



VALIDATION REPORT

GUANGRUN HYDROPOWER PROJECT IN HUBEI PROVINCE, P.R. CHINA

REPORT No. 2006-2133

REVISION No. 01

DET NORSKE VERITAS



VALIDATION REPORT

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Guangrun Hydropower Project in Hubei Province, P.R. China” (GHP) 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. This validation report summarizes the findings of the validation.

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

In summary, it is DNV’s opinion that the project, as described in the project design document of 12 November 2006, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0002 version 06. Hence, DNV requests the registration of the “Guangrun Hydropower Project in Hubei Province, P.R. China” as a CDM project activity.

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***Abbreviations***

| | |
|-------------------|---|
| BM | Build Margin |
| CAR | corrective action request |
| CCPG | Centre China Power Grid |
| CDM | Clean Development Mechanism |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction |
| CH ₄ | Methane |
| CL | Clarification request |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| DNV | Det Norske Veritas |
| DNA | Designated National Authority |
| GHG | Greenhouse gas(es) |
| GHP | Guangrun Hydropower Project in Hubei Province, P.R. China |
| GWP | Global Warming Potential |
| IBRD | International Bank for Reconstruction and Development |
| IPCC | Intergovernmental Panel on Climate Change |
| LoA | Letter of Approval |
| MP | Monitoring Plan |
| MVP | Monitoring and Verification Plan |
| N ₂ O | Nitrous oxide |
| NGO | Non-governmental Organisation |
| ODA | Official Development Assistance |
| OM | Operating Margin |
| PDD | Project Design Document |
| UNFCCC | United Nations Framework Convention on Climate Change |



1 INTRODUCTION

The Carbon Finance Unit of the World Bank has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the Guangrun Hydropower Project in Hubei Province, P.R. China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

| | | |
|---------------------|---------------------------|--------------------------|
| Mr. Shuyong Sun | DNV Certification Beijing | Team leader, GHG auditor |
| Ms. Miguel Rescalvo | DNV Certification Beijing | CDM validator |
| Mr. Wilson Tang | DNV Certification Beijing | Technical reviewer |
| Mr. Michael Lehmann | DNV Certification Oslo | Sector expert |

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the 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 ACM0002 version 06 of 19 May 2006. The validation team has, based on the recommendations in the Validation and Verification Manual /9/ employed a risk-based approach, been 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.

1.3 Description of Proposed CDM Project

The project is a three step hydropower station including two new small reservoirs and three small-sized hydropower plants with the average power density of 32.3W/m^2 (15.87W/m^2 for Zhamushui hydropower plant and 75W/m^2 for Hongwawu hydropower plant). The proposed installed capacity is 28 MW consisting of one 8 MW (Honwawu I plant), one 10MW (Hongwawu II plant) and one 10MW (Zhamushui plant) powerhouse. The predicted power



generation is 89280 MWh per year. The project is located in Jianshi County, Enshi Tujia and Miao Minority Autonomous Prefecture, Hubei Province, P.R.China.

The electricity generated by the project will displace part of the electricity generated by the Centre China Power Grid (CCPG) which is dominated by coal-fired power plants, and thus greenhouse gas (GHG) emission are expected to be reduced. The estimated average annual GHG emission reductions are 75 832 tCO₂e during a seven years renewable crediting period.

2 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.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /9/. 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 Figure 1.

The completed validation protocol for the GHP is enclosed in Appendix A to this report.

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

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

The term clarification may be used where additional information is needed to fully clarify an issue.



| Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities | | | |
|---|--|--|--|
| Requirement | Reference | Conclusion | Cross reference |
| <i>The requirements the project must meet.</i> | <i>Gives reference to the legislation or agreement where the requirement is found.</i> | <i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i> | <i>Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.</i> |

| Validation Protocol Table 2: Requirement Checklist | | | | |
|--|--|---|---|---|
| Checklist Question | Reference | Means of verification (MoV) | Comment | Draft and/or Final Conclusion |
| <i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i> | <i>Gives reference to documents where the answer to the checklist question or item is found.</i> | <i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i> | <i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i> | <i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.</i> |

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD /1/ version 2 of 12 November 2006 submitted by the Carbon Finance Unit of the World Bank and additional background documents/2/-/19/related to the project design and baseline were reviewed as a part of the validation.

2.2 Follow-up Interviews

In the period of 28-29 June 2006, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Global Climate Change Institute, Tsinghua University and Guangrun Hydropower Development Co., Ltd. were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

| Interviewed organisation | Interview topics |
|--|---|
| Guangrun Hydropower Development Co., Ltd. | <ul style="list-style-type: none"> ➤ Information of project construction ➤ The development of hydropower project in Hubei province ➤ The approval status (incl. EIA approval, the feasibility study report approval, CDM project approval) ➤ Project management ➤ Emission reduction monitoring plan ➤ Consulting process for stakeholder's comments ➤ Investment risks and barriers |
| Global Climate Change Institute, Tsinghua University | <ul style="list-style-type: none"> ➤ Baseline determination of the project ➤ Applicability of selected methodology ACM 0002 ➤ Issues related to the additionality ➤ Common practice analysis ➤ Emission reductions calculation ➤ Emission reduction monitoring plan and project management |

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The corrective action requests and requests for clarification raised by DNV, presented to the project participants in DNV's draft validation report of 09 July 2006 (rev. 0) will be resolved during communications between the Carbon Finance Unit of the World Bank and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, the client decided to revise the PDD and resubmitted the PDD dated on 12 November 2006. After reviewing the revised PDD, DNV issued this final validation report and opinion.



