



VALIDATION REPORT

THE PROTOTYPE CARBON FUND

XIAOGUSHAN HYDROPOWER PROJECT IN PEOPLE'S REPUBLIC OF CHINA

April 03 2006

**JCI CDM Center
Japan Consulting Institute
Report No. 2004JCI CDM VAL 004 Rev 0**

VALIDATION REPORT

Date of first issue: April 03 2006	Project No.: 2004JCI CDM VAL 004
Approved by: Akio Yoshida, CDM CENTER-EXECUTIVE DIRECTOR	Organisational unit: JCI CDM Center Japan Consulting Institute (JCI)
Client: The Prototype Carbon Fund	Client ref.:

Summary:

JCI, as a Designated Operational Entity, has been commissioned by The Prototype Carbon Fund (PCF) to perform a validation of the “Xiaogushan Hydropower Project in People’s Republic of China” hereafter called “the Project”.

This validation report summarises the results of the validation of the Project, on the basis of the requirements for validation under the CDM in the Kyoto Protocol (KP) and decision 17/CP.7 under Marrakech Accords. The PDD-Ver.01 was made publicly available from July 23 to August 21, 2005 on the UNFCCC web site.

The validation conducted by JCI CDM Center involves a desk review of the Project Design Documents (PDDs) and supporting documents and follow-up interviews by a field survey to relevant stakeholders of PRC, including project developer, project site and regulatory bodies. The scope of the validation covers the baseline methodology, the monitoring methodology and plan, calculation of GHG emission reduction, environmental impacts and due accounts on the comments of stakeholders.

The Project expects GHG emission reduction of **3,128,919** tons CO₂ e/ 10years.

In the opinion of JCI CDM Center, the Project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria with correct application of the baseline and monitoring methodology ACM0002.

Consequently, JCI requests the registration of the Project as CDM project activity.

Report No.: 2004JCI CDM VAL 004	Subject Group: JCI CDM Center	
Report title: Xiaogushan Hydropower Project in People’s Republic of China		
Work carried out by: Yoshihisa Sakai, Sadao Kondo, Tadaaki Fujikura		
Work verified by: Hideyuki Sato		
Date of this revision: April 03 2006	Rev. No.: 0	Number of pages: 24

Indexing terms

Climate Change
Kyoto Protocol
Clean Development Mechanism
Methane Extraction and Renewable Electricity Generation

No distribution without permission from the Client or responsible organisational unit

VALIDATION REPORT

Abbreviations

ADB	Asian Development Bank
BM	Build Margin
CDM	Clean Development Mechanism
CAR	Corrective Action Request
CERs	Certified Emission Reductions
CLAR	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	CO ₂ equivalent
DNA	Designated National Authority
EB	Executive Board
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
JCI	Japan Consulting Institute
KP	Kyoto Protocol
MP	Monitoring Plan
NDRC	National Development and Reform Committee (DNA of PRC)
NGO	Non-governmental Organisation
NCV	Net Calorific value
ODA	Official Development Assistance
OM	Operating Margin
PCF	World Bank Prototype Carbon Fund
PDD	Project Design Document
PPA	Power Purchase Agreement
PRC	People's Republic of China
QA/QC	Quality Assurance/ Quality Control
SD	Sustainable Development
UNFCCC	United Nations Framework Convention on Climate Change
XHC	Xiaogushan Hydropower Co. Ltd.

<i>Table of Contents</i>		<i>Page</i>
1	INTRODUCTION	2
1.1	Objective	2
1.2	Scope	2
1.3	Project Description	3
2	METHODOLOGY	3
2.1	Desk Review	5
2.2	Follow-up Interviews	6
2.3	Resolution of Clarification and Corrective Action Requests	7
3	VALIDATION FINDINGS	8
3.1	Project Design	9
3.2	Baseline	10
3.3	Monitoring Plan	12
3.4	Calculation of GHG Emissions	13
3.5	Environmental Impacts	13
3.6	Comments by Local Stakeholders	14
4	COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	15
5	VALIDATION OPINION	19
6	REFERENCES.....	20

Annex A: CDM Validation Protocol for “Xiaogushan Hydropower Project in People’s Republic of China”

1 INTRODUCTION

The Prototype Carbon Fund has commissioned Japan Consulting Institute to validate “Xiaogushan Hydropower Project in People’s Republic of China”, hereafter called “the project”.

The validation was executed in accordance with Kyoto Protocol requirements, modalities as agreed in Marrakech Accords and decisions of UNFCCC CDM EB.

This report summarises validation of the project, performed on the basis of desk review of the PDD as well as the relevant documents provided through correspondence between The Prototype Carbon Fund and JCI CDM Center, and information obtained by the follow-up interviews.

The following personnel of JCI CDM Center were assigned to execute the validation.

Validation Team Leader	Mr. Yoshihisa Sakai	Team Leader: All relevant criteria
Team Member	Mr. Sadao Kondo	GHG auditor: Baseline, monitoring Methodologies
Team Member	Mr. Tadaaki Fujikura	GHG auditor: Technology

1.1 Objective

The purpose of validation is to have an independent third party assess the project design. In particular, it will be assessed whether the project baseline, the monitoring plan (MP), and the project’s compliance with relevant UNFCCC and host country criteria meet the stated requirements and 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 PDD for the project, the project’s baseline study, monitoring plan and other relevant documents.

The information in these documents is reviewed in accordance with Kyoto Protocol requirements, UNFCCC rules and associated interpretations including requirements for the public comments on the project.

