

Validation Report

Report for:
EcoSecurities International Limited
and
Sichuan Huadian Xixi River Hydro-electricity
Development Co., Ltd

Validation of CDM project for
Sichuan Huadian Xixi River Hydro-electricity
Development Co., Ltd. Luogu Hydroelectric
Project

LRQA Reference	: A20053-B Version 1.3
Date	: 09/02/2012
Work carried out by	: Ketan S Deshmukh Stewart Niu Cuiping Li
Work verified by	: Xianxin Yan Michiaki Chiba

Contents

1	<i>Executive Summary</i>	3
2	<i>Introduction</i>	5
2.1	Objective	6
2.2	Scope.....	6
2.3	GHG Project Description	6
3	<i>Methodology</i>	7
3.1	Review of documents.....	7
3.2	Follow-up interviews	7
3.3	Resolution of clarification and corrective action requests	7
3.4	Internal quality control.....	8
4	<i>Validation protocol and conclusions</i>	8
4.1	Participation requirements	8
4.2	General description.....	10
4.3	Baseline methodology	12
4.4	Emission reductions	35
4.5	Monitoring methodology and monitoring plan.....	40
4.6	Duration of the project activity / crediting period	41
4.7	Environmental impacts	42
4.8	Stakeholders' comments	42
5	<i>Comments by parties, stakeholders and NGOs</i>	43
6	<i>Validation Opinion</i>	45
7	<i>Appendices</i>	46
7.1	Appendix A: Letter of approval for the project by the host and investing country DNA	46
7.2	Appendix B: List of documents reviewed	46
7.3	Appendix C: List of persons interviewed.....	49
7.4	Appendix D: How due account has been taken to the public input made to the validation requirements.....	50
7.5	Appendix E: Certificate of Appointment	51
7.6	Appendix F: Validation findings log	52

- ☒ No distribution without permission from the client or responsible organisational unit
☐ Limited distribution
☐ Unrestricted distribution

1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by EcoSecurities International Limited, representing the project participants (PP), to undertake validation of the proposed project activity "Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project". The validation has been performed through a process of document review based on the project design document, Version 1 dated 01/03/2010 initially submitted for validation and the subsequent revisions, follow-up interviews with the stakeholders, resolution of outstanding issues and issuance of the validation report.

The proposed Project is a grid-connected hydropower plant with a newly-built dam in Sichuan Province in People's Republic of China. Total installed capacity is 110 MW, consisting of two 55 MW turbine generator units. The predicted electricity supply of 455,962MWh per year will be sold to Central China Power Grid (hereafter referred to as CCPG). Electricity delivered by the project activity to the CCPG would have otherwise been generated in grid-connected fossil fuel based power plants resulting in Green House Gas (GHG) emissions in the absence of the project activity.

The fulfilment of the requirements as set forth in Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM (CDM M&P) and relevant decisions of the Conference of the Parties, serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) have been evaluated and conformance to the validation requirements were confirmed based on the given information. A risk based approach was taken to conduct the validation and corrective action requests (CARs) and clarifications (CLs) were raised for relevant actions by the PP.

The validation team has found through the validation process 9 CARs and 6 CLs. The PP has taken actions and submitted to LRQA overview of changes and other evidence. The validation team is of the opinion that the proposed project activity as described in the project design document Version 5 dated 06/07/2011 meets all the relevant UNFCCC requirements for the CDM, as well as the host country's national requirements and if implemented as designed, is likely to achieve the emission reductions and contribute to the sustainable development of the host country. LRQA therefore requests the registration of "Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project" to the CDM Executive Board as a CDM project activity.

Lloyd's Register Quality Assurance Ltd
Hiramford
Middlemarch Office Village
Siskin Drive
Coventry CV3 4FJ
United Kingdom

Registered office:
Lloyd's Register
71 Fenchurch Street
London EC3M 4BS
United Kingdom

Abbreviations

BE	Baseline emissions
CARs	Corrective action requests
CCPG	Central China Power Grid
CDM	Clean development mechanism
CDM-EB	Executive board of clean development mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CDM VVM	CDM Validation and Verification Manual
CERs	Certified emission reductions
CLs	Clarification requests
COP/MOP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
DNA	Designated national authority
DOE	Designated operational entity
EF	Emission factor
EIA	Environmental impacts assessment
ERPA	Emissions reduction purchase agreement
FAR	Forward action requests
GHG	Greenhouse gas
GSP	Global stakeholders' consultation process
HNA	Host Nation Approval
IPCC	Intergovernmental panel on climate change
IRR	Internal rate of return
KP	Kyoto Protocol of the United Nations Framework Convention on Climate Change
kW / kWh	Kilowatt / Kilowatt hour
LE	Leakage emissions
LoA	Letter of approval
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
MW / MWh	Mega watt / Mega watt hour
MoC	Modalities of Communication
NCV	Net calorific value
NDRC	National Development and Reform Commission
NGO	Non governmental organization
ODA	Official development aid
PDD	Project design document
PE	Project emissions
PP	Project participant
SDRC	Sichuan Provincial Development and Reform Commission
tCO ₂ e	Tonnes of carbon dioxide equivalent
UK	United Kingdom of Great Britain and Northern Ireland.
UNFCCC	United Nations Framework Convention on Climate Change

2 Introduction

The project participant (PP) represented by EcoSecurities International Limited has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake validation of the proposed project activity Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project. This report summarizes the findings of the validation process that has been conducted on the validation requirements of the CDM.

The validation has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Ketan S Deshmukh	LRQA Asia	Team leader, CDM lead validator
Stewart Niu	LRQA China	Team member, CDM lead validator, Sector expert
Cuiping Li	LRQA China	Team member, CDM lead validator, Sector expert
Xianxin Yan	LRQA China	Technical reviewer, Sector expert
Michiaki Chiba	LRQA Ltd.	Decision maker

Personnel being engaged in a CDM project validation are qualified based on the established procedures of LRQA to assure the resource requirements satisfy all the requirements of competence criteria in the CDM accreditation standard for operational entities. LRQA is designated as an operational entity and holds the full responsibility of decision-making regarding the validation, in accordance with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Validation is the process of an independent third party evaluation of a project activity on the basis of the PDD, against the requirements of the CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development. The validation follows the requirements of the current version of the CDM validation and verification manual (CDM VVM) to ensure the quality and consistency of the validation work and the report.

2.2 Scope

The scope of validation is an independent and objective review of the project design. Review of the PDD is conducted against the requirements of the Kyoto Protocol, the CDM M&P and relevant decisions of the COP/MOP and the CDM-EB. LRQA follows a risk-based approach in the validation focusing on the identification of significant risks for project implementation and generation of CERs. Validation is not meant to provide any consulting towards the PP, however, the corrective actions requests (CARs) and clarifications (CLs) might provide input for improvement of the project design. A validation conclusion shall become final subject to the decision maker's review by LRQA Ltd.

2.3 GHG Project Description

Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project (hereafter referred to as the Project) developed by Sichuan Huadian Xixi River Hydroelectricity Development Co., Ltd, is a grid-connected hydropower plant with an accumulation reservoir in Sichuan Province in People's Republic of China. The dam is built to accumulate water and divert some of the water from Xixi River into diversion channel. The water enters into the turbine through a high pressure pipeline. After power generation, the water is discharged into the Xixi River through a tailrace. Total installed capacity of the Project is 110 MW, consisting of two 55 MW turbine generator units. The predicted electricity supply of 455,962MWh per year will be sold to CCPG. The surface area of the reservoir is 4.497 km², and the power density of the Project is 24 W/m².

Electricity delivered by the project activity to the CCPG would have otherwise been generated in grid-connected fossil fuel based power plants resulting in Green House Gas (GHG) emissions in the absence of the project activity. The project activity therefore, by displacing relatively carbon intensive grid electricity (primary emission source with a Combined Margin Emission Factor of 0.85285 tCO₂e/MWh) with renewable hydroelectricity, reduces GHG emission that would have occurred in the baseline.

The estimated annual net electricity supply of 455,962MWh is used to calculate the emission reductions and the estimated GHG emission reductions are 388,867 tCO₂e per annum.

3 Methodology

3.1 Review of documents

The validation is performed primarily based on the review of the project design document (PDD) and the other supporting documentation.

The PDD Version 1 dated 01/03/2010 was initially reviewed. LRQA requested the PP to present supporting information and documents relating to the project design and such additional information and documents were also reviewed by LRQA.

Through the process of the validation, the PDD and the supporting documents of the same were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix B. LRQA reviewed the final version of the PDD Version 5 dated 06/07/2011 to confirm that all changes agreed had been incorporated.

3.2 Follow-up interviews

Follow-up interviews with the stakeholders and a field survey were conducted as detailed in the schedule as below:

30/06/2010	Sichuan Huadian Xixi River Hydro-electricity
~	Development Co., Ltd
02/07/2010	EcoSecurities International Limited
	Development and Reform Bureau of Zhaojue County
	Environment Protection Bureau of Zhaojue County
	Water Resource Bureau of Zhaojue County
	Migrant Resettlement Administrator of Zhaojue County
	Guqu Town Government
	Local residents

A full list of persons interviewed is shown in Appendix C.

3.3 Resolution of clarification and corrective action requests

LRQA applies the risk based approach aimed at focusing on high risk issues to the validation results whilst not omitting any part of the mandatory processes.

Findings identified in the process are indicated under the titles corrective action requests (CARs) and clarification requests (CLs) and forward action requests (FARs). CARs and CLs require the PP to take relevant actions. Criteria for judging items as CAR or CL are as follows:

Corrective action request (CAR):

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

Clarification request (CL):

- information is insufficient or not sufficiently clear to determine whether the applicable CDM requirements have been met.

FARs are to be raised to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to CDM requirements for registration.

CARs and CLs are to be resolved or closed out if the PP modifies the project design, rectifies the PDD or provides adequate additional explanations or evidence that satisfies the concerns. If this is not completed, the project activity cannot be recommended for registration to the CDM Executive Board.

3.4 Internal quality control

A technical review by a qualified person independent from the validation team and a review by an authorized decision maker were conducted prior to the submission of the validation report to the PP and prior to requesting the registration of the project activity.

4 Validation protocol and conclusions

This section provides an overview of the validation activities undertaken by LRQA in order to arrive at the final validation conclusions and opinion. It includes a general discussion of details captured by the validation protocol (which is based on the Clean Development Mechanism Validation and Verification Manual Version 01.2) and conclusions related to CDM requirements. Further details in relation to specific findings are provided in the Validation Findings Log.

The protocol is structured based on the main validation requirements as follows:

- participation requirements
- general description
- baseline methodology
- emission reductions
- monitoring methodology and monitoring plan
- duration of the project activity / crediting period
- environmental impacts
- stakeholders' comments.

4.1 Participation requirements

A CDM project shall be approved by the Parties involved.

The host Party of the proposed project is the People's Republic of China. China ratified the Kyoto Protocol on 30 August 2002. The Designated National Authority (DNA) is National Development and Reform Commission (NDRC). A letter of approval from the host country, reference number 1727 has been received. This letter of approval confirms the contribution of the project activity Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project to the sustainable development of China.

The Annex I Party is the United Kingdom of Great Britain and Northern Ireland. UK ratified the Kyoto Protocol on 31st May, 2002. The Environment Agency is the Designated National authority for the CDM. A letter of approval from the Annex I Party,

reference number EA/ESInt/01/2012 has been received.

The letter of approval of the Annex I Party contains the PDD version 5, dated 06 July 2011. Therefore the request for registration is made on the basis of the PDD version 5, dated 06 July 2011.

The letter of approval of the Annex I Party contains the draft Validation Report, number A20053-B Version 1.2, dated 06 July 2011. As per CDM VVM para. 50, the validation report was updated to Version 1.3, dated 09/02/2012 to reflect the receipt of the letter of approval. The validation team confirmed that this is the only change that has been made to the version referred to in the letter of approval.

The information of the DNAs has been confirmed by the validation team against the relevant information on the UNFCCC CDM website (<http://cdm.unfccc.int/DNA/index.html>).

The validation team reviewed the LoAs presented by the PP against the requirements in 'Clarification on elements of a written approval' and confirmed that the LoAs contain the elements requested by the CDM-EB, including:

- confirmation of the Party's ratification to the Kyoto Protocol
- voluntary participation
- the project activity's contribution to sustainable development of the country (host Party), and
- the precise title of the CDM project activity of the final PDD referenced.

The LoAs were noted as unconditional with respect of the above elements. The LoA was also compared with those of other approval cases issued by the DNA, as well as information made public by the host country DNA on its website. The team confirmed the authenticity of the letters issued.

CAR 01

While all Parties involved should have approved the project activity, the Letter of Approval from Annex I Party was not available.

The Letter of Approval from Annex I Party Ref No. EA/ESInt/01/2012 dated 19/01/2012 was made available by the PP and the validation team confirmed the content of the LoA is in line with Clarification on elements of a written approval (EB16, Annex 6) and the finding was therefore closed accordingly.

Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd is a public entity having its registered office in People's Republic of China.

EcoSecurities International Limited¹ is a private entity having its registered office in United Kingdom of Great Britain and Northern Ireland.

¹ The name of the participant from the Annex I Country indicated in the host country's LoA, EcoSecurities Group PLC, is different from the one stated in the PDD, EcoSecurities International Limited. Clarification was made by the PP referring to confirmation made between the Secretary of the CDM-EB and the chair of the Project Developer Forum regarding changes in Annex I Party different from HNA. The validation team confirmed that through the correspondences with the Project Developer Forum, the CDM-EB confirmed that the indication of the Annex I Party and Annex I country participant in the host country's LoA is not a requirement of CDM and it is a matter to be resolved by the host country DNA and the project developer. Based on the confirmation, the difference is not covered by the scope of validation.

The contact details of the PPs are correctly provided in Annex 1 of the PDD.

The Modalities of Communication (MoC) was signed on 26/02/2011 and submitted to LRQA as per the guidance adopted in the 45th meeting of the CDM-EB.

Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd is the project participant as indicated in the Letter of Approval and in Section A.3 of the PDD. Mr. Taicong, Long is the same person indicated as the representative of the entity in Annex 1 of the PDD. The contact details of the entity were compared with Annex 1 of the PDD and the correctness was confirmed by the validation team.

Mr. Patrick James Brown is the same person indicated as the representative of EcoSecurities International Limited in Annex 1 of the PDD. The contact details of the entity were compared with Annex 1 of the PDD and the correctness was confirmed by the validation team.

4.2 General description

Project design document

The PDD was checked and confirmed as complete against the:

Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM) referring to the Version 07 applicable to the validation.

A valid form of the CDM-PDD Version 03 is used that is the current form as available on the CDM website.

Project description

The project activity is a newly-built grid-connected hydropower plant with an accumulation reservoir located in Zhaojue County, Sichuan Province, P. R. China, and is populated with ethnic minorities having low income levels. Total installed capacity of the Project is 110 MW, consisting of two 55 MW turbine generator units. The average annual generation is expected as 466,200MWh based on the 44 years historical hydrological data. Considering the fact that the project has storage function with an accumulation reservoir, the effective generation factor of 1 (or 100%) was applied by the PDR designer, East China Investigation and Design Institute under China Hydropower Engineering Consulting Group Corporation. After deducting the self-consumption (rate of 0.2%) and line loss (rate of 2%), the annual power supplied to CCPG via local grid was estimated as 455,962MWh. These were presented in the Preliminary Design Report (PDR) and formally approved by Development and Reform Commission of Sichuan Province on 07/08/2006. Based on the output data, the power load factor of the project was calculated as 48.4% (466,200MWh/110MW/8760h), which is confirmed in accordance with the "Guidelines for the reporting and validation of plant load factors, version 01". The surface area of the reservoir is 4.497 km², and the power density of the Project is 24 W/m² (110MW/4.497km²).

The main components of the project include an intake structure, a water conveyance system and a powerhouse. The water intake structure is located on the upstream

portion of the Xixi River, and consists of a dam with one sluice gate, which directs part of the river flow into the water conveyance system. The type of dam is concrete gravity dam with a maximum 78m height and 222m length and is built to form an accumulation reservoir. The conveyance system comprises a diversion tunnel, a pressure adjustment well and high pressure pipelines. It forms a 328 m water head to take advantage of the natural height drop of the river, and carries the water to the powerhouse. The water enters, through high pressure pipelines, into the two set of turbine generator unit installed in the powerhouse. After power generation, the water is discharged into the Xixi River through a tailrace.

The size of hydro turbine and generator technology was produced by a leading domestic manufacturer, GE Hydro Equipment Asia Company Limited. The electricity produced is transferred to the grid system through 220kV transmission lines.

The GHG emission reductions will be achieved by replacement of electricity that would otherwise have been produced by thermal power plants connected with CCPG. The annual emission reductions of the project are estimated as 388,867 tCO₂e and total Emission Reductions over the first crediting period are estimated as 2,722,070 tCO₂e.

The Project is the second of five planned cascade hydro power plants in the Xixi River, and is developed by Sichuan Huadian Xixi River Hydroelectricity Development Co., Ltd. The project company was co-founded on 27/11/2003 by China Huadian Group (66%) and Xichang Electric Power Co. (34%). Of the five planned cascade plants, except Kuyi hydro (not planned to be developed in the near future because of bad development condition), other 4 cascade hydro power plants have all taken CDM into consideration supported by the signed ERPAs and the Chinese LoAs.

The accuracy and completeness of the project description in the PDD was validated by review of document including the PDR and its approval, the purchasing contract of turbine generator units, interview, and field survey.

Sustainable development

The host Party's DNA confirmed the contribution of the project activity to the sustainable development of the host Party by issuing the host Country LoA dated December 2008.

Public funding

According to the PDR approval issued by Sichuan Provincial Development and Reform Commission dated 07/08/2006, around 20% of the total investment is from the equity of the PP and 80% of them are from loan of commercial bank. By interviewing the top management and cross checking the actual loan contracts signed with China Development Bank, Construction Bank of China and Bank of China and the equity payment records, the validation team confirmed that the project activity uses no public fund.

CAR 02

The team identified that

- a) The type and lifetime of the hydro turbines and generators were not transparently stated in the Table A.4.2 of the PDD.
- b) The rated capacity of 56.7MW and rated flow of 18.8m³/s was witnessed in the nameplate of turbine which are slightly different from the ones in the PDD. The PP was required to correct them and justify with respect to costing and impacts on additionality.
- c) The plant load factor was not defined ex-ante in the CDM-PDD as per EB48 Annex 11.

In response to the finding, the PP revised the PDD and included the type and lifetime of the hydro turbines and generators, the correct turbine parameters and the plant load factor. The PP justified that the slight difference in the identified parameters was reasonable since the PDR only refers to a typical specification for estimation purpose that does not represent the actual specification to be hired by the project and no cost was reduced by the slight difference. The team confirmed the correct information was reported in the revised PDD. It was confirmed by reviewing the Budget Adjustment Report of Luogu that the actual expenditure on Mechanical Electronic Equipment was not reduced in comparison to the indicated costs in the PDR and the additionality was not altered. The slight changes of technical parameters in the actually purchased equipment from those assumed at the design stage presented in the PDR does not increase electricity generation since the change is only for turbine capacity and the rated capacity of the generator is not increased. The finding was therefore closed.

CAR 03

During the validation stage, the team identified that:

- a) The date of EIA approval by Environmental Protection Bureau of Sichuan Province was witnessed as 29/04/2006 that is different from the date of 02/03/2006 indicated in the PDD Version 1.
- b) The date of PDR approval by Development and Reform Commission of Sichuan Province was witnessed as 07/08/2006 that is different from the date of 08/06/2006 indicated in the PDD Version 1.
- c) The date of the Contract signed for turbine and generator units with GE Hydro Asia Co. Ltd. was witnessed as 01/09/2006 that is different from the date of 30/09/2006 indicated in the PDD Version 1.
- d) The date of stakeholder consultation was witnessed as 11/06/2007 in the notice of stakeholder consultation that is different from the date of 01/12/2007 as stated in the project development timeline and E.1 of the PDD Version 1.
- e) The footnote 8 was not relevant to the project.

In response to the finding, the PP corrected the PDD using the correct information. The validation team confirmed the correct dates of the EIA approval, FSR approval, contract of hydro turbine and generator units and the notice of stakeholders' consultation were stated in the revised PDD. In addition, the PP provided the correct and relevant link in the previous footnote 8 (it is updated as footnote 10 in the revised PDD) to demonstrate iron price increasing in recent years. Therefore, CAR 03 was closed.

4.3 Baseline methodology

Application of baseline and monitoring methodology

The project activity applied the approved baseline and monitoring methodologies ACM0002: "Consolidated methodology for grid-connected electricity generation from

renewable sources”, Version 12.1.0, in effect as of EB 58. The methodology is latest version as of the date of this report.

The methodology refers to “Tool to calculate the emission factor for an electricity system” and “Tool for the demonstration and assessment of additionality”

The methodology also refers to the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” but the project activity does not contain the respective project emission or leakage emission that is to be covered by the tool. It is confirmed by LRQA that the methodology and the related Tools used in the PDD is suitable and correct.

The project applicability was confirmed against each condition in the approved methodology selected by the following methods.

Conditions in ACM0002 Version 12.1.0	Justification in PDD	Validation Opinion
This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The project activity is a grid-connected renewable power generation project activity that installs a new accumulation reservoir hydro power plant at a site where no renewable power plant was operated prior to the implementation of the project activity.	The validation team reviewed the design and technical specification of the project activity, electricity connection diagram and the definition of the grid boundary issued by China DNA and confirmed that the statement in the PDD is correct. Therefore, it fulfils the requirement listed as left.
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The project activity is a grid-connected renewable power generation project activity that installs a new accumulation reservoir hydro power plant at a site where no renewable power plant was operated prior to the implementation of the project activity.	Through checking the PDR and its approval, implementing on-site inspection, the validation team confirmed that the project is the installation of a hydropower plant with a newly-built accumulation reservoir but not the capacity addition, retrofit or replacement of a power plant. Thus it fulfils the requirement listed as left.
In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2: on page 10 to calculate the parameter	The project activity is not a retrofit, replacement or capacity addition to an existing hydro power plant.	Through on site inspection, the validation team witnessed the project is the installation of a hydropower plant with a

EG_{PJ,y}): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;		newly-built accumulation reservoir (greenfield plant) but not the capacity addition, retrofit or replacement of a power plant. Therefore this requirement is not applicable to the project activity.
• In case of hydro power plants, one of the following conditions must apply: - o The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or - o The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; or - o The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².	The project activity results in a new accumulation reservoir, and the power density of the power plant (24 W/m²) is greater than 4 W/m².	According to PDR and the additional clarification on parameter in PDR issued by the PDR designer, the project activity resulted in a new reservoir and the power density of the power plant, as per the definitions given in the project emission section of the applied methodology, is 24W/m². Therefore, the statement in the PDD is deemed correct and fulfils the requirement listed left.
• The methodology is not applicable to the following: - o Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; - o Biomass fired power plants; - o Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m².	The project activity neither involves any switching from fossil fuels to renewable energy at the site of the project activity nor it is a biomass fired plant.	As a green field hydropower plant, the project doesn't involve switching from fossil fuels to renewable energy sources at the site of the project activity and surely is not a biomass fired plant. The power density of the project was confirmed as 24 W/m², which is greater than the threshold of 4 W/m². Thus the statement in the PDD is correct and it fulfils the requirement as left.

The validation team assessed each statement, crosschecked with the supporting information and interviewed the PP. The applicability conditions of the methodology are satisfied by the proposed project activity. During the validation, the team confirmed there is no greenhouse gas emission source within the project boundary as a result of the implementation of the proposed CDM project activity which is expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology.

CL 05

Since the project uses the previously approved methodology ACM0002 Version 11 in the PDD used for GSP which is valid for requesting registration until 17 May 2011 23:59 GMT, the PP was required to confirm whether it applies the updated version of the methodology considering the time required to obtain the LoA from Annex I Party and for submission of request for registration. In response to the finding, the PP revised the PDD to apply the latest version of the methodology ACM0002 Version 12.1.0. The team reviewed the elements affected by the application of the updated version of the methodology and confirmed the appropriateness in the revised PDD. The team therefore accepted the revision and closed the finding.

Project boundary

In compliance with the applied methodology ACM0002 (version 12.1.0), the spatial extent of the project boundary includes the Project power plant and all power plants physically connected to the CCPG to which the Project is connected to. The flow diagram of the project boundary, physically delineating the project activity as per the descriptions in section A.4.3 was presented in the PDD, that includes all the equipments, systems and flows of mass and energy, the emissions sources and gases included in the project boundary and the monitoring variables.

The project boundary has been validated through documentation review on the PDR, EIA report and field survey that included physical site of the dam and power house and the relevant equipments. This information was substantiated via cross check with the local government during the interview. Through the processes taken, the validation team confirmed that the identified project boundary, selected sources and gases were justified for the project activity and meet the requirements of the approved methodology.

Baseline scenario

The validation team assessed the requirements taking the steps below.

In the applied methodology ACM0002 (Version 12.1.0), it stated that if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the project activity would be otherwise been generated by the operation of grid-connected power plants and by the addition of new generation source , as reflected in the combined margin(CM) calculations described in the Tool to calculate the emission factor for an electricity system.

The validation team confirmed that the project is the installation of a new grid-connected hydro power plant with an accumulation reservoir based on the PDR and on site inspection. Therefore, it is deemed appropriate that the baseline scenario of the project was identified as above. The validation team has checked the PDD and confirmed that the baseline scenario identified in the PDD is in accordance with the requirements of the approved methodology.

Additionality

The project additionality was demonstrated by the PP using the Tool for the demonstration and assessment of additionality Version 05.2.

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

The following two alternatives to the Project activity are considered here in detail:

Alternative 1: The proposed Project activity undertaken without being registered as a CDM project activity, i.e. the construction of a new hydroelectricity generation plant with an installed capacity of 110 MW, connected to the local grid, and implemented without considering CDM revenues.

Alternative 2: Continuation of the current situation, i.e. electricity will continue to be generated by the existing generation mix operating in the grid.

As clearly stated in paragraph (4) of Tool for the demonstration and assessment of additionality Version 05.2, project activities that apply the tool in context of approved consolidated methodology ACM0002 only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity. Therefore, the validation team confirmed the identified alternatives are acceptable.

The proposed project is a renewable project and is a kind of project that the host country China has been promoting. The amount of electricity is supplied from CCPG if no such power plant would have been built. Therefore, it was confirmed that the alternatives are consistent with mandatory laws and regulations.

Investment analysis

Investment analysis is used for demonstration of the additionality. Benchmark analysis is selected out of the options for the analysis method as the project activity will produce economic return by electricity sales other than the CDM related revenue and the project owner has no other investment option to compare with. The project IRR was identified as the financial indicator.

As a large hydro power project, the project activity could be developed by another entity than the project participant and a benchmark should be based on a publicly

available data source. The identified benchmark is 8%, as indicated in the Interim rules on Economic Assessment of Electric Engineering Retrofit Projects published by the Operation Department of Power Generation and Power Transmission, the State Power Corporation of China on 10 September 2002. The sector benchmark IRR was determined in considering risk premiums on the basis of long term commercial loan. The rules are still effective for assessment of power project investment in China as of the time of the validation and were valid when the investment decision was made for implementation of the project activity in 2006. The PDR of this project also referred to the rules and followed the indicated standard financial IRR of 8% on the total investment and 10% on the equity. The investment analysis is on the total investment basis and benchmark of 8% is applicable for this project as the benchmark. The benchmark of 8% was witnessed widely used by the project owner in previous investment experience, such as registered project of 823, 1592, 1992, 2413 and 2887. The validation team therefore confirmed the suitability of the benchmark applied by the project.