2.4 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 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 12 November 2006.

3.1 Participation Requirements

The project participants are Guangrun Hydropower Development Co., Ltd. of China, The International Bank for Reconstruction and Development (IBRD) as trustee of Community Development Carbon Fund and the State of the Netherlands, acting through the Netherlands' Ministry of Housing, Spatial Planning, and the Environment. The host party China and the Annex I Party the Netherlands meet the requirements to participate in the CDM.

DNA of China has issued the LoA on 07 November 2006/2/, authorizing Guangrun Hydropower Development Co., Ltd. as project participant and confirming that the project assists Chinese sustainable development.

The Netherlands has issued a LoA on 10 July 2006/3/, authorizing the International Bank for Reconstruction and Development (IBRD) as trustee of Community Development Carbon Fund and the State of the Netherlands, acting through the Netherlands' Ministry of Housing, Spatial Planning, and the Environment as project participant.

3.2 Project Design

The main project characteristics are described in the PDD /1/. The GHP is a new reservoir type plant with a total installed capacity of 28 MW and power density of 32.3W/m² (15.87W/m² for Zhamushui hydropower plant and 75 W/m² for Hongwawu hydropower plant). The proposed project is to utilize the hydrological resource of the Guangrun River to generate zero carbon emission electricity for the CCPG.

The project will utilise resources from the reservoirs which will be built for these 3 power plants. By promoting renewable energy, the project will contribute to sustainable development in China.

The project activity will start on 01 July 2008 and the designed operation life of the project is 30 years. The length of the first crediting period is 7 years, starting on 01 July 2008.

The estimated amount of emission reduction over the first crediting period (7 years) is 75 832 tCO₂e per year.

The project will not receive any public funding from Parties included in Annex I of the UNFCCC. The funding is from Community Development Carbon Fund(CDCF) entrusted at the



World Bank, which is a special fund set by nine governments including Netherlands Government and 15 corporations/organizations. The CDCF aims to combine community development attributes with emission reductions to create "development plus carbon" credits, and significantly improve the lives of the poor and their local environment. It does not result in a diversion of official development assistance towards China.

3.3 Baseline Determination

The GHP applies the approved consolidated baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /10/ version 06. Its applicability has been justified by DNV due to that i) the project is a new reservoir type hydropower project and ii) is connected to an regional electricity grid (CCPG).

The baseline scenario is that an equivalent of electricity would, in the absence of the project activity, have been generated by the operation of grid-connected thermal power plants and by the addition of new generation sources.

In accordance with ACM0002 version 06, the electricity baseline emission factor is determined ex-ante as a combined margin, consisting of the weight average of the operating margin (OM) emission factor and the build margin (BM) emission factor.

The application of the baseline methodology is transparent and conservative.

3.4 Additionality

The additionality of the GHP, as required by ACM0002, is demonstrated by applying the "Tool for demonstration and assessment of additionality" /11/ as follows:

Step 0 – Preliminary screening based on the starting date of the project activity:

The project did not start between 1 January 2000 and 18 November 2004 and will have the crediting period after the registration of the project activity.

Before the project construction, an investment analysis was carried out by the World Bank/18/, which indicates that the project is not financial attractive without CDM revenue. DNV was able to verify that the World Bank decided to lend to the project and make the project proceed after seriously considering the CDM incentives.

Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations:

Two alternative baseline scenarios to the project have been identified and discussed.

- (1) To develop the proposed hydropower plant, but not as a CDM project activity;
- (2) To generate an equivalent amount of electricity by the existing generation mix operating in the grid.

The alternative (1) and (2) are in compliance with all applicable legal and regulatory requirements.

Step 2 – Investment analysis: The Tools for the Demonstration and Assessment of Additionality recommends three analysis methods/11/, including simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).



The GHP generates financial and economic benefits through the sales of electricity other than CDM related income. Therefore the simple cost analysis (Option I) is not applicable. And the investment comparison analysis (Option II) is only applicable when the alternatives are similar investment projects. The realistic and credible alternative is not a new investment project. So the benchmark analysis (Option III) is chosen to assess the financial viability of the project activity. In China an IRR of 8 % for total investment of a project is regarded as benchmark/7/ for investments in hydropower plants, fossil fuel fired plants and wind farm projects. Based on the data in the initial design report/4/ and the financial analysis carried out by World Bank/18/, the project IRR without CER revenues is 6.98 % which shows that the project is not financially attractive compared to the benchmark in the absence of CDM benefits.

A sensitivity analysis shows the changes of total investment and annual average output can have a significant impact on project financial performance. If the electricity annual average output increases by 8.9%, the project IRR could exceed the benchmark. However, this is not likely as that the average annual electricity output is estimated through long term study of hydrology data and hence is not likely to change that much. The IRR could exceed the benchmark if the total investment decreases by 9.2%, which is also unlikely to happen due to that the material costs and fuel cost are all have increased during recent years in China, hence making any total investment decrease unlikely as well.

Step 3 –Barrier analysis: Not applicable (Only step 2 is selected)

Step 4 – Common practice analysis: This analysis shows that all other similar hydropower projects in Hubei province with installed capacity under 50MW were developed by large electricity investment companies, while the GHP is developed by a small-scale hydropower company who has limited competence to deal with the risk and to overcome the investment barriers. DNV was able to verify that hydropower projects under 50MW developed by small scale companies were not a common practice in the area.