Based on the recommendations in the Validation and Verification Manual, JCI CDM Center has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

In addition to the above documents review, follow-up interviews at site survey are included in the scope.

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

1.3 Project Description

The Xiaogushan Hydropower Project (“XHP” or the “Project”) is a run-of-river hydro project consist of a diversion weir, an intake power tunnel (9.1 km), water fall of 117 m, a powerhouse, line a 110 kV high voltage switchyard and 27 km of 110 kV transmission lines. It is located on the Heihe River in the Sunan Yugu Autonomous County of Zhangye City, Gansu province, China. The original engineering design proposed the project has an installed capacity of 98MW with expected output of 380 gigawatt-hours per year and a net supply of 357 gigawatt-hours per year to Gansu grid in long-term average. Based on refined study on hydrological conditions of the river, the XHP company upgraded the generation capacity to 102 MW, resulting in an increased output of 394 gigawatt-hours per year, and a net supply of 370 gigawatt-hours per year to the Gansu grid in long-term average terms.

The 102 MW Project will provide additional capacity to the interconnected Gansu Power Grid, which is part of the Northwest Power Network in China. XHP will be supplying reliable power to the Zhangye prefecture, which the current capacity is only 94.5MW thus heavily depends on daily import from the Gansu Power Grid. The XHP transmission lines, in addition to going to the Gansu Power Grid, will connect the nearby townships and villages in a highly impoverished area dominated (98%) by the Zang (Tibetan) minority.

The XHP will reduce emissions of greenhouse gases (GHGs) by avoiding operation of existing thermal power plant and future capacity expansion of fossil fuel-based generation by the regional Gansu Power Grid in Northwest China. The privately owned hydropower plant will sell electricity to the grid as well as supplying reliable power to nearby villages.

The proposed XHP project is considered under the CDM modalities as a renewable energy project. The XHP is one of China’s first proposed CDM activities given its combination of positive environmental, economic, and sustainable development benefits. Given this combination of socio-economic and environmental benefits, the Xiaogushan Hydropower Project is the first-ever renewable energy power loan provided for the Northwest region of China from the Asian Development Bank (ADB). In terms of environmental and power benefits, the project supports China’s policy of harnessing zero-impact renewable energy resources and avoiding investment in high-GHG emission coal power plants.

The emission reduction during the crediting period (10years) is expected to **3,128,919** tonnes CO₂e.

2 METHODOLOGY

The validation consists of the following three phases:

- I A desk review of the project design documentation,
- 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 order to ensure transparency, a validation protocol is customised for the project, according to the Validation and Verification Manual.

VALIDATION REPORT

The protocol shows, in a 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 Table 2.1.

Where a finding is issued, a corrective action requests (CAR) or clarification request (CLAR) are stated in each table of the validation protocol.

Corrective action requests (CAR) are issued, where:

- Mistakes have been made with a direct influence on project results;
- Requirements of CDM or host party have not been met; or
- There is an unacceptable risk as a CDM project or a risk that emission reductions cannot be verified and certified.

Clarification request (CLAR) are issued where additional information is required to clarify an issue sufficiently.

The completed validation protocol is enclosed in Annex A in this report.

VALIDATION REPORT

Table 2.1 Validation protocol tables

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report. Clarification is used when the validation team has identified a need for further clarification.	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.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question.	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). Clarification is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation conclusion
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 1 & 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

2.1 Desk Review

The PDD-Ver.1 (June 10, 2005) and the PDD-Ver.2 (February 10, 2006) submitted by The Prototype Carbon Fund for the project and additional documents related to the project design and baseline were reviewed.

2.2 Follow-up Interviews

In the period of 25 August 2005 to 31 August 2005, JCI CDM Center performed interviews with project stakeholders in PRC to confirm selected information and to resolve issues identified in the document review and also visited Xiaogushan Hydropower Project (XHP) site to ensure the plant layout and boundaries.

The representatives of NDRC (National Development and Reform Commission), Water Resource and Hydropower Investigation and Design Institute of Gansu Province, Zhangye City Environmental Protection Office, Gansu Power Grid Co., Ltd and XHC (Xiaogushan Hydropower Co. Ltd.) were interviewed. The main topics of the interviews are summarised in Table 2.2.

Table 2.2 Interview topics

Interviewed organisation	Interview topics
National Development and Reform Commission, NDRC (DNA of PRC)	<ul style="list-style-type: none"> ➤ Acceptance of the Kyoto Protocol and establishment of DNA ➤ Policy/Criteria on Sustainable Development of PRC ➤ General national policy/criteria and procedure for approving a CDM project activities ➤ Opinions on the proposed CDM project activity, Xiaogushan Hydropower Project,
Water Resource and Hydropower Investigation and Design Institute of Gansu Province	<ul style="list-style-type: none"> ➤ Criteria/regulations for hydropower electricity development in PRC ➤ Criteria/regulations for run-of-river hydropower plants in PRC ➤ Monthly flow data for the project site
Zhangye City Environmental Protection Office	<ul style="list-style-type: none"> ➤ Role for approving and conducting EIA ➤ EIA requirements and status of the report ➤ Approval process of the compensation and rehabilitation measures for the directly affected household and their village
Gansu Power Grid Co.	<ul style="list-style-type: none"> ➤ Criteria/regulations for purchasing the electricity generated by utilization of renewable energy ➤ Basic data of emission factor ➤ Power Purchase Agreement between Gansu Power Grid Co. and XHC ➤ Anticipated purchasing tariff (off-taking agreement)
Xiaogushan Hydropower Co. Ltd., XHC	<ul style="list-style-type: none"> ➤ Written approval of voluntary participation from DNA ➤ Criteria for CDM project, and sustainable development policies and plans of PRC ➤ Schematic drawing and documents of the project ➤ Available data for the baseline determination ➤ Power Purchase Agreement between Gansu Power Grid Company and XHC ➤ Investment cost and project construction schedule. ➤ Environmental criteria for construction of hydropower plant and approval process of EIA by the authority ➤ Project management system and monitoring plan ➤ Comments by local stakeholders, and due account to the comments ➤ Major process design data for the project

The following persons were interviewed during the site survey from 25 August 2005 to 31 August 2005.