In paragraph 54 of the 38th meeting and CDM VVM Version 01.2, para 113, the CDM-EB clarified that in cases where PPs rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, DOEs are required to ensure that:

- The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed.
- The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values.
- On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.

For implementation of the project activity in China, completion of feasibility study report (FSR) or Preliminary Design Report (PDR) to demonstrate project's viability and its approval by the Government are pre-requisite.

The PDR of the project was completed in November 2005 by East China Investigation and Design Institute under China Hydropower Engineering Consulting Group Corporation, with A class engineering design certification, and the PDR was approved by Development and Reform Commission of Sichuan Province on 07/08/2006. The investment decision for the project activity was made at board meeting on 20/06/2006, after considering of CDM revenue. The real action for implementation of the project activity was started from 07/07/2006, on which the construction contract of the dam and structure installation was signed between the project owner and the 3rd Engineering Bureau of Sinohydro Corporation. The validation team confirmed that it is unlikely in the context of the underlying project activity that the input values would have materially changed during the short time gap between the PDR completion and the investment decision.

The values used in the PDD and associated annexes were confirmed consistent with the PDR by the validation team via checking these data against the PDR.

For confirming the validity and suitability of the input values from the PDR at the time of the investment decision, the validation team cross checked these data by the sources other than the PDR as shown in the bellow table.

Name	Value	Source	Method of crosscheck
Installed capacity (MW)	110	PDR 14-4	Confirmed from the PDR. The installed capacity can be crosschecked from PDR approval, EIA approval, the bank loan contracts and Power Purchase Agreement. The actual installed capacity was witnessed as 110MW (2*55MW) during site inspection. Therefore, the data is deemed accurate.
Designed theoretical electricity generation (MWh/year)	466,200	PDR 14-4	Confirmed from the PDR. The designed theoretical electricity generation (average annual generation) is expected as 466,200MWh based on the 44 years' historical hydrological data. The data was presented in the Preliminary Design Report (PDR) and formally approved by Development and Reform Commission of Sichuan Province on 07/08/2006. Based on the output data, the power load factor of the project was calculated as 48.4% (466,200MWh/110MW/8760h), which is confirmed in accordance with the "Guidelines for the reporting and validation of plant load factors, version 01". The expected power supplied to the grid = the estimated annual generation × effective generation factor × (1- self-consumption rate) × (1- transmission loss rate) According to the PDR, the effective generation factor, the self-consumption rate and transmission loss rate is 1 (or 100%), 0.2% and 2% respectively. Therefore, the annual power supplied to the grid is estimated as 455,962MWh. 1. Effective generation factor As clarified by the PDR designer, East China Investigation and Design Institute under China Hydropower Engineering Consulting Group Corporation, through formal document letter dated 09/09/2010,

			considering the fact that the project has storage function with an accumulation reservoir, the regulation capacity is around annual regulation and the water discharge is expected quite small and the effective generation factor of 1 (or 100%) was applied. Based on the fact that water can be stored in the reservoir when the generation can not be fully accepted by the grid during the low load demand time, the effective power factor is confirmed as reasonable. 2. Self consumption rate The self consumption rate of the project was designed as 0.2%. The validation team, by cross-checking the statistic from the site management, the normal load of the frequently used equipments was confirmed as around 190.1KW, which is 0.17% of the total installed generation capacity. The total load of the site equipments was confirmed as 473.1KW, which is 0.43% of the total installed generation capacity. Hence, the rate used to estimate the self power consumption is deemed suitable in the designing stage. 3. Line loss rate Line loss rate of the project was assumed as 2% at the design stage. According to the clarification from the PDR designer dated 19/04/2011, the line loss rate of 2% was based on the estimated transmission distance of 33 km and general design approach considering some redundancy. The PP uses the designed theoretical electricity generation of 466,200 MWh in calculating IRR of the project at a conservative approach in terms of justifying addtionality. In the mean time, the PP has applied the expected power supplied to the grid of 455,962MWh ($466,200 \times 100 \% \times (1 - 0.2\%) \times (1 - 2\%)$) to estimate the emission reduction of the project for avoiding any emission reduction overestimation. The validation assessed the reported data and confirmed the appropriateness of the treatment.
Total investment	1,332,250,000	PDR 14-9	Confirmed from the PDR.

(Yuan)			The total investment reported in the PDD was total dynamic investment which is same as checked from the PDR approval. The total dynamic investment was composed of the fixed asset investment (1,239,480,000 Yuan), the interest during construction period (91,670,000 Yuan) and the initial current funds (1,100,000 Yuan), Through comparison to the similar technology projects (as shown in below comparison table), the team identified that the investment cost per installed capacity (Yuan/kW) of the project, 12,111.36 Yuan/kW, is about 40% higher than the average level of the other similar technology projects compared. The team further checked the PDR and the clarification on high unit cost by the PDR designer dated 09/09/2010, and confirmed that the high unit capacity cost was caused by 1) huge construction engineering, such as an accumulative reservoir with capacity of 37,300,000m³ and a diversion tunnel as long as 15.925 km from the dam site to the powerhouse. 2) the large amount of investment in land acquisition and related compensation. Amount of 2,206 local residents need to be resettled. 3) geological disaster prevention engineering and, 4) the longer access road construction. The proposed project activity lies in far remote mountain area that involves distant road building as part of access to the site. With reduction of the investment cost by 40%, the project's IRR will cross the benchmark. The team implemented further check against all the actually happened investment cost to confirm the possibility of decreasing of the investment cost, As crosschecked from the financial audit report 2009 of the PP conducted by BDO China Li Xin Da Hua Certified Public Accountants Co., Ltd., till end of 2009, the fixed asset of the project was already 1,817,510,049.91Yuan which is much higher than the estimated investment in the PDR. The validation team reviewed the Budget Investment Adjustment Report of the project composed by the PDR designer in June 2010 and found that the actual total static investment of the project was 1,992,320,400 Yuan
--------	--	--	--

			and the total dynamic investment was 2,096,742,900 which was increased by 764,491,900 Yuan from the originally estimated total dynamic investment. 38.42% of the investment increment was caused by national policy change, 44.48% of them was caused by the allocated cost for transportation facilities, power dispatching facilities and the power imported facilities for construction, 9.08% of them was caused by the increased material price and 13.12% of them was caused by the geological reason and increased construction engineering. Considering the investment increment happened during the actual construction period, the investment cost in the PDR was not overestimated and therefore deemed suitable in the decision making stage and conservative in calculation of IRR for additionality justification.									
Total annual operating costs (Yuan)	34,499,399	PDR 14-6 and 14-7	Confirmed from the PDR. The data can be reproduced based on the input values stated in the PDR as presented in the bellow table. <table><tr><th>Operation cost</th><th>Employed data</th><th>Data source</th></tr><tr><td>Repair cost (%)</td><td>1.5% of fixed asset investment</td><td>PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]</td></tr><tr><td>Salary&welfare (Yuan/year)</td><td>3,474,900</td><td>PDR 14-6 81*30,000Yuan/year *(1+43%) Welfare takes 43% of the salary. The number of planned employee is below the suggested number of employees of Hydropower Project Financial Evaluation Interim Provisions [1994]. The actual number of employees till 26/05/2011 is</td></tr></table>	Operation cost	Employed data	Data source	Repair cost (%)	1.5% of fixed asset investment	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]	Salary&welfare (Yuan/year)	3,474,900	PDR 14-6 81*30,000Yuan/year *(1+43%) Welfare takes 43% of the salary. The number of planned employee is below the suggested number of employees of Hydropower Project Financial Evaluation Interim Provisions [1994]. The actual number of employees till 26/05/2011 is
Operation cost	Employed data	Data source										
Repair cost (%)	1.5% of fixed asset investment	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]										
Salary&welfare (Yuan/year)	3,474,900	PDR 14-6 81*30,000Yuan/year *(1+43%) Welfare takes 43% of the salary. The number of planned employee is below the suggested number of employees of Hydropower Project Financial Evaluation Interim Provisions [1994]. The actual number of employees till 26/05/2011 is										

						reported as 85 by the PP which is higher than the estimated one. Therefore, the planned number of employees is not over estimated. The proof dated 10/01/2011 from the PP showed that the average annual salary of the company is more than 60,000Yuan/year/person. The input data is not overestimated.
				Material cost (Yuan/kW)	5.0	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]
				Reservoir maintenance fee (Yuan/kWh)	0.001	PDR 14-6 In line with The notice on medium-sized reservoir Fund (Cai_Zong[2007]26)
				Water resource fee (Yuan/kWh)	0.005	PDR 14-7 In line with The Notice on Adjustment of Water Fee in Sichuan Province (Chuan_Ban_Han[2005]110)
				Other cost (Yuan/kW)	24.0	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]

			<table><tr><td>Sustainable fee for resettlement(Yuan)</td><td>1,323,600</td><td>PDR 14-7 600 Yuan/person/year ×2206 person In line with The implementing the policy of reservoir resettlement in Sichuan Province (Chuan_Fu_Fa [2006] 24)</td></tr><tr><td>Insurance (%)</td><td>0.25% of fixed asset investment</td><td>PDR 14-7 Within the range of normal insurance rate for engineering project in China.</td></tr><tr><td>Operation cost of transmission line (Yuan)</td><td>2.4% of transmission line investment</td><td>PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]</td></tr></table>	Sustainable fee for resettlement(Yuan)	1,323,600	PDR 14-7 600 Yuan/person/year ×2206 person In line with The implementing the policy of reservoir resettlement in Sichuan Province (Chuan_Fu_Fa [2006] 24)	Insurance (%)	0.25% of fixed asset investment	PDR 14-7 Within the range of normal insurance rate for engineering project in China.	Operation cost of transmission line (Yuan)	2.4% of transmission line investment	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]
Sustainable fee for resettlement(Yuan)	1,323,600	PDR 14-7 600 Yuan/person/year ×2206 person In line with The implementing the policy of reservoir resettlement in Sichuan Province (Chuan_Fu_Fa [2006] 24)										
Insurance (%)	0.25% of fixed asset investment	PDR 14-7 Within the range of normal insurance rate for engineering project in China.										
Operation cost of transmission line (Yuan)	2.4% of transmission line investment	PDR 14-6 In line with Hydropower Project Financial Evaluation Interim Provisions[1994]										
			As compared to the similar technology projects which were registered with installed capacity above 50MW in Sichuan Province, the unit cost of the project, 0.076 Yuan/kWh, is higher than the largest of the data of all similar technology projects, 0.057 Yuan/kWh (project 2590). Upon analysing the composition of the O&M cost, the team noted that the high O&M cost was mainly caused by the repair cost which accounts for 57.88% of total O&M cost when applying the data rate of 1.5% of fixed asset investment. The team confirmed that the rate is in line with Hydropower Project Financial Evaluation Interim Provisions [1994] and even if assuming the repair cost as zero, the IRR of the project would only be 6.07% which would not alter the conclusion of unattractiveness of the project. Therefore, the input value is deemed appropriate.									
Income tax (%)	33	PDR 14-8,	Confirmed from the PDR. The income tax rate was available throughout the Country during the decision making stage in 2006.									

			http://www.fdi.gov.cn/pub/FDI/zcfg/ss/qysds/ybxgd/t20060619_48515.jsp . It is also confirmed that the income tax rate was updated as 25% since 01/01/2008 (http://www.gov.cn/ziliao/flfg/2007-03/19/content_554243.htm). If applying the rate of 25% in the project, the IRR will only be 5% which still much lower than the benchmark IRR and therefore the additionality of the project will not be altered.
City Maintenance and Construction Tax (%)	5%	PDR 14-8	Confirmed from the PDR. Meet the national regulation on City Maintenance and Construction Tax (http://www.53tax.gov.cn/showNews.jsp?info_id=1985)
Educational Surcharge Tax (%)	3%	PDR 14-8	Confirmed from the PDR. Meet the national regulation on Educational Surcharge Tax (http://www.53tax.gov.cn/showNews.jsp?info_id=767)
Electricity tariff, including VAT (Yuan/MWh)	318	PDR 14-7	Confirmed from the PDR. The validation team, by checking the tariff regulation with document number of ChuanJiaDianFa [2009] No.59 dated 19/11/2009, confirmed that the tariff of the project was 318Yuan/MWh (including VAT). The approved electricity tariff of the project was 30 Yuan/MWh higher than the highest tariff of 288 Yuan/MWh for large hydro with reservoir in Sichuan province as referred from Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the people's republic of china. The validation team, through checking the application for tariff of the project to the Sichuan Price Bureau, noted that the higher tariff of 540.53RMB/MWh was requested owing to the worse development conditions of the project. Considering the high investment nature of the project, and also in order to balancing the benefit of the Grid company, the tariff of 318RMB/MWh was issued by the Sichuan Price Bureau with document number of ChuanJiaDianFa [2009] No.59 dated 19/11/2009. The approved tariff to the project can be openly checked from below

			weblink: (http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=3574)
VAT (%)	17	PDR 14-8	Confirmed from the PDR. Cross-checked via China taxation regulation (http://www.gov.cn/banshi/2005-08/19/content_24733.htm)

Similar technology projects comparison

(For the purpose of cross check the input values of the project, the registered hydropower CDM projects located in Sichuan Province with the installed capacity above 50MW are identified as the similar technology projects in the validation report. Since 1) the input values in the registered PDD and IRR spreadsheet are the valid and accepted data and can be considered as the reasonable for project comparison; 2) In china, the hydropower projects with the installed capacity above 50MW are large scale hydropower projects and have the similar investment and regulatory environment; 3) The geography boundary is limited to provincial level since the investment environment, such as industrial development, technology development, availability of engineers and technical workers, availability of transportation are different between each province.)

