draft report clarifications and corrective action requests by validation team   | Ref. to checklist question in table 2 | Summary of project owner response  | Validation team conclusion  |
|---|---------------------------------------|--|---|
|   |                                       |  | CL4 is closed.  |
| <p>CL5</p> <p>Availability of water to operate throughout the crediting period is the probably the risk. Also, the water is first used by the existing plant and then by the PP, and hence, there is a risk of available water for power generation by the plant.</p> | B.2.7                                 | <p>49 years (from 1954 to 2002) of hydrological statistics in PDR show that water resource can substantially satisfy capacity addition power plant and existing Liangtan Hydroelectric Station (LHS).</p>  | <p>OK</p> <p>DNV confirmed the sufficient water has been assessed in PDR for the proposed project and existing Liangtan Hydroelectric Station (LHS).</p> <p>CL5 is closed.</p>  |
| <p>CL6</p> <p>Evidence should be provided for the incentive for consideration of CDM revenues at the project conceptualization?</p>   | B.3.3                                 | <p>PDR was finished on July 2005 by Institute of Nanchong Water and Electricity Design and approved by Guan An City Water Resources Bureau of 26 July 2005 for its feasibility because IRR is a little higher than benchmark of 10%. During the grace period between FSR approval and construction start permit of 6 September 2005, the electricity tariff in PDR cannot be realized, so the incentive of CDM consideration was that the electricity tariff in PDR cannot be realized. According to the document from Guang'an Price Bureau issued on 14 June 2005, the electricity tariff for most hydro station is 0.231yuan/kwh (the highest electricity tariff is 0.246yuan/kwh) which is much lower than that expected in PDR. And electricity tariff signed in Intent for</p> | <p>OK</p> <p>Before the start permit of the proposed project, the tariff assumed in FSR (0.39RMB/Kwh) was changed to 0.36RMB/Kwh according to the document from Guang'an Price Bureau issued on 14 June 2005; this made the IRR of the proposed project lower than benchmark of 10%; so PP considered CDM and the project developer had resource to CDM revenue in July 2005. The incentive for consideration of CDM revenues at the project conceptualization is clearly demonstrated.</p> <p>CL6 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team  | Ref. to checklist question in table 2 | Summary of project owner response  | Validation team conclusion  |
|--|---------------------------------------|--|---|
|  |                                       | Power Delivered to Grid on 30 July 2005 is also lower than that in PDR when the PDR had been completed and approved by Guang'an water Resource Bureau.   |   |
| <p>CL7</p> <p>In the sensitivity analysis, the value at which the IRR will be equal to the benchmark and then the likelihood of the parameter having this value to confirm that it is not likely that the IRR will become equal to the benchmark needs to be assessed.</p> | B.3.3                                 | The PDD has been updated accordingly.  | <p>OK</p> <p>The variables leading to IRR reaching benchmark and impossibility to reach that point in realistic condition has been discussed.</p> <p>CL7 is closed.</p>   |
| <p>CL8</p> <p>The PP has taken the tariff from the PPA for the financial analysis. However, the PPA was signed in Sept 2007. How did PP take this tariff for financials carried out in 2005?</p>   | B.3.3                                 | The electricity tariff source used was a mistake, the correct source is the Letter of Intent for the Grid Connection of Liangtan Hydro Power Station, signed in July, 2005.  | <p>OK</p> <p>This has been verified by DNV.</p> <p>CL8 is closed.</p>   |
| <p>CL9</p> <p>If CDM was considered in 2005 itself, why did the PP take more than two years to start validation? A justification needs to be provided.</p>   | B.3.4                                 | Due to obvious financial barriers and unrealistic electricity tariff estimated in PDR, the project developer had resourced to CDM revenue in July, 2005. After a CDM conference held by the Sichuan Local Electric Power Bureau, the project developer engaged an intermediary named Sichuan Huayuan County Electrification Development Co., Ltd to introduce a Carbon Buyer in December 2005 /33/. Nearly one year of negotiation and | <p>OK</p> <p>The evidence /33/ of PP attending CDM conference held by the Sichuan Local Electric Power Bureau and the project developer engaged an intermediary named Sichuan Huayuan County Electrification Development Co., Ltd to introduce a Carbon Buyer in December, 2005 has been assessed by DNV.</p> <p>CL9 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team   | Ref. to checklist question in table 2 | Summary of project owner response  | Validation team conclusion  |
|---|---------------------------------------|--|---|
|   |                                       | investigation followed, including detailed screening of the project. Further to this, a CDM Emission Reduction Purchase Agreement (ERPA) was signed on 19 October 2006 /34/ with EcoSecurities Group Plc. The work on the PDD was initiated and the Chinese PDD was submitted to NDRC in May 2007. The project was approved by NDRC as CDM project on 13 July 2007 /35/. The LoA from the DNA of China was obtained on 10 September 2007 /2/. The English PDD was submitted to DNV in October 2007 and project validation was initiated. |   |
| CL10<br>Clarifications are required to state how the EGy for the CER calculation is taken.  | B.5.1                                 | The EGy is the total net electricity of both original and Upgrade Hydro station. There are two meter to measure the EGy, as described in PDD, one meter know as " revenue meter" is used to measure the electricity supplied to the Grid" The other meter know as " cross -check" meter will be used to check the electricity to the grid.   | OK<br>The revised monitoring plan in new version PDD sufficiently addresses metering the EGy.<br>CL10 is closed.  |
| CL11<br>The electricity generated delivered to the grid will be monitored directly.<br>Does the project have separate meters to monitor the readings at the existing as well as | B.10.1                                | Yes, each power station has its revenue meter and cross-check meters, please see the diagram of power delivered to grid of Liangtan Project.   | OK<br>From the diagram provided, we verify that checkmeter is located at the site, and the revenue meters are located at the Substation for both grid company |



| Draft report clarifications and corrective action requests by validation team  | Ref. to checklist question in table 2 | Summary of project owner response   | Validation team conclusion   |
|--|---------------------------------------|---|--|
| the new plant?   |                                       |   | and PP to count electricity generation. This has been checked and CL11 is closed.  |
| CL12<br>Accuracy class of the meters should be clearly designated.   | B.10.5                                | According to Instrument Certification Report by Sichuan Guang'an Quality and Technical Monitoring Bureau, the accuracy class of these meters is 0.5.  | OK<br>CL12 is closed.  |
| CL13<br>The date of registration of the CDM project activity can not be on 01/01/2008. Starting date of the first crediting period should be at least 8 weeks from the date of requesting the project for registration. Hence, the start date of the project activity needs to be revised. | C.1.2                                 | The starting date of first crediting period will be changed into 1 June 2009.   | OK<br>CL13 is closed.  |
| CL14<br>Clarification is required that if there were 172 people resettled as a part of the project, how have they been involved in the stakeholder consultation?   | E.1.1                                 | 15 people who were designated by guangxing town government were delegated for 172 people resettled to be consulted. All those households affected by power house construction were resettled nearby and 66 people were given jobs. So the project construction was supported by the local people. | OK<br>This is reasonable and all documents relating to resettlement and compensation have been verified by DNV.<br>CL14 is closed. |

## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



# CERTIFICATE OF COMPETENCE

**Michael Lehmann**

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

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

Høvik, 9 January 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

***Mathsy Kutty***

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

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

Høvik, 9 January 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



## CERTIFICATE OF COMPETENCE

### ***Xiaojun Johnsen Zhang***

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

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

Høvik, 14 January 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

***Cuiping Deng***

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

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

Høvik, 9 January 2009

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