VALIDATION REPORT

- **National Development and Reform Commission (DNA of PRC):**
 - Ms. Sun Cuihua: Division Director
 - Mr. Wang Shu: Project Officer

- **Water Resource and Hydropower Investigation and Design Institute of Gansu Province**
 - Mr. Hou Zi Yuan
 - Mr. Wang Ying Ge

- **Zhangye City Environmental Protection Office**
 - Mr. Liu Xiao Yun

- **Gansu Power Grid Co., Ltd, Zhangye Branch**
 - Mr. Lei Jian Qing

- **Xiaogushan Hydropower Co. Ltd., XHC**
 - Mr. Lu Xue Yin: Vice Director
 - Mr. Xu Qing Nian: Vice General Manager (VGM)
 - Mr. Ding Jian Jun: VGM
 - Mr. Huo Ji Cai: VGM
 - Mr. Chen Dong Xin: VGM
 - Mr. He Jun Bi: Chief Engineer
 - Mr. She Jian Yi: Chief
 - Mr. Tan Ji Dong: Chief
 - Ms. Yin Cai feng
 - Mr. Daniel Pu Jin Cheng
 - Ms. A. T. LUONG: Expert-International Cooperation Department

- **Consultant of XHC**
 - Dr. Zhou Sheng: Tsinghua University

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarifications and any other outstanding issues, which needed to be clarified for JCI CDM Center's conclusion on the project design.

The three (3) Corrective Action Requests and six (6) Clarification Requests raised by JCI CDM Center were completely resolved by the desk review of the revised PDD (PDD-Ver.02) with communications between the project participants and JCI CDM Center.

In order to guarantee the transparency of the validation process, the concerns raised and responses given are summarised in chapter 3 below and documented in more detail in the validation protocol in Annex A.

3 VALIDATION FINDINGS

In the following items the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the PDD-Ver.1 and 2 are summarised. A more detailed record of these findings can be found in Table 1 & 2 of the Validation Protocol (Annex A).
- 2) Where JCI CDM Center had identified issues that needed clarification and that represented a risk to the fulfilment of the project objectives, CARs and CLARs, respectively, have been issued.

Clarification and corrective action requests are stated, where applicable, in the following items and are further documented in Table 1 & 2 of the validation protocol (Annex A).

As the results of validation based on the original PDD (PDD-Ver.1), three (3) CARs and six (6) CLARs have been addressed as findings and all of these findings were completely resolved by the desk review of the revised PDD (PDD-Ver.2) and additional information submitted.

- 3) The conclusions for validation subject are presented as follows.

- (1) Approval of CDM project activity by the related countries DNA

The Letter of Approval (LoA) from People's Republic of China and the Declaration of Approval (DoA) from the government of Netherlands were obtained.

The DNA of PRC approved the project on August 30, 2005, furthermore, the government of Netherlands issued the DoA to the project on March 20 2006.

- (2) Sustainable Development

Sustainable Policy and Plan of the host country is mentioned clearly in the PDD. The Letter of Approval by DNA of PRC on 30 August 2005 confirmed that the project contributes PRC in achieving sustainable development

- (3) ODA diversion

No Official Development Assistance (ODA) funding will be provided.

- (4) PDD format

CAR2 is addressed as finding and resolved by the revised PDD (PDD-Ver.2).

- (5) Project Design

CLAR1 for project design engineering is addressed as finding and resolved by the revised PDD (PDD-Ver.2).

- (6) Baseline and Additionality

CLAR3 for the selection of OM calculation method is addressed as finding and resolved by the revised PDD (PDD-Ver.2). As requested by ACM0002, this project applies the "Tool for the demonstration and assessment of additionality" appropriately.

- (7) Baseline & Monitoring methodology

Application of the baseline & monitoring methodology (ACM0002) is appropriate.

CLAR2 for initial training, maintenance and monitoring plan for the project are addressed as finding and resolved by the revised PDD (PDD-Ver.2).

CLAR4 for source of document is addressed as finding and resolved by the revised PDD (PDD-Ver.2).

CLAR5 for the additional data to be monitored for project emission from operation of facilities in the project activity and calibration plan for the instruments is addressed as finding and resolved by the revised PDD (PDD-Ver.2).

(8) GHG Emission Reduction

The amount of **3,128,919** tons CO₂e/10years is expected.

CAR3 for the GHG calculation procedure and some discrepancy of the key data and formula is addressed as finding and resolved by the revised PDD (PDD-Ver.2).

(9) Environmental Impacts

The environmental impact assessment (EIA) to ensure that the project complied with national, regional and local environmental regulations was implemented with positive results.

CLAR6 for the environmental monitoring plan is addressed as findings and resolved by the revised PDD (PDD-Ver.2).