Ref. No	Installed capacity (MW)	Annual Electricity generation (MWh)	Annual operation hours (h)	PL F	Total Investment (million yuan)	Investment cost per capacity (Yuan/kW)	Investment cost per kWh (Yuan/kWh)	Operational period	Bus-bar tariff (with VAT, Yuan/kWh)	VAT tax	Income Tax Rate	Urban Maintenance and construction Tax	Educational Sur tax	Annual Operating Cost (million Yuan)	O&M /KW (Yuan/kW)	O&M/KWh (Yuan/kWh)
The project	110	466,200	4238	48%	1,332.25	12,111.36	2.92	30	0.318	17%	33%	5%	3%	34.499	0.314	0.076
2162	80	329,600	4120	47%	454.54	5,682	1.40	29	0.218	17%	25%	5%	3%	17.32	0.217	0.053
1987	76	380,228	5003	57%	570.46	7,506	1.71	27	0.238	17%	33%	5%	3%	13.211	0.174	0.040
962	75	323,250	4310	49%	409	5,453	1.30	47	0.215	17%	33%	5%	3%	13.76	0.183	0.044

952	72	288,720	4010	46 %	476	6,611	1.69	47	0.242	17%	15%	5%	3%	12.52	0.174	0.044
1432	52.5	307,350	5854	67 %	309	5,886	1.21	20	0.200	17%	33%	5%	3%	6.66	0.127	0.026
2105	55	242,440	4408	50 %	342.1	6,220	1.60	27	0.210	17%	33%	5%	3%	9.03	0.164	0.042
1996	96	360,096	3751	43 %	573	5,969	1.59	20	0.200	17%	33%	5%	3%	13.61	0.142	0.038
2197	56	178,360	3185	36 %	432.04	7,715	2.51	26	0.288	17%	33%	5%	3%	8.18	0.146	0.048
2206	162	665,820	4110	47 %	928.84	5,734	1.42	29	0.220	17%	25%	5%	3%	32.68	0.202	0.050
2155	81	351,540	4340	50 %	624.07	7,705	1.98	30	0.270	17%	33%	5%	3%	13.32	0.164	0.042
2107	120	531,000	4425	51 %	866	7,217	1.66	30	0.240	17%	33%	5%	3%	21.664	0.181	0.041
2539	150	710,250	4735	54 %	1388.72	9,258	2.32	26	0.314	17%	33%	7%	3%	24.82	0.165	0.042
2590	52	249,600	4800	55 %	511.38	9,834	2.43	26	0.358*	17%	33%	5%	3%	12.046	0.232	0.057
2880	228	941,640	4130	47 %	1320.46	5,791	1.42	29.5	0.218	17%	33%	5%	3%	45.13	0.198	0.049
2009	102	505,920	4960	57 %	741.679	7,271	1.80	30	0.269	17%	15%	5%	3%	18.867	0.185	0.046
1943	60	242,160	4238	46 %	289.68	4,828	1.20	30	0.201	17%	33%	5%	3%	8.16	0.136	0.034
2702	120	531,000	4238	51 %	1157.01	9,642	2.19	30	0.288	17%	33%	5%	3%	22.986	0.192	0.044

2850	240	1,251,100	5213	60%	1866.146	7,776	1.60	30	0.262	17%	33%	5%	3%	33.917	0.141	0.029
2858	72	255,700	3551	41%	679.0363	9,431	2.66	30	0.288	17%	33%	5%	3%	13.83	0.192	0.054
3030	150	605,250	4238	46%	1330.96	8,873	2.20	30	0.288	17%	33%	5%	3%	25.29	0.169	0.042
2037	54	247,644	4238	52%	398.14	7,373	1.81	22	0.252	17%	33%	5%	3%	7.4	0.137	0.034
3041	87	380,016	4368	50%	985.96	11,333	2.95	30	0.386**	17%	33%	5%	3%	17.31	0.199	0.052
Average			4,127	47%		7,414	1.85								0.174	0.043
*The higher tariff of 0.358Yuan/kWh (including VAT) in project 2590 was the tariff estimated in PDR, but not received tariff. In the registered PDD, it confirmed that the local electricity tariff for hydropower plants was 0.246 Yuan/kWh (without VAT); ** The higher tariff of 0.386Yuan/kWh (including VAT) in project 3041 was the tariff estimated in PDR, but not received tariff. In the registered PDD, it confirmed that the local electricity tariff for hydropower plants was 0.246 Yuan/kWh (without VAT);																

The IRR of the project was calculated as 4.72% (without the support of CDM revenue) in the PDR and the PDD Version 1. During the validation process, it was found that the calculation of the project IRR did not consider the issues raised in CAR 04, b), c) and d) in compliance with the *Guidelines on the Assessment of Investment Analysis* Version 03.1. The PP updated the IRR spreadsheet in replying to the finding and employed the designed theoretical electricity generation to estimate cash-in flow on a conservative approach. The project IRR was reported in the final version of PDD as shown in the below table.

	Project IRR
Without income from CERs	4.87%
With income from CERs	8.40%

The validation team assessed the calculation in the IRR spreadsheet and the supporting evidence and confirmed suitability of the IRR.

Given that the IRR of the project activity without CDM is much less than the benchmark of 8%, it is unlikely that an investor would have considered going ahead with the project activity without the benefits of CDM.

Sensitivity analysis

The PP conducted the sensitivity analysis based on the main factors to affect the result of IRR analysis that are 1) Operating costs, 2) Investment costs, 3) Electricity tariff and 4) Annual power supplied to the grid. These indicators are the variables that constitute more than 20% of either total project costs or total project revenues. The values presented in the PDD with respect of the sensitivity analysis could be reproduced and therefore stands validated. The sensitivity analysis shows that the range of variation of each factor when the IRR for the project reaches the 8% benchmark. The results of the sensitivity analysis were presented in the below table.

	% Variation of the parameter required to reach the 8% benchmark
Operating costs	-171.5%
Investment costs	-39.6%
Electricity tariff	+47.3%
Annual power supplied to the grid	+65.3%

Operating costs:

With the continuous development of China's economy, the increasing cost of labour and raw material in China is a disputable fact. However, the IRR of the project would be 6.9% if the Operation costs were down to zero. Therefore, It is unlikely that the benchmark IRR would be reached when the operating costs is reduced significantly.

Investment costs:

With the continuous development of China's economy, the inflation was common year by year, the prices of materials, such as iron and cement, have been witnessed

increased in recent years via checking public available information as provided in the PDD.

According to the Budget Investment Adjustment Report of the project composed by the PDR designer in June 2010, the actual total static investment of the project was 1,992,320,400 Yuan and the total dynamic investment was 2,096,742,900 which were increased by 764,491,900 Yuan from the originally estimated total dynamic investment. 38.42% of the investment increment was caused by national policy change, 44.48% of them was caused by the allocated cost for transportation facilities, power dispatching facilities and the power imported facilities for construction, 9.08% of them was caused by the increased material price and 13.12% of them was caused by the geological reason and increased construction engineering.

Considering the investment increment happened during the actual construction period, the decreasing of investment will not be likely occurred.

Electricity tariff:

The electricity tariff used in the financial analysis was checked consistent with the PDR. The Project supplies electricity to Sichuan Provincial Power Grid Company via Xichang City Power Grid, and the electricity tariff assumed in the PDR was 318Yuan/MWh which is same with the approved tariff for the project by Sichuan provincial Pricing Bureau in the tariff document number of ChuanJiaDianFa [2009] No.59.

Since the tariff is a key data for the electricity consumers (for both household and industry), the electricity producers and the grid companies, the tariff is normally approved by government price management agency. Even though no clear indication for how to determine a tariff, the government would normally consider the acceptability of the power station based on its construction condition and the acceptability of the connected grid. By reviewing the series of tariff policies in Sichuan Province, such as regulations (ChuanJiaFa (2005) No. 123² and ChuanJiaFa (2006) No.145³ and ChuanJiaDianFa [2009] No.59⁴, the benchmark electricity tariff of 288Yuan/MWh for hydropower plants regulated by Sichuan Provincial Pricing Bureau has not found changed over the past 5 years. The validation team, through checking the application for tariff of the project to the Sichuan Price Bureau, noted that the higher tariff of 540.53RMB/MWh was requested owing to the worse development conditions of the project. Considering the high investment nature of the project, and also in order to balance the benefit of the Grid company, the tariff of 318RMB/MWh was issued by the Sichuan Price Bureau with document number of ChuanJiaDianFa [2009] No.59 dated 19/11/2009. The tariff of 318 Yuan/MWh in the project is already 10% higher than the policy tariff.

From publicly available information, with the market-oriented reform in power sector, the competition mechanism will not lead to significant rises in the electricity tariff. Given the electricity pricing structure in China and in Sichuan Province, estimating a 47.3%

² <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=3238>

³ <http://www.scpi.gov.cn/zcfg/zcfg-content.asp?id=1972>

⁴ <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=3574>

increase in electricity tariff was highly unrealistic for the Project developer at the time of the investment decision and as such, the IRR is not likely to reach the 8% benchmark.

Annual power supplied to the grid:

The expected annual power supplied to the grid by the Project indicated in the PDR is calculated based on 44 years' of historical hydrological data and therefore the long term average annual power supply is unlikely to be significantly different to the value used in the financial analysis. Especially, a 65.3% increasing of annual power supply to the grid on the long term average basis is not reasonable and the IRR is therefore unlikely to reach the 8% benchmark.

The validation team therefore concluded the additionality of the project is robust. Given the Project is not financially attractive, the project activity would not have been implemented without the CDM.

CAR 04

During the validation stage, the team identified that:

- a) The data source of all the main input values were not transparently shown in the sheet of inputs of IRR spread sheet;
- b) The welfare rate should have been 43% (=14%+17%+12%), but not 51%, according to PDR, page 14-6;
- c) The Recovery of initial current funds and Recovery of residual value should have been recovered in the 34th year;
- d) The 100% of depreciation should have been used as loan repayment according to the PDR, 14-8, but not 90% of them shown in the sheet of Loan Repayment of IRR spread sheet;
- e) Assumptions and input data for the investment analysis should be presented in Sub-step 2c, but not in Sub-step 2d.

In response to the finding, the PP revised the IRR calculation spreadsheet and the PDD. The validation agreed to close the findings since:

- a) The data sources were correctly and transparently shown in the IRR calculation spreadsheet;
- b) The welfare rate of 43% was adopted in the revised IRR spreadsheet which is in line with the PDR;
- c) The recovery of initial current funds and the recovery of residual value were recovered in the 34th year in the revised IRR spreadsheet;
- d) The 100% of depreciation was used as loan repayment in the revised IRR spreadsheet;
- e) The Table B.5.3 Main parameters used in the investment analysis was presented in Sub-step 2c of the revised PDD.

CL 01

The team identified that PDD Version 1 mentioned the predicted average electricity supply to the grid of 455,962 MWh per annum since the start of the crediting period. PP was required to clarify the quantum of electricity that is generated and the various losses such as self-consumption, transmission associated with hydropower plants. As per the PDR, the line loss rate is selected as 2%, however, the rate was fixed as 0.6% in the Agreement on the Metering arrangement of electricity exported and imported from the grid signed by the PP and Xichang Grid Company on 02/08/2010. The PP

was required to justify the appropriateness of the input value for financial analysis.

In response to the finding, the PP transparently reported the internal electricity consumption rate (0.2%) and transmission loss (2%) in the PDD footnote 1. The team through checking the clarification from the PDR designer dated 19/04/2011, the line loss rate of 2% was based on the estimated transmission distance of 33 km and general design approach considering some redundancy. At a conservative approach in terms of justifying addtionality, the PP used the designed theoretical electricity generation of 466,200 MWh in calculating IRR of the project, and in estimating the emission reduction, the PP applied the expected power supplied to the grid of 455,962MWh ($466,200 \times 100 \% \times (1 - 0.2\%) \times (1 - 2\%)$) to estimate the emission reduction of the project for avoiding any emission reduction overestimation. The validation assessed the presented data and confirmed the appropriateness of the treatment. According to the ex-post line loss rate calculation implemented on 24/05/2010 by Xichang Grid Company, the actual line loss rate of the project is 0.46%. Considering the line loss rate fixed as 0.6% in the Agreement on the Metering arrangement of electricity exported and imported from the grid signed by the PP and Xichang Grid Company on 02/08/2010, and the conservativeness of ex-post emission reduction will be ensured. The finding was therefore closed.

Barrier analysis

Barrier analysis is not selected.

Common practice analysis

The validation team reviewed the common practice analysis of the project by checking the description in the PDD, related documented evidence and publicly available information. The PP selected Sichuan province as the geographical scope of the common practice analysis. This is considered appropriate because the factors including the investment climate, such as the regulatory framework, water resource availability and economic development situation of each province are different in China. The hydropower plants with capacity of 50MW to 300MW are defined as medium - sized hydropower project in China. Therefore, it is deemed appropriate that the activities with the installed capacity 50MW to 300MW are similar to the proposed project. In 2002, China started the reform of the electric sector to transfer it to be a more dynamic market. As a result, the investment environment of power production projects in the Host Country changed significantly since 2002.

Therefore, the projects with capacity of 50MW to 300MW located in Sichuan province and implemented after 2002 were reasonably defined as the similar activities to the project.

The validation team reviewed the China Water Resources Yearbook 2005 to 2008, which are available official sources. The validation team identified total of 24 more projects located in Sichuan Province with capacity between 50MW to 300MW, 14 of which were not listed in the GSP PDD. The validation team issued CL 03 asking the PP to justify as to why the fourteen hydropower plants were not included. In response, the PP clarified that the power plants were either constructed prior to 2002 or were CDM projects (refer CL 03 for details).

Of the balance ten hydropower plants, Hongyanzi Power Station was confirmed to be an accumulation reservoir power station with better social and economic benefits (IRR: 15%) than the proposed project activity. Therefore, it cannot be considered similar to the proposed project.