Step 5 – Impact of CDM registration: With the income from CERs sales, the IRR is increased to 9.13%, which is higher than the benchmark rate. DNV was able to verify that CDM has been introduced and considered through the World Bank's project assessment report prior to the start of project construction /18/.

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

3.5 Monitoring Plan

The GHP applies the approved monitoring methodology, ACM0002 "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources" version 06. The selected monitoring methodology is applicable for the project.

The project is a grid-connected renewable power generation (with reservoir having power density greater than 4W/m^2) project, which is applicable for the ACM0002 version 06.

The project is a new reservoir type hydropower project and the combined margin emission factor is determined *ex-ante* based on the most recent information available. Hence, both electricity generated and sold to the grid as well as reservoir area will be monitored.



The net electricity generated from the project will be measured and recorded on an hourly basis. This data will be cross verified against the sales receipt from the grid.

Because the power density is 32.3W/m^2 (15.87W/m^2 for Zhamushui hydropower plant and 75W/m^2 for Hongwawu hydropower plant, which are both greater than 10W/m^2), the project emissions are regarded as zero.

Leakage accounting is not required under ACM0002 and thus has not been considered for the project.

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.

Training of the current workforce will be provided by the technology provider. The management manual including responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and procedures for training and maintenance are been elaborated in the monitoring plan. Detailed procedures will be in place prior to the start of the crediting period to enable subsequent verification of emission reductions.

The application of the monitoring methodology is transparent.

3.6 Calculation of GHG Emissions

The emission reduction ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (Ly), as follows:

- 1) Baseline emissions: Baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) times the electricity supplied by the project activity to the grid (EG_y in MWh).
- 2) Project emissions: The GHP power density is 32.3W/m^2 , greater than 10W/m^2 , so the project emissions are regarded as zero.
- 3) Leakage: No leakage has to be considered for the proposed project activity.
- 4) Emission reduction: $ER_y = BE_y - PE_y - Ly = BE_y$.

For the calculation of the 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 as more disaggregated data are not available in the CCPG. Country specific data for net calorific value (NCV_i) of each type of fossil fuel, the IPCC 1996 default values for the oxidation factor of each type of fossil fuel and the total electricity delivered to the CCPG selected are deemed reasonable. Vintage data for the years 2002, 2003 and 2004 are used for operating margin calculation. The OM is calculated to be $1.2426\text{ tCO}_2/\text{MWh}$ as a generation-weighted average for the three years,

Because plant specific fuel consumption and electricity generation data is not public available in China, DNV requested guidance from the CDM Executive Board for a deviation of the baseline



methodology of AM0005 and received the following answers/19/ which are deemed to be applicable for this project.

- Use of capacity additions for estimating the build margin emission factor for grid electricity.
- Use of weights estimated using installed capacity in place of annual electricity generation.
- Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM).

Since AM0005 has been replaced by ACM0002, the application of the above confirmation from EB to this project is deemed to be acceptable.

Following the EB's guidance the build margin is calculated as follows:

- The capacity additions from the years 2000 to 2004 is chosen and reach 22.5% of total installed capacity.
- The weight of installed capacity additions for thermal power plant is accounted for 69.80% of total installed capacity additions.
- The standard coal consumption of 320 g SCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 336.66 g SCE/kWh is defined as the best technology commercially available in China by the DNA of China/16/.
- The local value of 29.27 GJ/t standard coal equivalent, 25.8 tC/TJ for carbon content of the coal and the IPCC default value of carbon oxidation factor of 98% are used to calculate the BM.
- The BM is calculated as 0.6062tCO₂/MWh.

The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5, respectively, as stipulated for hydropower project by ACM0002 version 06. The combined margin of 0.9244tCO₂/MWh is fixed *ex-ante* for the first crediting period.

The last data used to calculate OM is derived from China Energy Statistical Yearbooks 2000-2002, 2004 and 2005; the BM calculation is derived from China Power Electric Power Yearbooks 2001 to 2005.

The GHG calculations are complete and transparent, and their accuracy has been verified.

3.7 Environmental Impacts

The environmental impact assessment (EIA) /5/ for this project was carried out by Zhongjiao Survey & Design Institute. The EIA report has already been approved by Hubei Province Environmental Protection Bureau in September 2005.

The conclusion of the report has been described in the PDD. The project will have positive impact on local environment/5/.

3.8 Comments by Local Stakeholders

Local stakeholders were invited initially through public discussion during the EIA process.

In the survey, 100 questionnaires were distributed to local stakeholders, received 100% feedback



(100 questionnaires returned out of 100).

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

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 1.0 of 12 November 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 17 May 2006 to 15 June 2006.

No comments were received in this period.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Guangrun Hydropower Project in Hubei Province, P.R. China”. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

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

The project correctly applies ACM0002 version 06 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

By generating renewable energy which will displace grid electricity, the project results in reductions of CO₂ 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 75832 t CO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state 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 “Guangrun Hydropower Project in Hubei Province, P.R. China”, as described in the PDD of 12 November 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 version 06. DNV thus requests the registration of the project as a CDM project activity.



REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ Project Design Document for “Guangrun Hydropower Project in Hubei Province, P.R. China”, version 1.0 of 12 March 2006, revised version 2.0 of 12 November 2006.
- /2/ Letter of Approval issued by Chinese DNA on 7 November 2006.
- /3/ Letter of Approval issued by the DNA of Netherlands on 10 July 2006.
- /4/ The project initial design report in August 2005 and the approval letter by Hubei Province Development and Reform Committee in October 2005.
- /5/ The project environmental impact assessment report in August 2005 and the approval letter by Hubei Province Environmental protection Bureau in September 2005.

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /6/ CDM Project Management and Operating Procedures.
- /7/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003
- /8/ The Grid Accessing Agreement between the project owner and the grid company.
- /9/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /10/ ACM 0002 Approved methodology, “Consolidated methodology for grid-connected electricity generation from renewable sources”, version 06. 3 March 2006
- /11/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, version 02 of 28 November 2005
- /12/ Chinese DNA’s guidance for the determination of grid boundaries and emission factors, <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf>
- /13/ China Electric Power Yearbook 2001, 2002, 2003, 2004 and 2005
- /14/ China Energy Statistical Yearbook 2003, 2004 and 2005
- /15/ <http://www.ccchina.gov.cn/source/fa/fa2002082803.htm>
- /16/ 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>
- /17/ Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
- /18/ Financial Analysis prepared by World Bank
- /19/ The guidance for deviation in use of methodology AM0005 by several project activities in China by EB. <http://cdm.unfccc.int/Projects/Deviations>



Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /20/ Rao Aimin, vice president, Guangrun Hydropower Development Co., Ltd. , 29 June 2006.
- /21/ Wang Zhengfang, general engineer, Guangrun Hydropower Development Co., Ltd. , 29 June 2006.
- /22/ Teng Fei, professor, Global Climate Change Institute, Tsinghua University , 29 June 2006.

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APPENDIX A

CDM VALIDATION PROTOCOL

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

| Requirement | Reference | Conclusion | Cross Reference / Comment |
|--|--|------------------------|---|
| 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 | Table 2, Section E.4.1 |
| 2. 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 | CAR 1 ok | Table 2, Section A.3 The confirmation of China DNA has not been obtained. |
| 3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC | Kyoto Protocol Art.12.2. | | Table 2, Section E.4.1 |
| 4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved | Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a | CAR 1 ok | Table 2, Section A.3 The LoAs of Chinese DNA and the DNA of Netherlands have not been received. |
| 5. 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 | Table 2, Section E |
| 6. Reduction in GHG emissions shall be additional to any that would occur in 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 | Table 2, Section B.2 |
| 7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties. | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2 | ok | The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards China |
| 8. Parties participating in the CDM shall designate a national authority for the CDM | CDM Modalities and Procedures §29 | ok | Chinese DNA is the State Development and Reform Commission. The DNA of |

| Requirement | Reference | Conclusion | Cross Reference / Comment |
|---|------------------------------------|------------|--|
| | | | Netherlands is the Ministry of Housing, Spatial Planning and the Environment. |
| 9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol | CDM Modalities §30/31a | ok | China ratified the Kyoto Protocol on 30 August, 2002. The Netherlands ratified the Kyoto Protocol on 31 May 2002. |
| 10. The participating Annex I Party's assigned amount shall have been calculated and recorded | CDM Modalities and Procedures §31b | ok | Netherlands assigned amount is 92% of the emission level in 1990. |
| 11. 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 | The validation has not in detail assessed Netherlands compliance with article 5 and 7 of the Kyoto Protocol. The Netherlands has in place a national system for estimating GHG emissions and annually submits its most recent inventory to the UNFCCC. |
| 12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received | CDM Modalities and Procedures §37b | ok | Table 2, Section G |
| 13. 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 | Table 2, Section F |
| 14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board | CDM Modalities and Procedures §37e | ok | Table 2, Section B.1.1 and D.1.1 |
| 15. Provisions for monitoring, verification and reporting shall be in | CDM Modalities and | ok | Table 2, Section D |

| Requirement | Reference | Conclusion | Cross Reference / Comment |
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| accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP | Procedures §37f | | |
| 16. 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 | The PDD has been published on www.dnv.com/certification/ClimateChange , Parties, stakeholders and NGOs were invited through the UNFCCC CDM website to provide comments on the validation requirement during a period of 30 days, from 17 May 2006 to 15 June 2006. |
| 17. 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 | Table 2, Section B.2 |
| 18. 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 | Table 2, Section B.2 |
| 19. The project design document shall be in conformance with the UNFCCC CDM-PDD format | CDM Modalities and Procedures Appendix B, EB Decision | ok | PDD format version 2 is used. |

Table 2 Requirements Checklist

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------|------|---|-------------|-------------|
| A. General Description of Project Activity <i>The project design is assessed.</i> | | | | | |
| A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i> | | | | | |
| A.1.1. Are the project's spatial (geographical) boundaries clearly defined? | /1/ | DR | Yes. Guangrun Hydropower Project in Hubei Province, P.R. China is located in Jianshi County, Enshi Tujia and Miao Minority Autonomous Prefecture, Hubei Province, P.R.China. The project is a 3 step hydropower station: Hongwuwa I and II plants are located on Hongwuwa River, a tributary of the Zamusui River in Jianshi county in Jianshi County, about 30 km away from the Jianshi county seat ; Zhamushui plant is located on the Zhamushui River in Jianshi county, about 3.5 km away from Jianshi county seat. | | ok |
| A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined? | /1/ | DR | Yes, It will be connected to the CCPG though Hubei provincial power grid and will mitigate the power shortage in the CCPG. The power plant and the CCPG are defined as the project's system boundary. | | ok |