(10) Comments by Local Stakeholders

Local stakeholders' comments are summarized clearly in the PDD.

Most of comments show stakeholders' expectation to this project without negative comments.

3.1 Project Design

1) The followings were reviewed:

(1) The technology used

The Xiaogushan Hydropower Project ("XHP" or the "Project") is a run-of-river hydropower project consists of a diversion weir, an intake power tunnel (9.1 km), water fall of 117 m, a powerhouse, line a 110 kV high voltage switchyard and 27 km of 110 kV transmission lines.

The main project characteristics are described in detail in the PDD. The project design engineering reflects current good practise and applies well-proven technology and hardware for the above mentioned each components. The project design is sound and its project boundaries, both geographical and temporal boundaries are clearly defined.

The hydropower plant shall have an installed capacity of 102 MW (2 units × 40 MW + 1 unit × 22MW). The annual generation is expected to be approximately 394 million kWh of clean power over an expected operational lifetime of 30 years.

(2) The project's contribution to sustainable development

The expected results of this project for the sustainable development are as follows:

- Supply of reliable, zero-emitting renewable energy to the provincial grid
- Increased energy and decreased load-shedding for several nearby poor villages that will allow expansion of villagers' household, educational, health, and public facilities

- Promotion of private power development managed by local entrepreneurs
- Local income, new skills and job generation (3,000 jobs during the construction period and 100 permanent staff positions during operation)
- Improved access roads that will foster better transport routes for the villagers for the marketing of local goods throughout the year rather than seasonally
- Energy efficiency enhancements in the nearby areas

As described above, proposed project is expected to bring social, environmental and economic benefits and contribute to sustainable development of PRC.

(3) Project duration and crediting time

The project will start partial commissioning in March 2006 and become fully operational on July 1st, 2006 and the fixed crediting period is 10 years.

2) CLAR and Conclusion for Project Design

CLAR1: The project design engineering especially technical description is not good enough and transparent. There is some discrepancy in the project data. Features of the applied technology and its performance shall be proposed in detail

The relevant section in the PDD has been revised in the PDD-Ver.2 and resolved.

3.2 Baseline

1) The following were reviewed:

- Whether the proposed project applies an appropriate baseline methodology.
- Whether the selected baseline methodology is reasonably justified.
- Whether the proposed project fulfils what may be described as programme additionality.

The project applies the(ACM0002) "Consolidated baseline methodology for grid-connected electricity generation for renewable resources" in combination with the " Tool for the demonstration and assessment of additionality". ACM0002 is applicable to the project because ACM0002 is applicable to grid-connected run-of-river hydropower plants. The baseline methodology has been appropriately applied. The simple operating margin (OM) method is selected because detailed hour dispatch data is not available to the public in PRC and the low-cost/must run resources in the Gansu power system constitute less than 50% of total grid generation in average of the five most recent years.

Data on the Gansu power system of the years 2001, 2002 and 2003 have been used to determine an ex-ante operating margin (OM) and build margin (BM) emission factor.

The OM emission factor was determined in accordance with the Simple OM approach required by ACM0002 for electricity grids where low-cost/must run resources constitute less than 50% of total grid generation. Choosing the Option 1 specified by ACM0002, the BM is calculated based on data from the power plant additions in the Gansu power system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The determination of the OM and BM emission factor based on actual generation and fuel consumption data for the Gansu power system and using IPCC default values for NCV, carbon emission factors and fractions of carbon oxidised. The actual data on the Gansu power system was verified during follow-up interviews.

As required by ACM0002, the project applies the "Tool for demonstration and assessment of additionality"; Outline of the each step is as follows,

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

Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity is available as mentioned in the PDD. Therefore, the crediting period of the project is expected to start prior to the validation/registration of the project.

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

As a result of sectoral issues and the Gansu Power Grid's situation, the alternative available to the project would be:

- The proposed hydropower plant development not undertaken as a CDM project activity,
- Implement Coal-fired power plants (300 MW or above) to meet growing electricity demand of Gansu Power Grid.

All alternatives identified are in compliance with all applicable laws and regulations and are thus possible baseline scenarios.

Step 2 : Investment analysis

The proposed project will use the benchmark analysis method (Option III) since data on the benchmark IRR and NPV are available in PRC.

In accordance with benchmark analysis (Option III), if the financial indicator (Such as IRR and NPV) of the proposed project are lower than the benchmark, the proposed project is not considered as financially attractive. Without the CDM revenue, the project IRR is lower than the benchmark 8% and the NPV is negative, thus the proposed project is not financially attractive. With the CDM revenue, the project IRR and the NPV are significantly improved and exceed the benchmarks. Therefore, the proposed project, with the CDM revenue, can be considered as financially viable to the investors.

A sensitivity analysis was conducted to test whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. Under various adverse situation, it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be financially attractive with FIRR less than the benchmark IRR (8%).

Step 3 : Barrier analysis

The small-medium hydro project in a remote area, when developed by the county-level investor such as XHP case, faces prohibitive barriers of high project risk, access to financing, and uncertain tariff combined with weak enforcement of the PPA. The key barriers and strong evidence to support the barrier argument are described in detail in the PDD.

Step 4: Common practise analysis

Sufficient information exists to demonstrate in a transparent and conservative manner that the type of activity and the location of project undertaken in the project is not

common practice at the time that the project was prepared and the investment decision was made. All projects except XHP have been undertaken by large state or province level company before the power sector reform started in 2002 and the principle of setting tariff was full-cost recovery with reasonable return.