Of the balance nine hydropower plants, the validation team checked each publicly available data source of these projects and confirmed that the projects have lower unit capacity investment cost, which is no more than 6480Yuan/kW, while the unit capacity investment cost of the proposed project is 12111.36Yuan/kW. The validation team confirmed that the unit capacity investment cost of the project activity at 12111.36 Yuan/kW is significantly higher than the other similar projects (it is 86.9% higher than the highest unit cost of 6480Yuan/kW). As the team checked from the PDR and The additional clarification on parameter in PDR by PDR designer, since the proposed project activity lies in far remote mountain area that involves distant road building as part of access to the site, an accumulative reservoir with capacity of 37,300,000m³ a diversion tunnel as long as 15.925 km from the dam site to the powerhouse, and resettling of 2,206 local residents, the validation team deems the high unit cost as reasonable.

Under similar economic condition, taking the highest value of 6480 Yuan/KW, the IRR of the proposed project activity would cross the benchmark of 8% and the proposed project activity therefore become financially attractive. The validation team therefore confirms that the existence of these similar hydropower stations don't contradict the claim that the proposed project activity is financially unattractive.

Therefore, the validation team concluded that the common practice analysis meet the requirement and project activity is not widely observed or commonly carried out in the region.

CL 02

The team identified that according to the common practice analysis, the unit capacity investment cost of the project and the unit electricity production investment cost are significantly higher than that of most other similar projects, and the actual investment of the project was witnessed much higher than the estimated budget in the financial audit report, the PP is therefore required to elaborate what makes the project costly.

In response to the finding, the PP revised the PDD and provided the additional clarification on parameter in PDR conducted by PDR designer dated 09/09/2010 and the Budget Adjustment Report compiled by the PDR designer. The team through crosschecking the PDR and the clarification, noted that the higher unit capacity cost and the unit electricity production cost of the project were caused by 1) huge construction engineering, such as dam and the long distance diversion tunnel, 2) the large amount of investment in land acquisition and related compensation, 3) geological disaster prevention engineering and, 4) the longer access road construction. Through crosschecking the *Budget Adjustment Report* compiled by the PDR designer dated June 2010, the actual investment was already much higher than the estimated investment during the design stage. The input value used in the financial analysis is conservative. The finding was therefore closed. The finding was therefore closed.

CL 03

By checking the Yearbook of China Water Resources 2005 to 2008, 14 more projects with installed capacity between 50MW and 300MW were identified. Please justify why these project can not be considered as similar project with transparent evidence.

In response to the finding, the PP gave a justification and provided the team of relevant support web pages. Through checking the justification and relevant support evidence, the team noted that the 14 projects were not similar to the project activities against the reported criteria in the PDD since the projects 1~9 were constructed before 2002 and the projects 10~14 were proposed CDM project. The finding was therefore closed.

CAR 05

The team found that:

- a) The footnote 22, 36 and 37 in the PDD Version 1 was protected page and not publicly available;
- b) The footnote 23 in the PDD Version 1 was not a valid web link;
- c) Feasibility Study Report of Kehe Hydropower Station was required to be provided for checking the total investment and electricity generation or the publicly available information should be provided;
- d) The footnote 30 in the PDD Version 1 was not deemed relevant to Huilongqiao power station;
- e) The footnote 38 and 39 in the PDD Version 1 were not valid since no relevant the unit capacity investment cost and the unit electricity production investment cost can be found in the provided IRR spreadsheet.

In response to the finding, the PP corrected all invalid and non-convincing reference in the revised PDD, and provided the team all the support web pages. The team confirmed that all the web pages, as referred in common practice are valid and appropriate. The finding was therefore closed.

Prior serious consideration of CDM

The validation team, by checking the evidence documents, confirmed that the project activity starting date was before 2 August 2008 and the processes required in Guidelines on the demonstration and assessment of prior consideration of the CDM, Annex 22 to EB49, have been taken.

The date of 30/09/2006, when the purchasing contract of turbine and generator was signed between the project owner and the GE Hydro Asia Co. Ltd., was presented as the starting date of the project in the PDD Version 1.

For validating the start date, the validation team checked all the main construction contracts and main equipment purchasing contracts and confirmed that construction contract of the dam and structure installation signed between the project owner and the 3rd Engineering Bureau of Sinohydro Corporation (contract number of XXH-LG-2006-JJ-008) on 07/07/2006 is the earliest starting date. The starting date of 07/07/2006 has been updated in the revised PDD. Please see the detail in CAR 06.

The PP for this project activity is a special purpose vehicle created by China Huadian Corporation (66%) and Xichang Electric Power Co. (34%) for the development of projects on Xixi River. China Huadian Corporation was aware of the CDM as early as in 2005, when they attended the China CDM Capability Building Training Course. The earliest CDM project of the entity was "Huadian Inner Mongolia Huitengxile 100.25 MW Wind Farm project" which was firstly prepared on 13/04/2006 and later registered as

project reference 0823. This CDM project activity (0823) was web-hosted on the UNFCCC website from 09 Sept to 08 Oct 2006. Application for seeking Letter of Approval was prior to this date of commencement of validation. Thus, it was demonstrated that the project participants were aware of the CDM prior to the project activity starting date of 07/07/2006.

A Board meeting held on 20/06/2006 considered the CDM revenues in its decision to proceed with the project activity. The board minutes provide evidence that the benefits of the CDM were a decisive factor in the decision to proceed with the project.

A Strategic Cooperation Agreement between the project owner and Eco Securities was entered in Dec 2007. The project activity was included in the Inquiry Document dated March 2008 and the correspondences made between the project owner and Eco Securities from 11/04/2008 were made available as the evidence to the validation team that satisfy the requirements of the Guidelines on the demonstration and assessment of prior consideration of the CDM and the gap with continuing and real actions to secure CDM status is less than 2 years. This was followed by an ERPA in July 2008. An application for the Chinese LoA was made on 13/11/2008 and the LoA from China DNA was issued on December 2008. LRQA was contracted to do the validation work on 23 March 2010 and the PDD was published in the UNFCCC website on 08/05/2010. The validation team reviewed the submitted evidence and checked all the relevant original documents to support the chronology.

Since the time gap between the documented evidences is less than two years, regarding 8 (a) of Annex 22 to EB49, LRQA concluded that continuing and real actions were taken to secure the CDM status for the project in parallel with the implementation of the project activity.

CAR 06

The starting date of the project activity was stated as 30/09/2006 in the PDD Version 1 as the signing date of major equipments purchase contract, however, during the site visit, the validation team noted that the construction contract of the dam and structure installation was signed on 07/07/2006, which is earlier than the reported starting date.

In response to the finding, the PP corrected the starting date of the project as 07/07/2006 in the revised PDD. The validation team confirmed that the date after amended is consistent with the information checked during the on site assessment that included all the main contracts signed for equipment or construction/operation services required for the project activity and the date of 07/07/2006 is the earliest starting date according to the definition in Glossary of CDM terms. The finding was therefore closed.

4.4 Emission reductions

Project emissions

According to ACM0002 Version 12.1.0, the power density of the project activity should be calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

The project activity is construction of a new hydropower plant with capacity of 110 MW that results in a reservoir with power density of 24 W/m^2 , which is greater than 10 W/m^2 . The project employs 2 sets of hydropower generating units that can operate independently during maintenance and unplanned outage periods. In addition there is provision for electricity import from the grid when both units do not operate. Such electricity import, if any, is deducted from the net electricity supply to the grid by the installed power meters. Therefore it was confirmed $\text{PEy} = 0$.

Leakage

Following the guidance of the applied methodology ACM0002 Version 12.1.0, the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport) and these emissions sources are neglected. Therefore, $\text{Ly}=0$.

Baseline emissions

Baseline emissions (BEy) include only CO_2 emissions from electricity generation in fossil fuel fired power plants connected to CCPG that are displaced by the project activity, and are calculated as the product of Quantity of net supply of electricity to the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) and Combined margin CO_2 emissions factor in year y (tCO_2/MWh). Namely,

$$\text{BEy} = \text{EG}_{\text{facility},y} \times \text{EF}_{\text{grid,CM},y}$$

The PP has chosen ex-ante determination of the emission factor $\text{EF}_{\text{grid,CM},y}$ calculated as a combined margin (CM), consisting of the operating margin (OM) and build margin (BM).

The grid emission factor is calculated using publicly available data from official sources for the latest three years for which data was available at the time of the PDD submission and the IPCC defaults as appropriate. The validation team reviewed the calculation and supporting documents and validated the grid emission factor.

The Combined margin CO_2 emission factor ($\text{EF}_{\text{grid,CM},y}$) is calculated by applying the following steps in accordance with the "Tool to calculate the emission factor for an electricity system" Version 02.2.0.

Step 1. Identify the relevant electric power system

The electric power system of the project activity has been identified as CCPG following the Notification on Determining Baseline emission factor of China Grid issued by China DNA. CCPG is made up of several sub-grids including Henan Grid, Hubei Grid, Hunan Grid, Sichuan Grid, Chongqing Grid and Jiangxi Grid. There was electricity import from the Northwest China Power Grid during the years concerned.

Step 2. Choose whether to include off-grid power plants in the project electricity system

The "Tool to calculate the emission factor for an electricity system" offers two options

to calculate the operating margin and build margin emission factor and Option I, Only grid power plants are included in the calculation, was applied in the calculation.

Step 3. Select a method to determine the operating margin (OM)

For the project activity, because the dispatch data of the Grid (including the CCPG) in China is not available to the public and low-cost/must-run power sources constitute less than 50% of the CCPG during the last 5 years, Option (a), simple OM, was selected. The validation team reviewed the PDD and confirmed the correct calculation method of OM emission factor was selected.

Step 4. Calculate OM emission factor according to the selected method

Since detailed data on the individual power plants connected to the CCPG is not available and only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, option B, based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system, is applicable and used to calculate the Simple OM emission factor.

$EF_{grid,OMsimple,y}$, using option B is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{y,grid}}$$

The Operating Margin (OM) emission factors of CCPG are calculated for 2005, 2006 and 2007 respectively and the OM emission factor of CCPG is calculated as the weighted average of the three years.

$EF_{grid,OM,y} = 1.1255 \text{ tCO}_2\text{e/MWh}$.

Step 5. Calculate the build margin (BM) emission factor

Due to the fact that data on electricity generation of each power plant / unit in the grid is currently not available in P. R. China, the calculation is made by the alternative method that has been accepted by the CDM-EB for Chinese projects

http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZ_AK6V5YXPQKK7WYJ that details have been published by the Chinese DNA as <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2332.doc> and <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf>.

The sample group m is identified as capacity addition during the last two years for different power generation technologies.

The build margin emission factor ($EF_{BM,y}$) are calculated by multiplying the EF thermal power with the weight of new capacity addition by thermal power of total capacity addition in CCPG

$$EF_{grid,BM,y} = \frac{CAP_{thermal,y-n,y}}{\sum_j CAP_{j,y-n,y}} \times EF_{thermal,adv}$$

$EF_{Thermal,Adv}$ is calculated based on the weight of CO₂ emissions from fuel i fired power plants in the total CO₂ emissions from thermal power, using the most recent available data and The CO₂ emission factor of fuel i (tCO₂/MWh) using the best commercially available technology in P. R. China and taking into account the carbon content and the oxidation factor of coal, oil and gas.

$$EF_{Thermal,Adv} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$$

And

$$\lambda_{Coal} = \frac{\sum_{i=Coal} FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}$$

$$\lambda_{Oil} = \frac{\sum_{i=Oil} FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}$$

$$\lambda_{Gas} = \frac{\sum_{i=Gas} FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}$$

$$EF_{grid,BM,y} = 0.5802 \text{ tCO}_2/\text{MWh}$$

Step 6. Calculate the combined margin emission factor

The final step to calculate the weighted combined margin (CM) emissions factor ($EF_{grid,CM,y}$) as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

According to Tool to calculate the emission factor for an electricity system, all projects except wind and solar power generation (including hydro projects) : $w_{OM} = 0.5$ and $w_{BM} = 0.5$ for the first crediting period, and $w_{OM} = 0.25$ and $w_{BM} = 0.75$ for the second and third crediting period,

Therefore, for the first crediting period of the project, the grid emission factor can be confirmed as $EF_{grid,CM,y} = 0.85285 \text{ tCO}_2\text{e}/\text{MWh}$.

Emission reductions

$$ER_y = BE_y - PE_y = EG_{facility,y} \times EF_{grid,CM,y} - 0 = (EG_{PJ,y} - EC_y) \times EF_{grid,CM,y}$$

$$= 455,962 \text{ MWh} \times 0.85285 \text{ tCO}_2/\text{MWh} = 388,867 \text{ tCO}_2\text{e}$$

Although the designed theoretical electricity generation, 466,200MWh, was used to calculate IRR of the project, on the conservative approach, the team agreed to accept estimating the emission reduction based on the net supplied electricity of 455,962MWh (namely, $466,200 \times 100\% \times (1-0.2\%) \times (1-2\%)$).

The validation team confirmed the correct application of the calculation following the published official emission factor issued by the DNA of the host country that conforms with the approved methodology ACM0002 Version 12.1.0 and Tool to calculate the emission factor for an electricity system.

Through the validation process LRQA have confirmed that:

- All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

CAR 07

During the validation stage, the team identified that:

- a) Equation 9 shows $BE_y = EG_{pj,y} \times EF_{grid,CM,y}$ where $EG_{pj,y}$ has been denoted as the quantity of net electricity generation that was produced and fed into the grid. Considering that electricity is imported by the power plant and/ or the dam and denoted by EC_y , the net supply of electricity to the grid will be $EG_{pj,y} - EC_y$. Equation 9 & 10 were therefore not correctly presented.
- b) The procedure for the determination of the project emission, leakage and emission reduction was missing in the section B.6.1 of the PDD Version 1.
- c) $EF_{coal,Adv}$, $EF_{oil,Adv}$ and $EF_{gas,Adv}$ have been used in PDD Version 1 Annex 3, however, these parameters are not listed in table B.6.2 that includes data and parameters available at validation.
- d) Cap_{BL} and A_{BL} are not listed in table B.6.2.