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|-------------------|---------|---|-------------|-------------|
| A.2. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i> | | | | | |
| A.2.1. Does the project design engineering reflect current good practices? | /1/ | DR | Yes. The project design engineering reflects current good practices. | | ok |
| A.2.2. 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/ | DR I | The project uses state of the art technology with all the equipment produced domestically. | | ok |
| A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period? | /1/ /4/ | DR | No. The technology is not likely to be substituted by other efficient technologies within the project period. | | ok |
| A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? | /1/ | DR I | Yes. The initial training and maintenance efforts are required by the project. | | ok |
| A.2.5. Does the project make provisions for meeting training and maintenance needs? | /1/ | DR I | Yes. The project owner will make provisions for the training and maintenance needs before the operation of the project. | | ok |
| A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i> | | | | | |
| A.3.1. Is the project in line with relevant legislation and plans in the host country? | /1/ /4/ /5/ | DR | Yes. The project is in line with relevant legislation and plans in China. The Initial Design Report and EIA are both approved. | | ok |

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|---|------|---------|--|-------------|-------------|
| A.3.2. Is the project in line with host-country specific CDM requirements? | /1/ | DR I | Confirmation from the DNA of China has not been received. | CAR-1 | ok |
| A.3.3. Is the project in line with sustainable development policies of the host country? | /1/ | DR I | The LoA from the DNA of China has not been received. | CAR-1 | ok |
| A.3.4. Will the project create other environmental or social benefits than GHG emission reductions? | /1/ | DR | Yes. As a renewable energy project, it may produce positive environmental and economic benefits and contribute to the local sustainable development special on the alleviation of the power shortage in the local areas, alleviation of poverty in the county, increasing of new job opportunities for the local people. | | ok |
| B. Project Baseline | | | | | |
| <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i> | | | | | |
| B.1. Baseline Methodology | | | | | |
| <i>It is assessed whether the project applies an appropriate baseline methodology.</i> | | | | | |
| B.1.1. Is the baseline methodology previously approved by the CDM Executive Board? | /1/ | DR | Yes. The project applies the methodology of ACM0002 "Consolidated baseline methodology for grid-connected electricity generations from renewable sources" approved by the EB. | | ok |
| B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified? | /1/ | DR | Yes. The baseline methodology is applicable for the project and the appropriateness is justified. The | | ok |

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|--|-------------|---------|--|-------------|-------------|
| | | | hydropower project is a new reservoir type plant with power density of 32.3 W/m ² (larger than 4W/m ²) and is connected to a regional electricity grid (CCPG). | | |
| B.2. Baseline Determination <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i> | | | | | |
| B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent? | /1/ /12/ | DR | Yes. Two realistic and credible alternatives are identified: a) The proposed project not undertaken as a CDM project activity; b) Equivalent electricity service provided by the CCPG. a) has less financial attractiveness (see B.2.7). So the baseline is determined as continued operation of the existing power plants and the addition of new generation sources to meet electricity demand. | | ok |
| B.2.2. Has the baseline been determined using conservative assumptions where possible? | /1/ | DR | Yes. According to the deduction from the available information, the assumptions are conservative. | | ok |
| B.2.3. Has the baseline been established on a project-specific basis? | /1/ | DR | Yes. The baseline has been established on a project-specific basis. | | ok |
| B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations? | /1/ | DR I | Yes. All relevant national and sectoral policies, regulations and department rules and disciplines are considered. | | ok |

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| | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|--------------------|---------|---|------------------|----------------|
| B.2.5. Is the baseline determination compatible with the available data? | /1/ | DR | In the Step 1, the latest year with available data for OM calculation is 2003. However the China Electric Power Yearbook 2005 is already available. Please update the calculation in the next version of PDD. | CAR-2 | ok |
| B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios? | /1/ | DR | Yes. The selected baseline is the most likely scenario among other possible and/or discussed scenarios. | | ok |
| B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario? | /1/ /4/ /18/ | DR I | <p>Yes. The “tool for the demonstration and assessment of additionality” version 02 of 28 November 2006 is applied exactly.</p> <p>Step 0 – Preliminary screening based on the starting date of the project activity:</p> <p>The project did not start between 1 January 2000 and 18 November 2004 and will have the crediting period after the registration of the project activity.</p> <p>Before the project construction, an investment analysis was carried out by the World Bank to indicate that the project is not financial attractive without CDM revenue. After seriously considering the incentive from CDM, the World Bank decides to loan to the project and make the project to proceed.</p> <p>Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations:</p> <p>Three alternative baseline scenarios to</p> | | ok |

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| | | | <p>the project have been identified and discussed. See B.2.1.</p> <p>Step 2 – Investment analysis: 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.</p> <p>Further clarification is required to justify the benchmark rate. Please provide the spreadsheet for IRR calculation.</p> <p>Step 3 – Barrier analysis: not applicable(only step2 is selected)</p> <p>Step 4 – Common practice analysis</p> <p>The similar hydropower projects through out of Hubei Province should be compared in the common practice analysis and the data source from third party should be provided.</p> <p>Step 5 – Impact of CDM registration: The registration of the proposed project as a CDM project will make for the financial performance and increase the IRR, and thus will strengthen the attractiveness of the project.</p> | CL-1 | |
| | | | | CL-2 | |
| B.2.8. Have the major risks to the baseline been identified? | /1/ | DR | There are no significant risks to the baseline except the enforcement of the Chinese renewable law. However, this law | | ok |