It is evident from the table (Table 7 in PDD) that the XHP is the very first project in the Gansu Power Grid to be developed by a county-level developer with size over 50 MW since the power sector reform started in 2002.

Step 5: Impact of CDM registration

CER revenue significantly increases the project's financial attractiveness by improving the key financial indicators and makes it more resilient to various risks, such as resources availability risk, foreign exchange risk and risk of tariff change which is out of XHC's control.

The financial benefit of the revenue obtained by selling ERs (assuming price is \$10/tCO₂e) is significant as follows:

- The Net Present Value of ER revenue accounts for 25% of total capital investment of the Project.
- Increase the project IRR by 2.1% and turn it into a financially attractive investment
- Provides 0.051 CNY/kWh of additional revenue stream to the project making it more resilient to tariff changes since the project breaks even (assuming 8% as the hurdle rate) at a lower tariff of 0.258 CNY/kWh rather than at a tariff of 0.309 CNY/kWh.

As described above, since all steps(step 0 to step 5) specified in the tool for demonstration and assessment of additionality were satisfactorily passed, the proposed project (XHP) is not the baseline scenario and considered to be additional.

2) CLAR and Conclusion for Baseline

CLAR3: The reason for selection of the Simple OM method is not transparent.

The reason for selection of OM calculation method was clearly described in the revised PDD (PDD-Ver.2) and CLAR3 was closed.

3.3 Monitoring Plan

1) The following were reviewed:

- Whether the monitoring methodology mentioned in the original PDD (PDD-Ver.1) is appropriate,
- Justification and applicability of the monitoring methodology shall be reconsidered, and
- Whether the monitoring plan provides necessary information related to the collection and archiving of all relevant data needed to:

- (1) Estimate or measure emissions occurring within the project boundary,
- (2) Determine the baseline emissions, and
- (3) Estimate changes in emissions outside the project boundary

All indicators of importance for controlling and reporting of project performance are

incorporated in the “D.2.1.3 Relevant Data to be monitored” of the revised PDD (PDD-Ver.2).

3) CLAR and Conclusion for Monitoring Plan

CLAR2: The PDD does not clearly describe the extensive initial training and maintenance efforts for this project. Regarding the monitoring work of this project, the scope of work and responsibility for each division and /or section in the Organization Chart should be described briefly.

This has been revised in the revised PDD (PDD-Ver.2) and CLAR2 was resolved.

CLAR4: All literature and sources in the PDD are not clearly referenced and summarized. This has been revised in the revised PDD (PDD-Ver.2) and CLAR4 was resolved.

CLAR5: To justify the applicability of the proposed monitoring methodology for this project, additional data is monitored for project emission from operation of facilities in the project activity and calibration plan for the instruments.

This has been revised in the revised PDD (PDD-Ver.2) and CLAR5 was resolved

3.4 Calculation of GHG Emissions

1) The followings were reviewed:

- Whether the project boundaries are appropriate,
- Whether all relevant emissions are properly accounted by IPCC data,
- The correctness and transparency of formulas and factors used,
- The assumptions made for estimating GHG emission reductions, and
- Uncertainties

2) CAR and Conclusion for Calculation of GHG Emission

CAR3: The GHG calculation procedure is not transparent. Only calculation results are shown in section E. Some discrepancy of the key data and missing of the formula etc. in Annex 3 of the PDD are recognized.

CAR3 was resolved by the revised PDD (PDD-Ver.2).

3.5 Environmental Impacts

1) The followings were reviewed;

The project site is located in an experimental area of Qilianshan Natural Reserve (QNR) ,one of the top 40 natural reserves in China. Accordingly the Chinese national regulation requested

- (1) More detailed EIA than ordinary hydropower projects,
- (2) Approval by the QNR authority, and
- (3) Consultation with State Environmental Protection Administration before the local environmental bureau approves the project.

The quality of EIA is ensured by

- (a) Involvement of the Biology Department of Zhangye Environmental Monitoring Station of Gansu Environmental Protection Bureau and an local ecological expert from Hexi College,
- (b) External review of the EIA by a professor of the Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences.

Following the above mentioned approval process of the EIA, EIA has been carried out to ensure that the project complied with national, regional and local environmental regulations and the EIA concluded that there are no specific negative environmental impacts on the circumference of the project area. The EIA for this project was carried out by Gansu Environment Science Design Institute (GESDI) with the assistance of the ADB. GESDI is an EIA consultant certified by the State Environmental Protection Agency (SEPA) and is independent from the project owner, XHC, in terms of financial and personnel management.

All the necessary national legal procedures have been finished and the national and local environmental authorities have approved the project including the EIA.

In addition, a detailed Environmental Management and Monitoring Plan (EMMP) for building and operating the hydropower plant has been developed by East China Investigation and Design Institute in May 2004 and is currently implemented by Xiaogushan Hydropower Company (XHC).

The EMMP responds to requirements of the Chinese Environmental Impact Assessment as well as World Bank Standards. This EMMP was made publicly available via the World Bank Infoshop at its website on June 21, 2004.

2) CLAR and Conclusion for Environmental Impacts

CLAR6: No sustainable development indicators, social and economic impacts are required to monitor in this project. The environmental monitoring is required during construction and operation in the PDD. However, the environmental monitoring plan is not described in the PDD.

CLAR6 was resolved by the revised PDD (PDD-Ver.2) and supplementary proposed document.