In response to the finding, the PP revised the PDD accordingly. The validation team agreed to close the finding since:

- a) The revised Equation 9 and 10 were in line with the actual operation condition and the applied methodology;
- b) The procedure for determination of the project emission, leakage and emission reduction was added in section B.6.1 of the PDD;
- c) The parameters of $EF_{coal, Adv}$, $EF_{oil, Adv}$ and $EF_{gas, Adv}$ were listed in table B.6.2 of the revised PDD;
- d) Cap_{BL} and A_{BL} were listed in table B.6.2 and CAP_{pj} and A_{pj} were removed from table B.6.2. The revision is in line with the methodology..

CL 04

The information source of the surface area of 4.497 km² mentioned in PDD Version 1

was not clear.

According to the additional clarification on parameter in PDR dated 09/09/2010 issued by the PDR Designer, the surface area of the reservoir was calculated using Auto CAD software based on the relation between water level, surface area and storage capacity of the reservoir which was drawn as per the measured topography (1:2000). This method on calculation of surface area of the reservoir is widely used in hydro power project design by institute in China and it is accurate and reasonable. The finding was therefore closed.

4.5 Monitoring methodology and monitoring plan

The approved consolidated baseline and monitoring methodology ACM0002/Version 12.1.0

“Consolidated baseline methodology for grid-connected electricity generation from renewable sources” is applied to the project.

The surface area of the reservoir and the installed capacity, sourced from the PDR, are used for ex-ante calculation. According to ACM0002 Version 12.1.0, both the surface area and the installed capacity will be monitored yearly and the monitoring has been confirmed in the revised PDD.

The validation team crosschecked the Agreement on the Metering Arrangement of Electricity Exported and Imported from the Grid signed by the PP and Xichang Grid Company on 02/08/2010, in which the electricity monitoring point was settled at the project site and the 0.6% will be fixed as the line loss rate when calculating the exported to and imported from the power grid. The PP explained that the metering data will be accurately monitored by the meters, and the amount of line loss electricity will be considered during the electricity settlement with the grid and will be recorded in the records for sold electricity.

Electricity delivered to ($EG_{pj,y}$) will be the electricity output measured by the 2 revenue meters minus the agreed transmission loss. $EG_{pj,y}$ will be cross-checked against records for sold electricity. In case of inconsistency, the smaller value will be conservatively used;

Electricity purchased from CCPG (EC_y) will be the electricity consumptions measured by the 2 revenue meters plus the agreed transmission loss and also include electricity consumptions measured by the meter installed at the emergency backup line. EC_y will be cross-checked against records for purchased electricity. In case of inconsistency, the larger value will be conservatively used.

$$EG_{facility,y} = EG_{pj,y} - EC_y$$

The meters are installed according to the Technical Administrative Code of Electric Energy Metering (DLT448-2000) and will be calibrated according to the Verification Regulation of Electrical Energy Meters with Electronics (JJG 596-1999) or subsequent version.

The monitoring plan contains;

1. CDM monitoring Organization
2. Staff training

3. Maintenance and calibration of monitoring equipment
4. Data collection and record-keeping arrangements
5. Data Quality Control and Quality Assurance

By reviewing the PDR, observing the project site and interviewing the project owner, the validation team confirmed that the monitoring plan met the requirement of the selected approved methodology and the validation team evaluated the relevant monitoring procedures provided in PDD and believe that the project participant has the ability to implement the monitoring plan.

CAR 08

The team identified that:

- a) The $EG_{\text{facility},y}$ is not expressed as $EG_{p,j,y}$ to denote electricity generation (export to the grid) and EC_y to denote electricity consumption (import from the grid) in B.7.1 of the PDD;
 - b) Although, site visit confirmed that there is provision to import electricity in the event of an emergency through a back-up line, relevant monitoring parameter has not been included in the PDD Version 1 section B.7.1;
 - c) The information regarding accepted industry standards or national or international standards, the measurement equipment to be used and the calibration procedures applied were not stated in the table of B.7.1 of the PDD;
 - d) The PP is required to clearly state the monitoring point of the meters and the procedure to make sure the net electricity supplied to the grid can be clearly identified;
 - e) $CAP_{p,j}$ and $A_{p,j}$ should be ex-post monitored and should have been listed in B.7.1;
- In response to the finding, the PP revised the PDD. The validation team agreed to close the finding since:
- a) The electricity export to the grid, $EG_{p,j,y}$ and the electricity import from the grid, EC_y are clearly presented in B.7.1 of the revised PDD;
 - b) The potential electricity consumptions measured by the meter installed at the emergency backup line was taken account into EC_y and the meter will be managed as per national regulation;
 - c) The relevant national standards, the measurement equipment and its calibration procedures, measurement method and the responsible party were included in B.7.1 of the revised PDD;
 - d) According to the Agreement on settlement point of the project signed by the PP and Xichang Power Grid on 02/08/2010, the settlement point of the electricity supplied by the project to the grid and the electricity imported by the project from the grid is set at the project site. 2 revenue meters will be installed at output of the plant to measure the electricity supplied to and imported from the grid through main transmission line and the meter installed at the emergency backup line to measure potential electricity consumed by the project in emergency. Therefore, the net electricity supplied to the grid can be clearly identified;
 - e) $CAP_{p,j}$ and $A_{p,j}$ were listed in B.7.1 of the revised PDD and will be monitored in operation year as per the methodology.

4.6 Duration of the project activity / crediting period

The project activity started on 07/07/2006 and the operational lifetime is expected to be 30 years. These were confirmed by crosschecking sorts of construction contracts

and main equipment contracts.

The starting date of crediting period is indicated in the PDD as being 01/09/2011, or on the date of registration of the CDM project activity, whichever is later. The PP has chosen a seven years renewable crediting period for this project activity. The validation team confirmed that the duration of the crediting period is acceptable.

CL 06

The crediting period of 01/01/2011 was not realistic since the validation is still in process. The PP updated the crediting period as 01/09/2011 or on the date of registration of the CDM project activity, whichever is later. The crediting period is deemed reasonable and the finding was therefore closed.

4.7 Environmental impacts

The environmental impact assessment (EIA) of the proposed project activity has been conducted following the legal requirements of the host country (the Environmental Impact Assessment Law effective since September 1, 2003). The validation team reviewed the EIA report and the letters for approval of the EIA, interviewed the local environmental bureau and the PP and confirmed compliance with the legal requirements of the host country.

The EIA report of Sichuan Xixi River Luogu Hydropower Project was completed by Chengdu Hydropower Investigation Design & Research Institute in February 2006 and was approved by the Environmental Protection Bureau of Sichuan Province on 29/04/2006 (document number of Chuan Huan Jian Han[2006] 199). The validation team confirmed that the environmental impacts including water pollution, air pollution, noise pollution, solid waste, erosion impact, biodiversity and ecosystems were addressed in section D.1 of the PDD. The declaration of implementing environmental monitoring plan was provided by the project owner that the project owner will use all reasonable endeavours to apply and implement the provision outlined in Environmental and Social Management Plan reported in the EIA. The social impact of the land acquisition and people relocation and relevant compensation method was also reported in section D.1 of the PDD. According to the EIA, a total of 2206 persons were identified as project affected population caused by flooding and land acquisition. Of them, 1487 persons need to be relocated. The resettlement action plan (Validated Version), conducted by HydroChina Huadong Engineering Cooperation dated January 2009, has included the assessment of resources and livelihoods affected and the budget to compensation in line with nationally set levels. The Resettlement action plan was approved by Resettlement Office of Sichuan Provincial Government dated 23/02/2009 and the compensation agreement was signed with influenced residents through local government which have been agreed with individual householders.

No significant environmental impact was identified for the project activities. The environmental monitoring of the project is required to be carried out after commencement of power generation from the project as per the conditions of the environmental clearance.

4.8 Stakeholders' comments

The project owner carried out a project specific local stakeholders' consultation in

11/06/2007. The consultation was conducted by means of questionnaire survey to local stakeholders. 200 copies of questionnaires included local government officials (15 people), local residents (165 people) and related employees (20 people) were collected.

Considering the scale of the project and the population on the project area, 200 questionnaires are deemed adequate to reflect the attitude of local stakeholders. By reviewing the notice post dated 05/06/2007, and by interviewing the local stakeholder who had attended the consultation, the invitation for comments by local stakeholders was deemed in an open and transparent manner. Since the project has people relocation issue involved, the surveyed local stakeholders included the project affected people by physical relocation and land acquisition who lived close to the dam area and power house area, and the local civil servants and employees. It is therefore deemed all relevant stakeholders have been consulted. There is no negative comment searched by internet regarding the project.

The completeness of the summary of the comments received as provided in the PDD is confirmed by reviewing the received 200 copies of questionnaires.

The stakeholder consultation process, targeted stakeholders and due actions for concerned issues have been clarified in the PDD.

CAR 09

The team identified that the summary of the comments was not reported completely in the revised PDD against the raised questions in questionnaire.

As response the finding, the PP revised the summary of the comments in section E.2. and provided the team of the 200 questionnaires and the summary of the stakeholder consultation. Through checking the summary of the stakeholder consultation and these questionnaires, the team confirmed that the summary of the comments was completely reported in the revised PDD against the raised questions in questionnaire. The finding was therefore closed.

5 Comments by parties, stakeholders and NGOs

In accordance with the requirement of the Procedures for processing and reporting on validation of CDM project activities, the PDD is to be made publicly available for 30 days subject to confidentiality provisions agreed with the PP, to enable comments to be received from Parties, stakeholders and UNFCCC accredited NGOs on the validation and registration requirements.

The PDD was made publicly available in accordance with the requirements of the procedure for the period of 08/05/2010 to 06/06/2010 as per <http://cdm.unfccc.int/Projects/Validation/DB/FEM4EZQBX25ZR3860965BI85I75M8W/view.html>.

1 comment was received during the period and the comments were made publicly available as per:

<http://cdm.unfccc.int/Projects/Validation/DB/FEM4EZQBX25ZR3860965BI85I75M8W/view.html>.

The comments received have been taken into consideration as detailed in Appendix D of this report.

6 Validation Opinion

LRQA has undertaken the validation of the proposed project activity Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development.

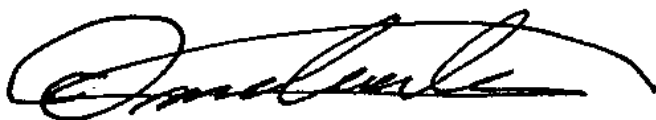
The Project activity is a grid connected hydropower project located on the Xixi River in Zhaojue County, Sichuan Province, P. R. China. The Project intends to reduce greenhouse gas (GHG) emissions by the installation and operation of a 110 MW hydropower plant with 2 sets of 55MW hydro turbine and generator units. The main components of the project include dam, water diversion tunnel, pressure penstocks, powerhouse, water release structure, main transformers, and other auxiliary facilities. The electricity generated by this hydro source will be exported to CCPG via the local power grid and is expected to displace the predominantly fossil-fuel based electricity generation, thereby reducing the CO₂ emissions. The annual emission reductions of the project are estimated as 388,867tCO₂e and total Emission Reductions over the first crediting period are estimated as 2,722,070 tCO₂e.

In order to arrive at the final validation conclusions and opinion, LRQA carried out document review, review of compliance with and application of the approved methodology and methodological tools in determination of baseline, additionality, monitoring and the calculation of emission reductions, field survey and interviews, and reference to similar CDM project activities. There was no project component or issues excluded from the validation.

Through the validation process, the validation team identified 9 CARs and 6 CLs. The PP has taken action on the raised issues and submitted to LRQA the revised PDD Version 5 dated 06/07/2011 and other supporting evidence.

The validation team is of the opinion that the proposed project activity conforms with all the relevant UNFCCC requirements for the CDM as well as the host country's national requirements and if implemented as designed, is likely to achieve the emission reductions and contribute to the sustainable development of the host country. LRQA therefore requests the registration of "Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project" to the CDM Executive Board as a CDM project activity.

Decision Maker



Michiaki Chiba

Climate Change Manager – Asia & Pacific

7 Appendices

7.1 Appendix A: Letter of approval for the project by the host and investing country DNA

Letter of Approval from The National Development and Reform Commission of the People's Republic of China dated December 2008.

Letter of Approval from the Annex I Party DNA, Ref No. EA/ESInt/01/2012, dated 19/01/2012.