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| | | | does not need to be taken into account as it is being implemented only now i.e. after the entry into force of decision 17.CP 7. | | |
| B.2.9. Is all literature and sources clearly referenced? | /1/ | DR | Yes. | | ok |
| C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i> | | | | | |
| C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable? | /1/ | DR | Yes. The starting date of the project activity was 1 July 2008 and the operational lifetime of the project activity is 30 years, which has been confirmed. | | ok |
| C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)? | /1/ | DR | Yes. A renewable crediting period (7 years *3) is selected, starting on 1 July 2008. | | ok |
| D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i> | | | | | |
| D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i> | | | | | |
| D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board? | /1/ | DR | Yes. The project applies the approved monitoring methodology ACM0002 | | ok |

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|---|------|---------|--|-------------|-------------|
| | | | "consolidated monitoring methodology for zero emissions grid- connected electricity generation from renewable sources". | | ok |
| D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified? | /1/ | DR | Yes. The project is a grid-connected renewable power generation (with reservoir having power density greater than 4W/m ²) project, which is applicable for the ACM 0002 version 06. | | ok |
| D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices? | /1/ | DR | Yes. The electricity generated delivered to the grid will be monitored directly by meter data in the plant and double checked by electricity sales receipts <i>According to the methodology, the surface area at full reservoir level should also be monitored.</i> | CL-3 | ok |
| D.1.4. Is the discussion and selection of the monitoring methodology transparent? | /1/ | DR | Yes | | ok |
| D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i> | | | | | |
| D.2.1. 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/ | DR I | This is a hydropower project with reservoir having power density greater than 10W/m ² that is not expected to result in project GHG emissions. | | ok |

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--|------|---------|--|-------------|-------------|
| D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i> | | | | | |
| D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage? | /1/ | DR | Indirect emissions can result from activities such as power plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects). Project participants do not need consider these emission sources as leakage in applying this methodology. | | ok |
| D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i> | | | | | |
| D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period? | /1/ | DR | Yes. 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. | | ok |
| D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable? | /1/ | DR | Yes. | | ok |
| D.4.3. Will it be possible to monitor / measure the specified baseline indicators? | /1/ | DR | Yes. The electricity generated delivered to the grid will be monitored directly. | | ok |
| D.4.4. Will the indicators give opportunity for real measurements of baseline emissions? | /1/ | DR I | The electricity generated delivered to the grid will be monitored by meter data in the plant and double checked by electricity sales receipts. | | ok |

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| D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i> | | | | | |
| D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts? | /1/ | DR | Neither ACM0002 nor the China DNA requires collection and archiving of relevant data concerning environmental, social and economic impacts. However the environmental impacts will be monitored by local environmental authority. | | ok |
| D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i> | | | | | |
| D.6.1. Is the authority and responsibility of project management clearly described? | /1/ | DR I | Yes. The authority and responsibility of project management is described in the PDD. | | ok |
| D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described? | /1/ | DR I | The authority and responsibility for registration, monitoring, measurement and reporting are described in the monitoring plan. | | ok |
| D.6.3. Are procedures identified for training of monitoring personnel? | /1/ | DR I | The procedures for training of monitoring personnel are identified and will be implemented by a third party. | | ok |
| D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions? | /1/ | DR I | According to the actual status of the hydropower project, no emergency situation which can cause unintended emissions is expected from the project. | | ok |

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------|---------|---|-------------|-------------|
| D.6.5. Are procedures identified for calibration of monitoring equipment? | /1/ | DR | The procedures for calibration of monitoring equipment are identified in the monitoring plan. | | ok |
| D.6.6. Are procedures identified for maintenance of monitoring equipment and installations? | /1/ | DR I | The procedures for maintenance of monitoring equipment and installations are identified in the monitoring plan. | | ok |
| D.6.7. Are procedures identified for monitoring, measurements and reporting? | /1/ | DR | Yes. The procedures for monitoring, measurements and reporting are identified in the monitoring plan. | | ok |
| D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) | /1/ | DR | The procedures for records handling are identified in the monitoring plan. | | ok |
| D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties? | /1/ | DR | Yes. The responsibility of dealing with the monitoring data adjustments and uncertainties is identified by the project owner. The relevant procedures are identified in the monitoring plan. | | ok |
| D.6.10. Are procedures identified for review of reported results/data? | /1/ | DR | Yes. There are supervising procedures for the reported data identified in the monitoring plan. | | ok |
| D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable? | /1/ | DR | The project is under construction stage. Detailed procedures for internal audits of GHG project compliance with operational requirements have not being developed yet. These 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 |
| D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally? | /1/ | DR | Ditto | | ok |

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| D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting? | /1/ | DR | Yes. Any corrective actions for more accurate monitoring and reporting will be dealt with according to the identified procedures. | | ok |
| E. Calculation of GHG Emissions by Source <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i> | | | | | |
| E.1. Project GHG Emissions <i>The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.</i> | | | | | |
| E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design? | /1/ /4/ | DR | The project is new reservoir type hydropower project with the power density of 32.3 W/m ² , greater than 10 W/m ² , so it is not expected to result in project GHG emissions. See D.2.1 | | ok |
| E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.</i> | | | | | |
| E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified? | /1/ | DR | No leakage from these activities is expected. See D.3.1. | | ok |