3.6 Comments by Local Stakeholders

1) The followings were reviewed:

During the preparation for the ADB-financed project, the Resettlement Action Plan (RAP) preparation, and the SA, several rounds of consultation have been conducted with important stakeholders. The SA team held intensive meetings with local villagers, local officials in the project affected area, local universities and other academic institutions, and Lama in Mati Temple that is the regional center of Tibetan Buddhism and ZhuanLunSi Temple that is close to the project site, and lengthy interviews with 161 households (more than a half of the total population) in Xishui Tibetan Autonomous Township. Comments and recommendations received from the consultation have been included in the project design, the RAP, and the Ethnic Minority Development Plan (EMDP).

The final draft RAP, the draft SA report, and the draft EMDP have been sent to InfoShop for disclosure on June 9, 2004. Two copies of the final RAP and EMDP (both in Chinese) will also be made available locally in ZXHC Office and the Xishui Township Achieves

VALIDATION REPORT

on May 20, 2004. The public disclosure will be announced through posts, as well as booklets that will be distributed to Bajiaowan village and each affected household.

The Social Assessment confirms that the project is widely supported by local people regardless their backgrounds. Most of the local people (including local religious leaders) interviewed by the SA or presented at the consultation meetings were aware of the project and believed that the project would bring significant benefits to local people and communities.

According to the opinions from 655 informants (570 Tibetans, 87% of the total), over 90% response positively to the project

Local people have shown some concern over the negative impacts since the project construction. Their requests and responses are summarized clearly in the PDD and specific countermeasures such as compensation and rehabilitation measures, to mitigate the identified adverse impact are disclosed in detail in the PDD.

Validation Team confirmed through the interviews with local people (including local religious leaders) during site survey that the project (XHP) is beneficial to the project surrounding area and greatly promotes the local life style and standard.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities and procedure for the Validation of CDM projects, the validator shall make publicly available the PDD and receive, within thirty (30) days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organisations (NGOs), and make comments publicly available.

The PDD-Ver.01 has been published on UNFCCC web site and Parties, NGOs and other stakeholders were invited to provide comments on the validation requirement during a 30 days period from 23 July 2005 to 21 August 2005. One (1) comment was received and resolved with following mail communication between International Rivers Network (IRN) and JCI CDM Center.

The comment received and JCI CDM Center Validation Team's response is given as follows;

Comment by: Mr.Patrick McCully, International Rivers Network (IRN)

Date: August 21, 2005

Subject: Additionality

IRN Comment-1 :

Xiaogushan is non-additional and therefore cannot be validated as a CDM project. Project documentation from the Asian Development Bank clearly states that Xiaogushan was the least-cost generation option for Gansu and that revenue from CDM credits (CERs) was irrelevant to the decision to go ahead with the project. Construction began in October 2003.

JCI CDM Center Validation Team's Response:

As well recorded in ADB's RPP document (Page 6 and page 30), both ADB and GoC agreed to pursue the CDM potential for XHP. As indicated in the project development timetable in the PDD, CDM had clearly been an incentive from the beginning for all the relevant parties in this project, the sponsor, the guarantor, and the financiers, in making the final investment decision. Although the ADB study concludes that XHP is the least cost option, it doesn't conflict with the statement that XHP is additional because the methodologies are different to analyze the least

cost option and Additionality. The least-cost analysis analyzes long-term energy demand and supply for the Gansu grid and compares economic costs and benefits of various options for supplying the much needed electricity. XHP Additionality is proved in three ways: 1) the investment analysis proves XHP's FIRR is less than the benchmark FIRR widely used by the Chinese power project developers in evaluating hydro projects; 2) approval of XHP as a carbon fund project is a condition for approval of the ADB loan and provision of guarantee for this loan by Gansu Finance Bureau; and 3) the sponsor faced significant barriers to start and construct this project.

IRN Comment-2:

The arguments in the Xiaogushan PDD as to why the project should be considered additional are completely at odds with the information in the ADB's November 2003 "Report and Recommendations of the President" (RRP: PRC 34476) for this project. The RRP is the document upon which the ADB's Executive Board bases its decision to support a project. The 2005 World Bank PDD - written two years after project construction began - stresses the barriers to XHP being developed without CERs. Yet the 2003 ADB RRP stresses that XHP is the least-cost alternative for generation expansion in Gansu and a priority for the state and provincial governments. There are numerous inconsistencies between the ADB RRP and the World Bank PDD. Both these documents cannot be factually accurate. Given that the project has almost been completed without CER revenue, it is safe to assume that it is the PDD which is being economical with the truth.

JCI CDM Center Validation Team's Response:

The World Bank accepted the PIN on Sept 11, 2003 to start the CDM preparation process, before the project started construction in October 2003, and before the ADB approved the loan in November 2003. The confirmed support from the World Bank to purchase emission reductions from this project was very important for the project sponsor, financiers, and regulators to start this project. The PIN acceptance, instead of PDD completion, should be the key indicator to prove that CDM revenue has been considered as an important factor in the decision to proceed with this project by all the relevant parties.

IRN Comment-3:

The PDD states that "Without CDM support, it would not have been able to reach financial closure, mitigate the high project risk, and commence the project constructions."

JCI CDM Center Validation Team's Response:

The Gansu Finance Bureau approved the ADB loan for XHP and the guarantee for this loan based on acceptance of the PIN by the World Bank. This was a critical step to bring the project financing to closure. In addition, the ADB report ("Report and Recommendations of the President" (RRP: PRC 34476) November, 2003) stated clearly that "...the project is a viable CDM candidate, and based on current prices being offered for emission reductions that are yet to be certified, potential revenues could meet about 10% of the total project cost." This clearly proves CDM impact on the project financing.