7.2 Appendix B: List of documents reviewed

Category A documents (documents prepared by the PP)

1. The CDM-PDD for Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project Version 1 dated 01/03/2010
2. The CDM-PDD for Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project Version 2 dated 09/02/2011
3. The CDM-PDD for Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project Version 3 dated 18/03/2011
4. The CDM-PDD for Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project Version 4 dated 27/05/2011
5. The CDM-PDD for Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project Version 5 dated 06/07/2011
6. IRR & ER calculation spread sheet of Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project, Version 1 dated 05/05/2010, Version 2 dated 15/11/2010 and Version 3 dated 09/02/2011 and Version 4 dated 06/07/2011
7. The Preliminary Design Report of Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project completed by East China Investigation and Design Institute under China Hydropower Engineering Consulting Group Corporation dated November 2005
8. The PDR Approval of the project approved by Sichuan Provincial Development and Reform Commission dated 07/08/2006
9. the EIA Report of Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project completed by Chengdu Hydropower Investigation Design & Research Institute dated February 2006
10. The EIA Approval of the project approved by the Environmental Protection Bureau of Sichuan Province dated 29/04/2006 with document number of Chuan Huan Jian Han[2006] 199.
11. The master development plan of Xixi River Hydropower development dated March 2004.
12. The Approval of Master Development Plan of Xixi River Hydropower development dated 26/07/2004.
13. The planned cascade hydros in Xixi River
14. The contract of Turbine Generator Unit signed between the PP and GE Hydro Equipment Asia Company Limited
15. The loan contract signed with National Development Bank
16. The loan contract signed with China Construction Bank Chengdu 7th Branch dated 26/03/2007

17. The loan contract signed with China Construction Bank Xichang Yuecheng Branch dated 26/03/2007
18. The loan contract signed with Bank of China dated 04/02/2009
19. The equity audit report completed by Sichuan Jinda Certified Public Accountants Co., Ltd. dated 20/06/2010
20. The Proposed CDM Application Plan of Diluo and Luogu Hydropower Project for the board meeting dated 16/06/2006
21. Extraordinary Board Meeting Minutes dated 20/06/2006
22. The construction contract of the dam and structure installation dated 07/07/2006
23. The construction contract of diversion tunnel dated 07/07/2006
24. The contract of Powerhouse and instation dated 15/08/2006
25. The Power Purchase Agreement dated 10/05/2009
26. The additional clarification on parameter in PDR by PDR designer dated 09/09/2010
27. The statistic of power of self-consumption equipment
28. the financial audit report 2009 of the PP conducted by BDO China Li Xin Da Hua Certified Public Accountants Co., Ltd. dated 15/03/2010
29. The Budget Investment Adjustment Report of the project dated June 2010
30. The investment on transmission engineering approved on 27/11/2006
31. The statement on actual number of employees of the project by the PP till 26/05/2011
32. The proof of employee's average monthly salary dated 10/01/2011
33. The Luogu Tariff Application by the PP to Sichuan Pricing Bureau dated 20/09/2009
34. The delegate of CHD attending China CDM Capability Building Training Course June 2005
35. The PDD of Huadian Inner Mongolia Huitengxile 100.25MW Wind Farm Project dated 13/04/2006
36. The CDM Comprehensive Strategic Cooperation Framework Agreement between China Huadian Group and Ecosecurities dated 11/12/2007
37. Inquiry Document for the price of Emission Reduction from China Huadian Group dated March 2008
38. CDM Development and Emission Reduction Purchase Agreement between the PP and Ecosecurities dated 07/07/2008
39. The evidence document of Letter of Approval Application dated 13/11/2008
40. The clarification on the designed line loss rate by the PDR designer dated 19/04/2011
41. The measured line loss rate by Sichuan Power Grid dated 24/05/2010
42. Comparison with similar hydropower project in Sichuan Province
43. Power Purchase Agreement of the project dated 10/05/2009
44. The Agreement on the Metering Arrangement of Electricity Exported and Imported from the Grid dated 02/08/2010
45. EB51_PDF_Changes in Annex I Party different from HNA_response
46. EB51_PD-Forum Letter Changes in Annex I Party different from HNA_281009_final
47. The common practice evidence websites
48. The resettlement action plan of the project completed by the PDR designer dated January 2009.
49. The approval of resettlement action plan of the project issued by Resettlement Office of Sichuan Provincial Government dated 23/02/2009.

50. The compensation contract signed between the PP and Government dated 30/06/2009
51. The Notice of the Stakeholder Consultation published by the PP dated 05/06/2007
52. The Questionnaires of local Stakeholder Consultation_(200 copies)
53. The summary of the stakeholder consultation.
54. The electricity trade from Jan to Nov 2010
55. The Education donation to Zhaojue County by the Project owner
56. The Education donation to Butuo County by the Project owner
57. The donation to Building Hospital in Zhaojue County_dated 06/05/2009

Category B documents (other documents referenced)

1. Approved consolidated baseline and monitoring methodology
ACM0002:“Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 11
2. Approved consolidated baseline and monitoring methodology
ACM0002:“Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 12.1.0
3. Tool to calculate the emission factor for an electricity system
4. Tool for the Demonstration and Assessment of Additionality
5. State Council's Decision on Reforming Investment Approval Process, 16/07/2004.
http://en.ndrc.gov.cn/policyrelease/t20060207_58851.htm
6. Renewable energy law of China
<http://www.ccchina.gov.cn/en/NewsInfo.asp?NewsId=5371>
7. Eleventh five year program for energy development issued by the National Development and Reform Commission in April 2007
<http://www.ndrc.gov.cn/zjgx/P020070410516458967992.pdf>
8. Hydropower Project Financial Evaluation Interim Provisions [1994]
9. The notice on medium-sized reservoir Fund Caizong [2007]26
10. The Notice on Adjustment of Water Fee in Sichuan Province
11. The implementing the policy of reservoir resettlement in Sichuan Province
12. Economic evaluation Implementation code for hydropower projects, published by The Ministry of Water Resources of the P.R.China
13. Interim rules of on Economic Assessment of Electric Engineering Retrofit Projects published by the Operation Department of Power Generation and Power Transmission of the State Power Corporation of China on 10 September 2002
14. The price index of hydropower engineering
<http://www.hydrocost.org.cn/price/priceIndex.jsp>
15. Provisional Measures for the Administration of On-Grid Electricity Tariffs” – document NDRC [2005] NO.514
16. Sichuan Provincial Price Bureau on the approval of average electricity purchase price of Sichuan power grid in 2004 (ChuanJiaHan (2005)No.46)
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=930>
17. Chuan_Jia_Fa (2005) No. 123 <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=3238>
18. ChuanJiaFa (2006) No.145 <http://www.scpi.gov.cn/zcfg/zcfg-content.asp?id=1972>
19. ChuanJiaDianFa [2009] No.59 <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=3574>
20. China energy statistical yearbook (2006 to 2008)
21. China electric power yearbook (2003 to 2008)

22. Yearbook of China Water Resources 2005 - 2008
23. Carbon emission factors and oxidation rates: IPCC default values; see 2006 IPCC guidelines for national greenhouse gas inventories, Volume 2 (energy)
24. The operating margin (OM) emission factor and the build margin (BM) emission factor published by the Chinese DNA on 02 July 2009
25. EB guidance on estimating the build margin for AM0005, consolidated in ACM0002 which refers to the Tool to calculate the emission factor for an electricity system
<http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM> and
http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ
26. EIA law of P.R. China, (effective September 1, 2003)
27. DL/448-2000 is Technical administrative code of electric energy metering

7.3 Appendix C: List of persons interviewed

1) Project entity: Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd

Mr. Wu Fuquan, Deputy General Manager
 Mr. Chen Kai, Deputy General Engineer
 Mr. Bo Mingdan, Director of Planning Department
 Mr. Wang Yuanzhong, Vice General Accountant
 Mr. Shi Jiali, Principal of Migrant Resettlement
 Ms. Chen Qi, Office Director
 Mr. Dai bin, Project Manager

2) CER buyer and Consultant: EcoSecurities International Limited

Mr. Luo Peng, Project Manager
 Mr. Zhou Jiangbo, Project Manager

3) Development and Reform Bureau of Zhaojue County

Mr. Xu Qiyong, Deputy Director

4) Environment Protection Bureau of Zhaojue County

Mr. Xiao Zhongyun, Deputy Director

5) Water Resource Bureau of Zhaojue County

Mr. Pan Ying, Senior Engineer

6) Migrant Resettlement Administrator

Mr. Ji Kebizhe, Principal

7) Guqu Town Government

Mr. A Limuxia, Secretary

8) Representatives of local communities

Mr. Ji Shikegu, villager of Laha Village of Guqu Town, Physical relocated
 Mr. Le E'muniu, villager of Nanping Village of Xincheng Town, Physical relocated
 Mr. Ba Ganzhangping, villager of Nanping Village of Xincheng Town, Physical relocated

Mr. Ji Shibuze, villager of Tiaoba Village of XinCheng Town, Physical relocated
Ms. A Kuzhifu, villager of Tiaoba Village of XinCheng Town, Physical relocated
Mr. Ji Shicibu, villager of Tiaoba Village of XinCheng Town, Physical relocated

7.4 Appendix D: How due account has been taken to the public input made to the validation requirements

The PDD was made publicly available in accordance with the requirements of the Procedures for processing and reporting on validation of a CDM project activity for the period of 08/05/2010 to 06/06/2010 as per:

<http://cdm.unfccc.int/Projects/Validation/DB/FEM4EZQBX25ZR3860965BI85I75M8W/vjew.html>.

1 comment was received during the period and the comments were made publicly available as per:

<http://cdm.unfccc.int/Projects/Validation/DB/FEM4EZQBX25ZR3860965BI85I75M8W/vjew.html>. Comments received have been taken into consideration as follows:

Submitted inputs:

The list in common practice is incomplete. Some referred info is not convincing.
Submitted by: shuidian

The action taken by LRQA:

The validation team assessed the common practice analysis reported in the GSP PDD against the referred information and the Year book of China Water Resource (2005-2008) which are the statistic book issued by the public authority in the water resource field in China. The team identified that:

1. a part of reference source presented in footnotes were not accessible or not convincing, the validation team therefore raised CAR 05 to require correction on the reference information.
2. 14 more projects with installed capacity between 50MW and 300MW were reported in the Year book of China Water Resource (2005-2008) but were not mentioned in the common practice. The validation team therefore raised CL 03 to ask for clarification on why these projects can not be defined as similar project with transparent evidence.

In response to CAR05, the PP updated all invalid information sources and provided relevant document evidences. Detailed information is shown in the Appendix F of the report.

In response to CL03, the PP justified that the 14 projects were not similar to the project against the criteria presented in the PDD since the projects 1~9 were constructed before 2002 and the projects 10~14 were proposed CDM project. Detailed information is shown in the Appendix F of the report. The validation team confirmed the correctness of this information and closed the findings.

7.5 Appendix E: Certificate of Appointment

Validation of Sichuan Huadian Xixi River Hydro-electricity Development Co., Ltd. Luogu Hydroelectric Project

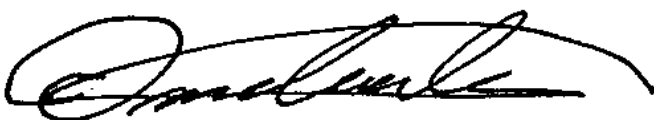
We hereby certify that the following personnel have engaged in the validation process that has fully satisfied the competence requirements of the validation of the CDM project activity.

Name of Person**Assigned Roles**

Mr. Ketan S Deshmukh
Mr. Stewart Niu
Ms. Cuiping Li
Mr. Xianxin Yan
Mr. Michiaki Chiba

Team Leader
Team Member and Sector Expert
Team Member
Technical Reviewer
Decision Maker

Signed by



Decision Maker
Michiaki Chiba
Climate Change Manager – Asia & Pacific

7.6 Appendix F: Validation findings log

1. Grade / Reference:	CAR 01	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	Paragraph 37 of the CDM modalities and procedures; CDM VVM Version 01.2 Paragraph 44				
5. Finding: While all parties involved should have approved the project activity, the Letter of Approval from Annex I Party was not available.					
6. Conclusion: The Letter of Approval from Annex I Party, Ref No. EA/ESInt/01/2012 dated 19/01/2012, was made available by the PP and the validation team confirmed the content of the LoA is in line with Clarification on elements of a written approval (EB16, Annex 6) and the finding was therefore closed.					

1. Grade / Reference:	CAR 02	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 58 Specific guidelines for completing the Project Design Document (CDM-PDD), Version 07, Page 8				
5. Finding: a) The type and lifetime of the hydro turbines and generators were not transparently stated in the Table A.4.2 of the PDD. b) The rated capacity of 56.7MW and rated flow of 18.8m ³ /s was witnessed in the nameplate of turbine which are slightly different from the ones in the PDD. The PP is required to correct them and justify with respect to costing and impacts on additionality. c) The plant load factor was not defined ex-ante in the CDM-PDD as per EB48 Annex 11..					
6. Conclusion: The validation team agreed to closed the findings since a) the type and lifetime of the hydro turbines and generators were correctly stated in the Table A.4.2 of the revised PDD as per the hydro turbines and generators purchase agreement, b) The PP justified that the slight difference in the identified parameters was reasonable since the PDR only refers to a typical specification for estimation purpose that des not represent the actual specification to be hired by the project and no cost was reduced by the slight difference. The team confirmed the correct information was reported in the revised PDD.. It was confirmed by reviewing the Budget Adjustment Report of Luogu that the actual expenditure on mechanical Electronic Equipment was not reduced in comparison to the indication in the PDR and the additionality was not altered. The slightly parameter change in the actual equipment from the designed ones in the PDR does not increase electricity generation since it is only for turbine capacity and the rated capacity of the generator is not increased. c) The plant load factor has been correctly defined in the revised PDD.					

1. Grade / Reference:	CAR 03	2. Date:	19/07/2010	3. Status:	Closed
------------------------------	--------	-----------------	------------	-------------------	--------

4. Requirement	CDM VVM Version 01.2 para. 58
5. Finding: a) The date of EIA approval by Environmental Protection Bureau of Sichuan Province is witnessed as 29/04/2006 that is different from the date of 02/03/2006 indicated in the PDD Version 1. b) The date of PDR approval by Development and Reform Commission of Sichuan Province is witnessed as 07/08/2006 that is different from the date of 08/06/2006 indicated in the PDD Version 1. c) The date of the Contract signed for turbine and generator units with GE Hydro Asia Co. Ltd. is witnessed as 01/09/2006 that is different from the date of 30/09/2006 indicated in the PDD Version 1. d) The date of stakeholder consultation is witnessed as 11/06/2007 in the notice of stakeholder consultation that is different from the date of 01/12/2007 as stated in the project development timeline and E.1 of the PDD Version 1. e) The footnote 8 is not relevant to the project.	
6. Conclusion: The validation team confirmed the correct dates of the EIA approval, FSR approval, contract of hydro turbine and generator units and the notice of stakeholders' consultation were stated in the revised PDD. In addition, the PP provided the correct and relevant link in the previous footnote 8 (it is updated as footnote 10 in the revised PDD) to demonstrate iron price increasing in recent years. The finding was therefore closed.	