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|--|-----------------------------|------|---|-------------|-------------|
| E.3.Baseline Emissions <i>The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.</i> | | | | | |
| E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions? | /1/ | DR | Yes. All the power plants connected to the CCPN are included for calculating the OM and BM. | | ok |
| E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions? | /1/ | DR | Yes. CCPN is clearly defined as baseline boundary. | | ok |
| E.3.3. Are the GHG calculations documented in a complete and transparent manner? | /1/ /15/ /16/ /19/ | DR | Yes. For the calculation of the operating margin (OM) the simple OM emission factor calculation method is selected due to a lack of data availability. Following the EB guidance, the average emission factor for the grid for each fuel type is calculated based on a 3-year average of the most recent statistics available (data available for 2002, 2003 and 2004 at the time of PDD submission). The simple OM emission factor is calculated as 1.2426 tCO ₂ /MWh. For the calculation of the build margin (BM), following the EB guidance, the standard coal consumption of 320 g SCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 336.66 g SCE/kWh is defined as the best technology commercially available in China by the DNA of China/16/. The capacity additions of | | ok |

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| | | | 22.5% from the years 2000 to 2004 have been identified by applying weights estimated using installed capacity instead of annual electricity generation; the BM is calculated as 0.6062 tCO ₂ /MWh. The combined margin of 0.9244 CO ₂ /MWh is fixed ex-ante for the entire first crediting period. The local value of 29.27 GJ/t standard coal, the IPCC default value of 25.8 tC/TJ and the carbon oxidation factor of 98% are used to calculate the OM and BM. In summary, the GHG calculations are in a complete and transparent manner. | | |
| E.3.4. Have conservative assumptions been used when calculating baseline emissions? | /1/ | DR | Yes. The local value of 29.27 GJ/t standard coal (data source: China Energy Statistics Yearbook 2004) and the IPCC default value of 25.8 tC/TJ, carbon oxidised OXIDi 98% are used to calculate the CO ₂ coefficient. | | ok |
| E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation? | /1/ | DR | No significant uncertainties have been addressed in the PDD. | | ok |
| E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions? | /1/ | DR | Yes. | | ok |
| E.4. Emission Reductions <i>Validation of ex-ante estimated emission reductions.</i> | | | | | |
| E.4.1. Will the project result in fewer GHG emissions than the baseline scenario? | /1/ | DR | Yes, The project is forecasted to reduce CO ₂ emissions 75 832 tCO ₂ e / year average over the crediting period. | | ok |

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|-------------------|---------|--|-------------|-------------|
| F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i> | | | | | |
| F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described? | /1/ /5/ | DR | Yes. The impacts including on land use, noise, waste water, air, ecological environment are all described. | | ok |
| F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? | /1/ /5/ | DR | Yes. The EIA has been approved by Hubei Provincial Environmental Protection Bureau. | | ok |
| F.1.3. Will the project create any adverse environmental effects? | /1/ /5/ | DR | The project will have positive impact on local environment. | | ok |
| F.1.4. Are transboundary environmental impacts considered in the analysis? | /1/ /5/ | DR I | There are no transboundary environmental impacts foreseen for the project. | | ok |
| F.1.5. Have identified environmental impacts been addressed in the project design? | /1/ /4/ /5/ | DR | Yes. The environmental impacts identified have been addressed in the project design. | | ok |
| F.1.6. Does the project comply with environmental legislation in the host country? | /1/ /5/ | DR | Yes. The EIA has been approved. | | ok |
| G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i> | | | | | |
| G.1.1. Have relevant stakeholders been consulted? | /1/ | DR | Yes. Local stakeholders were invited initially through a survey during the EIA process. All comments received and how they will be taken into account is included in the EIA report. The provided document | | ok |

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|---|------|------|---|-------------|-------------|
| | | | has been verified by DNV. | | |
| G.1.2. Have appropriate media been used to invite comments by local stakeholders? | /1/ | DR | Yes. The site surveys, distribution of questionnaires and meetings have been used to invite comments by local stakeholders. | | ok |
| G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws? | /1/ | DR | Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations. | | ok |
| G.1.4. Is a summary of the stakeholder comments received provided? | /1/ | DR | Yes. A summary of the stakeholder comments received is described in the PDD. | | ok |
| G.1.5. Has due account been taken of any stakeholder comments received? | /1/ | DR | All the comment are positive and supporting the project activity. | | ok |