IRN Comment-4:

The RRP has a 2-page appendix on the potential benefits from the CDM. It states that an ADB fact-finding mission explained the CDM to the Chinese government and that "it was agreed to pursue tapping the CDM potential for XHC, and benefits could be channeled as seed resources to reduce poverty in the area." (emphasis added) No mention is made in the project financing plan or in any other place in the RRP of CDM benefits being in any way necessary for project construction to proceed.

JCI CDM Center Validation Team's Response:

Agreement on the project financing plan by various parties was dependent upon acceptance of the PIN by the World Bank. The steady cash flows in hard currency in the future were perceived critical in future debt service and mitigation of risks associated with uncertainties of power tariff, energy outputs and the exchange rate. Back in 2003, China's CDM regulations were not yet formulated. How the CDM revenue should be used was an internal matter for the Chinese government and the project company and were not determined until June 2004 when the Interim Measures for Operation and Management of Clean Development Mechanism Projects in China came into effect. The owners of the company (30% by the local government in this case) financed this project and can decide how to use the dividends in any manner they deem fit. Use of government revenues arising from dividend on government equity contribution and fiscal revenue from the future project operation (which would have funded the expected future cash flows from carbon credit) for poverty alleviation does not seem to be an inappropriate use and it is difficult to imagine that anyone would make the case that the government should be prohibited from using these revenues for poverty reduction.

IRN Comment-5:

The RRP states that "sensitivity analysis shows that the [Financial Internal Rate of Return] is robust under adverse conditions." It states that XHC is "aware of [project] risks and adequate steps are being taken to avoid or minimize them." No mention is made of CER revenue as one of these risk mitigation strategies.

JCI CDM Center Validation Team's Response:

The risk mitigation tools can be both preventive actions such as a secured Power Purchase Agreement (PPA) with the off-taker and financial instrument such as CDM revenue. They are not mutually exclusive. CER revenue is intended as a very important risk mitigation measure as shown by the fact that the Gansu Finance Bureau insisted that availability of CDM revenue be a condition for approval and provision of guarantee of the ADB loan for XHP.

IRN Comment-6:

The ADB's financial analysis is based on an electricity tariff of CNY0.26/kWh. The World Bank's PDD states that a lower tariff of CNY0.227/kWh is likely (although Table 4 says average hydro tariff in Gansu since 2004 ranges up to CNY0.24/kWh) and that at this tariff level, XHP "will not be able to make the investment viable." Yet this CNY0.227/kWh tariff level is consistent with the 10% reduction in tariff used in the ADB's sensitivity analysis – and the ADB concluded that with this lower tariff the project financial viability remained "robust". (The PDD text on the serious impact of the tariff reduction also appears to be inconsistent with the sensitivity analysis table given in the PDD).

JCI CDM Center Validation Team's Response:

As explained in the beginning of this note, ADB's conclusion on the financial viability of XHP is based on the FIRR in comparison with the company's theoretical WACC as the threshold FIRR, which was about 4.5%. The PDD evaluation of the financial viability is based on the threshold FIRR commonly accepted in the power industry in China in evaluating feasibility and financial viability of similar projects by investors, which is 8%. In the PDD of the World Bank, a tariff of CNY0.29/kWh as agreed in the PPA was used and the FIRR was projected at about 7.3%, which is already not attractive to investors in China. Recently, the GoC issued regulations on hydropower tariff in western China and a cap of CNY0.24/kWh for hydropower tariff was placed for Gansu Province. According to discussion between XHC and the off-taker, CNY0.227 is likely to be the tariff following the new regulation, and FIRR will be further away from the 8% threshold but still well above 4.5%.

IRN Comment-7:

In any case this lower tariff has only come into effect after project construction started so could not have been a factor in the decision to proceed with the project.

One further discrepancy between the World Bank and ADB is the date at which XHP can start full generation, and therefore full “production” of CDM credits. The ADB projected the project to come on-line in stages between August 2006 and February 2007. According to the RRP, XHP would generate only a quarter of its long-term average annual output in 2006. The PDD does not give a clear project time-line but implies that the project will come fully on-line in January 2006 as it claims for 2006 the full annual amount of CERs. If, as the PDD implies, the project is 14 months ahead of schedule this would represent a significant financial benefit for the project sponsors weakening the World Bank’s case as to how financially fragile the project is. Yet no mention is made in the PDD of this progress being made by the project. If however the project is not significantly ahead of schedule, this should reduce the CER revenue claimed for 2006 by 75%.

JCI CDM Center Validation Team’s Response:

ADB’s projection was valid based on its assessment of the situation back in 2003. The PIN was accepted and financial closure reached in 2003. The actual progress is ahead of schedule due to XHP’s round-the-clock construction in 2004 and 2005, which is extremely difficult given the project’s remoteness and no prior experience of the sponsor in managing a hydropower project of this size. The PDD contains information about the project schedule and progress when the document was prepared and will be updated with the latest information regarding the construction schedule and progress.

It cannot be anybody’s intention to penalize the sponsor’s achievement earned by hard work and claim that any resulting financial benefit makes it ineligible for the CDM. This hindsight-based judgment would literally rule out any CDM project coming into existence because one would face two possible situations:

1. The project turns out to be too successful so that it is not eligible, or
2. The project is very weak so that it fails because even CDM can not make a difference.