1. Grade / Reference:	CAR 04	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 110 GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (version 3.1) para. 11				
5. Finding: a) The data source of all the main input values were not transparently shown in the sheet of inputs of IRR spread sheet; b) The welfare rate should have been 43% (=14%+17%+12%), but not 51%, according to PDR, page 14-6; c) The Recovery of initial current funds and Recovery of residual value should have been recovered in the 34th year; d) The 100% of depreciation should have been used as loan repayment according to the PDR, 14-8, but not 90% of them shown in the sheet of Loan Repayment of IRR spread sheet; e) Assumptions and input data for the investment analysis were not presented in Sub-step 2c, but in Sub-step 2d.					
6. Conclusion: The validation agreed to close the findings since a) The data sources were correctly and transparently shown in the IRR calculation spreadsheet; b) The welfare rate of 43% was adopted in the revised IRR spreadsheet which is in line with the PDR; c) The recovery of initial current funds and the recovery of residual value were recovered in the 34th year in the revised IRR spreadsheet; d) The 100% of depreciation was used as loan repayment in the revised IRR spreadsheet;					

- e) The Table B.5.3 Main parameters used in the investment analysis was presented in Sub-step 2c of the revised PDD.

1. Grade / Reference:	CAR 05	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 119 and 120				
5. Finding: a) The footnote 22, 36 and 37 in the PDD Version 1 is protected page and not publicly available; b) The footnote 23 in the PDD Version 1 is not a valid web link; c) Feasibility Study Report of Kehe Hydropower Station is required to be provided for checking the total investment and electricity generation or the publicly available information should be provided; d) The footnote 30 in the PDD Version 1 is not deemed relevant to Huilongqiao power station; e) The footnote 38 and 39 in the PDD Version 1 are not valid since no relevant the unit capacity investment cost and the unit electricity production investment cost can be found in the provided IRR spreadsheet.					
6. Conclusion: The team confirmed that all the common practice relevant web pages were documented and were provided to the team. Through checking all the support web pages, the team confirm their appropriateness and all the correct information relevant to these references was updated in the revised PDD. The finding was therefore closed.					

1. Grade / Reference:	CAR 06	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 98 and 99, EB41 meeting report, para. 67 Specific guidelines for completing the Project Design Document (CDM-PDD), , Version 07, Page 17				
5. Finding: The starting date of the project activity was stated as 30/09/2006 in the PDD Version 1 as the signing date of major equipments purchase contract, however, during the site visit, the validation team noted that the construction contract of the dam and structure installation was signed on 07/07/2006, which is earlier than the reported starting date.					
6. Conclusion: The starting date of the project was corrected as 07/07/2006 in the revised PDD. The validation team confirmed that the date after amended is consistent with the information checked during the on site assessment that included all the main contracts signed for equipment or construction/operation services required for the project activity and confirmed that the date of 07/07/2006 is the earliest starting date according to the definition in Glossary of CDM terms. The finding was therefore closed.					

1. Grade / Reference:	CAR 07	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para 89,90 and 91				
5. Finding: a) Equation 9 shows $BE_v = EG_{pi,v} \times EF_{grid,CM,v}$ where $EG_{pi,v}$ has been denoted as the					

quantity of net electricity generation that is produced and fed into the grid. Considering that electricity is imported by the power plant and/ or the dam and denoted by EC_y , the net supply of electricity to the grid will be $EG_{pj,y} - EC_y$. Equation 9 & 10 were therefore not correctly presented.

- b) The procedure for the determination of the project emission, leakage and emission reduction was missing in the section B.6.1 of the PDD Version 1.
- c) $EF_{coal, Adv}$, $EF_{oil, Adv}$ and $EF_{gas, Adv}$ have been used in PDD Version 1 Annex 3, however, these parameters are not listed in table B.6.2 that includes data and parameters available at validation.
- d) Cap_{BL} and A_{BL} are not listed in table B.6.2.

6. Conclusion:

The validation team agreed to close the finding since

- a) The revised Equation 9 and 10 are in line with the actual operation condition and the applied methodology.
- b) The procedure for determination of the project emission, leakage and emission reduction was added in section B.6.1 of the PDD.
- c) The parameters of $EF_{coal, Adv}$, $EF_{oil, Adv}$ and $EF_{gas, Adv}$ were listed in table B.6.2 of the revised PDD
- d) Cap_{BL} and A_{BL} were listed in table B.6.2 and CAP_{pj} and A_{pj} were removed from table B.6.2. The revision is in line with the methodology.

1. Grade / Reference:	CAR 08	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM para. 123 (a) (ii); CDM VVM para. 123 (b)(ii) Specific guidelines for completing the Project Design Document (CDM-PDD) B.7.1 ACM0002 Version 12.1.0				
5. Finding:	a) The $EG_{facility,y}$ is not expressed as $EG_{pj,y}$ to denote electricity generation (export to the grid) and EC_y to denote electricity consumption (import from the grid) in B.7.1 of the PDD. b) Although, site visit confirmed that there is provision to import electricity in the event of an emergency through a back-up line, relevant monitoring parameter has not been included in the PDD ver 01 section B.7.1. c) The information regarding accepted industry standards or national or international standards, the measurement equipment to be used and the calibration procedures applied were not stated in the table of B.7.1 of the PDD; d) The PP is required to clearly state the monitoring point of the meters and the procedure to make sure the net electricity supplied to the grid can be clearly identified. e) CAP_{pj} and A_{pj} should be ex-post monitored and should have been listed in B.7.1;				
6. Conclusion:	The team agreed to closed the finding since a) The electricity export to the grid, $EG_{pj,y}$ and the electricity import from the grid, EC_y are clearly presented in B.7.1 of the revised PDD; b) The potential electricity consumptions measured by the meter installed at the emergency backup line was taken account into EC_y and the meter will be managed as per national regulation; c) The relevant national standards, the measurement equipment and its calibration procedures, measurement method and the responsible party were included in B.7.1 of the revised PDD;				

- d) According to the Agreement on settlement point of the project signed by the PP and Xichang Power Grid on 02/08/2010, the settlement point of the electricity supplied by the project to the grid and the electricity imported by the project from the grid is set at the project site. 2 revenue meters will be installed at output of the plant to measure the electricity supplied to and imported from the grid through main transmission line and the meter installed at the emergency backup line to measure potential electricity consumed by the project in emergency. Therefore, the net electricity supplied to the grid can be clearly identified;
- e) CAP_{PJ} and A_{PJ} were listed in B.7.1 of the revised PDD and will be monitored in operation year as per the methodology.

1. Grade / Reference:	CAR 09	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 129 (b)				
5. Finding: The summary of the comments is not reported completely in the revised PDD against the raised questions in questionnaire.					
6. Conclusion: The PP revised the summary of the comments in section E.2 and provided the team of the 200 questionnaires and the summary of the stakeholder consultation. Through checking the summary of the stakeholder consultation and these questionnaires, the team confirmed that the summary of the comments was completely reported in the revised PDD against the raised questions in questionnaire. The finding was therefore closed.					

1. Grade / Reference:	CL 01	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 58 and 91				
5. Finding: PDD Version 1 mentions the predicted average electricity supply to the grid of 455,962 MWh per annum since the start of the crediting period. PP is required to clarify the quantum of electricity that is generated and the various losses such as self-consumption, transmission associated with hydropower plants. As per the PDR, the line loss rate is selected as 2%, however, the rate was fixed as 0.6% in the Agreement on the Metering arrangement of electricity exported and imported from the grid signed by the PP and Xichang Grid Company on 02/08/2010. The PP is required to justify the appropriateness of the input value for financial analysis.					
6. Conclusion: The internal electricity consumption rate (0.2%) and transmission loss (2%) was transparently presented in the PDD footnote 1. The team through checking the clarification from the PDR designer dated 19/04/2011, the line loss rate of 2% was designed based on the estimated transmission distance of 33 km and general design approach considering some redundancy. At a conservative approach in terms of justifying additionality, the PP used the designed theoretical electricity generation of 466,200 MWh in calculating IRR of the project, and in estimating the emission reduction, the PP applied the expected power supplied to the grid of 455,962MWh (466,200×100 %×(1-0.2%) × (1-2%)) to estimate the emission reduction of the project for avoiding any emission reduction overestimation. The validation assessed the presented data and confirmed the					

appropriateness of the treatment. According to the ex-post line loss rate calculation implemented on 24/05/2010 by Xichang Grid Company, the actual line loss rate of the project is 0.46%. Considering the line loss rate fixed as 0.6% in the Agreement on the Metering arrangement of electricity exported and imported from the grid signed by the PP and Xichang Grid Company on 02/08/2010, the conservativeness of ex-post emission reduction will be ensured. The finding was therefore closed.

1. Grade / Reference:	CL 02	2. Date:	19/07/2010	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 93 (ii)				
5. Finding: According to the common practice analysis, The unit capacity investment cost of the project and the unit electricity production investment cost are significant higher than that of most other similar projects, and the actual investment of the project was witnessed much higher than the estimated budget in the financial audit report, the PP is therefore required to elaborate what makes the project costly.					
6. Conclusion: The team through validating the PDR and the additional clarification on parameter in PDR dated 09/09/2010, noted that the higher unit capacity cost and the unit electricity production cost of the project were caused by 1) huge construction engineering, such as dam and the long distance diversion tunnel, 2) the large amount of investment in land acquisition and related compensation, 3) geological disaster prevention engineering and, 4) the longer access road construction and also price soaring of goods. Through crosschecking provided Budget Adjustment Report compiled by the PDR designer dated June 2010, the actual investment was already much higher than the estimated investment during the design stage. The input value used in the financial analysis is conservative. The finding was therefore closed.					

1. Grade / Reference:	CL 03	2. Date:	19/07/2010	3. Status:	Closed																								
4. Requirement	CDM VVM Version 01.2 para 120 Tool for the demonstration and assessment of additionality (Version 05.2)																												
5. Finding: By checking the provided copies of Yearbook of China Water Resources 2005 to 2008, 14 more projects with installed capacity between 50MW and 300MW were identified. Please clearly justify why these project can not be defined as similar project with transparent evidence.																													
<table><tr><th>No.</th><th>Name of power plant</th><th>Installed capacity (MW)</th></tr><tr><td>1.</td><td>Mahui Power station</td><td>86.1</td></tr><tr><td>2.</td><td>Chengdong Power station</td><td>84</td></tr><tr><td>3.</td><td>Caoyutan Power station</td><td>75</td></tr><tr><td>4.</td><td>Huaneng Dongxiguan Power station</td><td>180</td></tr><tr><td>5.</td><td>Jiangkou Power station</td><td>51</td></tr><tr><td>6.</td><td>Yucheng Power station</td><td>60</td></tr><tr><td>7.</td><td>Tongtou Power station</td><td>80</td></tr></table>						No.	Name of power plant	Installed capacity (MW)	1.	Mahui Power station	86.1	2.	Chengdong Power station	84	3.	Caoyutan Power station	75	4.	Huaneng Dongxiguan Power station	180	5.	Jiangkou Power station	51	6.	Yucheng Power station	60	7.	Tongtou Power station	80
No.	Name of power plant	Installed capacity (MW)																											
1.	Mahui Power station	86.1																											
2.	Chengdong Power station	84																											
3.	Caoyutan Power station	75																											
4.	Huaneng Dongxiguan Power station	180																											
5.	Jiangkou Power station	51																											
6.	Yucheng Power station	60																											
7.	Tongtou Power station	80																											

8.	Tongzhong Power station	57
9.	Daqiao Shuiku Power station	100
10.	Wanbahe Yiji Power station	69
11.	Er Daogiao Power station	55
12.	Xiaotiandu Power station	240
13.	Shaping hydro power station	162
14.	Kaijianqiao hydro power station	52.5

6. Conclusion:

the PP gave a justification and provided the team of relevant support web pages. The raised 14 projects were confirmed not similar to the project activities against the reported criteria in the PDD and the information from the support web pages since the projects 1~9 were constructed before 2002 and the projects 10~14 were proposed CDM project. The finding was therefore closed.

1. Grade / Reference:	CL 04	2. Date:	19/07/2011	3. Status:	Closed
4. Requirement	CDM VVM Version 01.2 para. 58				
5. Finding: The information source of the surface area of 4.497 km ² mentioned in PDD Version 1 was not clear.					
6. Conclusion: According to the additional clarification on parameter in PDR dated 09/09/2010 issued by the PDR Designer, the surface area of the reservoir was calculated using Auto CAD software based on the relation between water level, surface area and storage capacity of the reservoir which was drawn as per the measured topography (1:2000). This method on calculation surface area of the reservoir is widely used in hydro power project design by institute in China and it is accurate and reasonable. The finding was therefore closed.					

1. Grade / Reference:	CL 05	2. Date:	08/03/2011	3. Status:	Closed
4. Requirement	CDM VVM, Version 01.2, para. 68.				
5. Finding: Since the project uses the previously approved methodology ACM0002 (Version 11) in the PDD used for GSP which is valid for requesting registration until 17 May 2011 23:59 GMT, the PP is required to confirm whether it applies the updated version of the methodology considering the time required to obtain the LoA from Annex I Party and for submission of request for registration.					
6. Conclusion: The latest available ACM0002 Version 12.1.0 was appropriately referred in the revised PDD. The team reviewed the Nature of Revision of the methodology from Version 11 to Version 12.1.0. The team reviewed the elements affected by the application of the updated version of the methodology and confirmed the appropriateness in the revised PDD. The team therefore accepted the revision and closed the finding.					

1. Grade / Reference:	CL 06	2. Date:	08/03/2011	3. Status:	Closed
------------------------------	-------	-----------------	------------	-------------------	--------

4. Requirement	CDM VVM, Version 01.2, para. 68.
5. Finding:	The crediting period of 01/01/2011 was not realistic since the validation is still in process.
6. Conclusion:	The crediting period of the project was updated as 01/09/2011 or on the date of registration of the CDM project activity, whichever is later. The crediting period is deemed reasonable and the finding was therefore closed.