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

Table 3 Resolution of Corrective Action and Clarification Requests

| Draft report corrective action requests and requests for clarifications | Ref. to Table 2 | Summary of project participants' response | Final conclusion |
|--|------------------------|--|--|
| CAR 4: The LoAs of Chinese DNA and the DNA of Netherlands have not been received. | A.3.2 A.3.3 | The LoAs of Chinese DNA and the DNA of Netherlands have been received. | ok |
| CL 1: Further clarification is required to justify the benchmark rate. Please provide the spreadsheet for IRR calculation. | B.2.7 | According to the relevant regulation in China/7/, IRR of 8 % for total investment of a project is regarded as benchmark for investments in hydropower plants, fossil fuel fired plants and wind farm projects. The financial analysis carried out by World Bank/18/ has been provided to DNV. | DNV has checked the financial analysis by World Bank and was able to verify that the choice of benchmark and the IRR calculation are both reasonable. CI closed |
| CL 2: The similar hydropower projects through out of Hubei Province should be compared in the common practice analysis and the data source from third party should be provided. | B.2.7 | All the hydropower projects in Hubei province with installed capacity under 50MW were compared with the proposed project and the analysis shows the other project were all developed by large electricity investment companies, while the GHP is developed by a small-scale hydropower company who has weak competence to deal with the risk and to overcome the investment barriers. Data source used for common practice analysis are official statistics yearbooks. | DNV was able to verify that hydropower projects under 50MW developed by small scale companies were not a common practice in the area. CI closed |
| CL 3: According to the methodology, the surface area at full reservoir level should also | D.1.3 | The surface area will be monitored at the start of each crediting period. | Ok |

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

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| Draft report corrective action requests and requests for clarifications | Ref. to Table 2 | Summary of project participants' response | Final conclusion |
|---|-----------------|---|------------------|
| be monitored. | | | |

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

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

| | | | |
|--|--------------------------|----------------------|-----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | Yes |
| CDM Verifier: | Yes | JI Verifier: | Yes |
| Industry Sector Expert for Sectoral Scope(1): | Sectoral scope 1,2,3 & 9 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | Yes | AM0021 | Yes |
| ACM002, AMS-I.A-D, AM0019, AM0026, AM0029 | Yes | AM0023 | Yes |
| ACM003, ACM0005, AM0033, AM0040 | Yes | AM0024 | Yes |
| ACM0004 | Yes | AM0027 | Yes |
| ACM0006, AM0007, AM0015, AM0036, AM0042 | Yes | AM0028, AM0034 | Yes |
| ACM0007 | Yes | AM0030 | Yes |
| ACM0008 | Yes | AM0031 | Yes |
| ACM0009, AM0008, AMS-III.B | Yes | AM0032 | Yes |
| AM0006, AM0016, AMS-III.D | Yes | AM0035 | Yes |
| AM0009, AM0037 | Yes | AM0038 | Yes |
| AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I | Yes | AM0041 | Yes |
| AM0014 | Yes | AM0034 | Yes |
| AM0017 | Yes | AMS-II.A-F | Yes |
| AM0018 | Yes | AMS-III.A | Yes |
| AM0020 | Yes | AMS-III.E, AMS-III.F | Yes |

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Wilson Tang

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

| | | | |
|---|--------------------------|----------------------|----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | |
| CDM Verifier: | -- | JI Verifier: | |
| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 1,2,3 & 9 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | Yes | AM0021 | -- |
| ACM0002, AMS-I.A-D, AM0019, AM0026, AM0029 | Yes | AM0023 | -- |
| ACM0003, ACM0005, AM0033, AM0040 | -- | AM0024 | -- |
| ACM0004 | -- | AM0027 | -- |
| ACM0006, AM0007, AM0015, AM0036, AM0042 | -- | AM0028, AM0034 | -- |
| ACM0007 | -- | AM0030 | -- |
| ACM0008 | -- | AM0031 | -- |
| ACM0009, AM0008, AMS-III.B | -- | AM0032 | -- |
| AM0006, AM0016, AMS-III.D | -- | AM0035 | -- |
| AM0009, AM0037 | -- | AM0038 | -- |
| AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I | -- | AM0041 | -- |
| AM0014 | -- | AM0034 | -- |
| AM0017 | -- | AMS-II.A-F | -- |
| AM0018 | -- | AMS-III.A | -- |
| AM0020 | -- | AMS-III.E, AMS-III.F | -- |

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Miguel Rescalvo

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

| | | | |
|---|--------------------------|----------------------|----|
| GHG Auditor: | Yes | | |
| CDM Validator: | Yes | JI Validator: | -- |
| CDM Verifier: | -- | JI Verifier: | -- |
| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 1,2,3 & 9 | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | -- | AM0021 | -- |
| ACM002, AMS-IA-D, AM0019, AM0026, AM0029 | -- | AM0023 | -- |
| ACM003, ACM0005, AM0033, AM0040 AM0004 | -- | AM0024 | -- |
| | -- | AM0027 | -- |
| ACM0006, AM0007, AM0015, AM0036, AM0042 AM0007 | -- | AM0028, AM0034 | -- |
| | -- | AM0030 | -- |
| ACM0008 | -- | AM0031 | -- |
| ACM0009, AM0008, AMS-III.B | -- | AM0032 | -- |
| AM0006, AM0016, AMS-III.D | -- | AM0035 | -- |
| AM0009, AM0037 | -- | AM0038 | -- |
| AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I | -- | AM0041 | -- |
| AM0014 | -- | AM0034 | -- |
| AM0017 | -- | AMS-II.A-F | -- |
| AM0018 | -- | AMS-III.A | -- |
| AM0020 | -- | AMS-III.E, AMS-III.F | -- |

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Shu Yong Sun

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

| | | | |
|---|--------------------------|-----------------------------|----|
| <i>GHG Auditor:</i> | Yes | | |
| <i>CDM Validator:</i> | -- | <i>JI Validator:</i> | -- |
| <i>CDM Verifier:</i> | -- | <i>JI Verifier:</i> | -- |
| <i>Industry Sector Expert for Sectoral Scope(s):</i> | Sectoral scope 1,2,3 & 9 | | |

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director