IRN Comment-7:

The PDD claims that “the XHP project was not common practice at the time that the project was prepared.” This is not credible. The PDD itself shows four other >50MW hydropower projects that entered construction in Gansu 1998-2002 and states that 2003 hydropower installed capacity in the province was 3281 MW. The ADB (RRP p.49) lists a further four hydros in the 157-300 MW range as “committed” for Gansu before 2009.

JCI CDM Center Validation Team’s Response:

XHP is not listed in the 10-year expansion plan of Gansu Power Grid, and is the first project of such a size developed by a county-level company given all the barriers. As the PDD explained, the sector environment has changed substantially after the implementation of market-oriented sector reform started in 2002. All the plants that started construction before 2002 were commissioned by state-owned companies with full cost recovery and a reasonable rate of return guaranteed. However, the power sector reform on-going in 2002-2003 would bring more competition and the rules for tariff determination by government authorities were not very clear at the time when XHP’s investment decision was made.

The four hydro plants listed in the RRP are from the candidate projects for Gansu power system expansion for 2002 to 2020, which does include XHP. However, there was no timeframe projected for commissioning of XHP due to uncertainties about this project, while other hydropower projects listed in the plan, bigger or smaller than XHP, have such an indicative timeframe. The candidate projects listed in the plan provide only guidance to potential

developers and are not “committed” projects. Investment in these projects is purely up to the decision of individual power project developer.

IRN Comment-8:

In conclusion, XHP is a non-additional project. The PCF’s attempts to show that CDM revenue is necessary for the project are disingenuous and thoroughly contradicted by the ADB’s project approval report.

JCI CDM Center Validation Team’s Response:

We believe XHP is eligible for CDM for the reasons explained above, and additionality of the project will be objectively established through the validation and the registration process.

5 VALIDATION OPINION

JCI CDM Center has performed a validation of the “Xiaogushan Hydropower Project in People’s Republic of China”, hereafter called “the project”. The validation was performed on the basis of the UNFCCC criteria for CDM project activities and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: 1) a desk review of the PDD and relevant documents, 2) follow-up interviews with project stakeholders and 3) the resolution of outstanding issues and the issuance of the final validation report and opinion.

The review of the PDD (Ver.01 and Ver.2) and the follow-up interviews have been conducted by JCI CDM Center with sufficient evidence to determine the fulfilment of stated criteria.

The project is expected to bring social, environmental and economic benefits and contribute to sustainable development of PRC which was confirmed by the official documents regarding sustainable development policy and plan of the host country.

The project correctly applies the ACM0002: “Consolidated baseline methodology for grid-connected electricity generation from renewable resources” in combination with the tool for the demonstration and assessment of additionality.

The project contributes the reduction of GHG emissions by generating renewable energy which will displace grid electricity. The emission reductions expected in this project are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project.

By generating renewable energy and avoiding operation of thermal power plant, the project will reduce the following amount of anthropogenic emissions of greenhouse gases (GHGs).

GHG emission reduction: Amount of **3,128,919** tons CO₂e / 10years is expected.

In the opinion of JCI CDM Center, the project, as described in the revised PDD (PDD-Ver.2) dated on February 10 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria, and correctly applies the approved consolidated methodology ACM0002.

JCI requests the registration of the “Xiaogushan Hydropower Project in People’s Republic of China” as CDM project activity.

6 REFERENCES

Category 1 Documents:

- /1/ Project Design Document, Ver. 1 (June 10, 2005)
- /2/ Project Design Document, Ver. 2 (February 10, 2006)
- /3/ Layout Drawings of XHP
- /4/ Environmental Management and Monitoring Plan (May 2004, Hangzhou)
- East China Investigation and Design Institute
- /5/ Letter of Approval/DNA PRC-NDRC (30/08/2005)

Category 2 Documents:

- /1/ Approved Consolidated Baseline Methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 05 of 03 February 2006
- /2/ Approved Consolidated Monitoring Methodology ACM0002: "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", Version 05 of 03 February 2006
- /3/ CDM-EB, "Tool for the demonstration and assessment of additionality", Version 2 of 28 November 2005.
- /4/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): Validation and Verification Manual

Persons interviewed:

- /1/ **National Development and Reform Commission (DNA of PRC):**
Ms. Sun Cuihua: Division Director
Mr. Wang Shu: Project Officer
- /2/ **Water Resource and Hydropower Investigation and Design Institute of Gansu Province**
Mr. Hou Zi Yuan
Mr. Wang Ying Ge
- /3/ **Zhangye City Environmental Protection Office**
Mr. Liu Xiao Yun
- /4/ **Gansu Power Grid Co., Ltd, Zhangye Branch**
Mr. Lei Jian Qing
- /5/ **Xiaogushan Hydropower Co. Ltd., XHC**
Mr. Lu Xue Yin: Vice Director
Mr. Xu Qing Nian: Vice General Manager (VGM)
Mr. Ding Jian Jun: VGM

Mr. Huo Ji Cai: VGM
Mr. Chen Dong Xin: VGM
Mr. He Jun Bi: Chief Engineer
Mr. She Jian Yi: Chief
Mr. Tan Ji Dong: Chief
Ms. Yin Cai feng
Mr. Daniel Pu Jin Cheng
Ms. A. T. LUONG: Expert-International Cooperation Department

/6/ **Consultant of XHC**
Dr. Zhou Sheng: Tsinghua University