



VALIDATION REPORT

Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project in People's Republic of China

REPORT NO. 2008-9128

REVISION NO. 03



VALIDATION REPORT

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CERTIFICATION AS

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Client: ČEZ a.s.	Client ref.: Jan Baláč

Project Name: "Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project"

Country: People's Republic of China

Methodology: AMS-I.D

Version: 16

GHG reducing Measure/Technology: Renewable energy based power generation.

ER estimate: 46 679 tonnes of CO₂e per year

Size

☐ Large Scale

☒ Small Scale

Validation Phases:

☐ Desk Review

☐ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project in People's Republic of China, as described in the PDD version 8 of 8 September 2010, meets all relevant UNFCCC requirements for the CDM and relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D version 16. DNV thus request the registration as a CDM project activity.

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Report title: Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project in People's Republic of China		
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Key words:

CDM Validation

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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CCPG	Central China Power Grid
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EB	Executive Board
EIA	Environmental Impact Assessment
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
OM	Operating Margin
PDD	Project Design Document
PDR	Preliminary Developed Document
PP	Project Participant
UNFCCC	United Nations Framework Convention on Climate Change
BE _y	Baseline emissions
EF _{grid,OM,y}	Operating Margin Emission Factor
EF _{grid,BM,y}	Build Margin Emission Factor
EF _{grid,CM,y}	Combined Margin Emission Factor
EF _y	Emission Factor
EG _y	Electricity generated by project



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

“DNV Certification AS (DNV) has performed a validation of the “Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project” in People’s Republic of China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is People’s Republic of China and the Annex I Party is the Netherlands. Both countries fulfil the participation criteria and have approved the project and authorized the project participants. The DNA of People’s Republic of China confirmed that the project assists in achieving sustainable development.

The project correctly applies AMS-I.D “Grid connected renewable electricity generation”, version 16.

By generating renewable energy, which replaced energy from fossil fuels, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 46 679 tCO_{2e} per year over the 7 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV’s opinion that the “Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project” in People’s Republic of China, as described in the PDD, version 8 of 8 September 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-I.D, version 16. DNV thus requests the registration of the project as a CDM project activity.”



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2 INTRODUCTION

The ČEZ a.s. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project” in People’s Republic of China. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

This revised report has been prepared specifically based on the clarifications sought as part of the incompleteness message mail dated 21 August 2010 from the UNFCCC Secretariat.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology and the Validation and Verification Manual, version 1.2 /19/.

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



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3 METHODOLOGY

The validation consisted of the following three phases:

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

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project, version 8, 8 September 2010 (previous versions: Version 1.1, February 2008; Version 2, March 2008; Version 3, 10 October, 2008; Version 4, 11 June 2009; version 5, 27 August 2009; version 6, 25 September 2009, version 7, 10 March 2010).
- /2/ AMS-I.D, version 16 – Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity, Type I – renewable energy projects, categories I.D – Grid connected renewable electricity generation
- /3/ “Tool to calculate the emission factor for an electricity system”, version 2
- /4/ “Tool for demonstration and assessment of additionality”, version 5.2
- /5/ ”Request for guidance: Application of AM0005 and AMS-I.D in China”, a letter from DNV to the Executive Board, dated 07/10/2005, available online at: <http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM...>
- /6/ GSP IRR – Sichuan Lengshuikou – Lengshuikou (stage1).xls
- /7/ GSP IRR – Sichuan Lengshuikou – Jinyuhe (stage2).xls
- /8/ GSP IRR – Sichuan Lengshuikou – Xuekoushan (stage3).xls
- /9/ Letter of Approval from the host party: National Development and Reform Commission of China – No 1514, October 2008
- /10/ Letter of Approval from annex I party: VROM/Senter Novem – 2008SN.250 from 27 November 2008, Netherlands
- /11/ PDR – Lengshuikou (stage 1), issued by Sichuan university engineering designing institute and Huali hydropower consulting Co., Ltd. dated in August 2006;
PDR – Jinyuhe (stage 2), issued by Leshan hydropower construction designing institute dated in July 2006;
PDR – Xuekoushan (stage 3), issued by Leshan hydropower construction designing institute dated in July 2006
- /12/ Approval for PDR – Lengshuikou (stage 1) by Leshan DRC NDRC dated 21 September 2007



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- Approval for PDR – Jinyuhe (stage 2) by Mabian DRC dated 13 September 2007
- Approval for PDR – Xuekoushan (stage 3) by Mabian DRC dated 13 September 2007
- /13/ EIA – Lengshuikou (stage 1) issued by Chengdu Science and Technology University Environment Protection Institute dated July 2007
- EIA – Jinyuhe (stage 2) issued by Chengdu Science and Technology University Environment Protection Institute dated July 2007
- EIA – Xuekoushan (stage 3) issued by Chengdu Science and Technology University Environment Protection Institute dated July 2007
- /14/ Construction project start permission for Lengshuikou (stage 1) issued by Mabian construction planning commission dated 10 January 2007
- Construction project start permission for Jinyuhe (stage 2) issued by Mabian construction planning commission dated 1 November 2007
- Construction project start permission for Xuekoushan (stage 3) issued by Mabian construction planning commission dated 28 May 2008
- /15/ Approval for EIA – Lengshuikou (stage 1) by Leshan Environment Protection Bureau dated 23 August 2007
- Approval for EIA – Jinyuhe (stage 2) by Leshan Environment Protection Bureau dated 23 August 2007
- Approval for EIA – Xuekoushan (stage 3) by Leshan Environment Protection Bureau dated 23 August 2007
- /16/ PPA for Lengshuikou (stage 1) , Jinyuhe (stage 2) and Xuekoushan (stage 3) with Mabian Changhe Electricity Co. Ltd. dated 15 April 2007
- /17/ Board meeting minutes of Sichuan Mabian Tianhe Power for CDM consideration dated 5 September 2006
- /18/ Stakeholder consultation meeting minutes dated 21 March 2008
- /19/ Clean Development Mechanism Validation and Verification Manual, version 1.2
- /20/ Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 6, 30 September 2005.
- /21/ China Electric Power Yearbook 2002, 2003, 2004, 2005, 2006 and 2007
- /22/ China Energy Statistic Yearbook 2002, 2003, 2004, 2005, 2006 and 2007
- /23/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories
- /24/ Ministry of Water Resources, Economic evaluation code for small hydropower projects (SL 16-95)
- /25/ China NDRC: China's Regional Grid Baseline Emission Factors, for BM Calculation (<http://cdm.ccchina.gov.cn/website/cdm/upfile/file1374.pdf>)
- China NDRC: China's Regional Grid Baseline Emission Factors, for OM Calculation (<http://cdm.ccchina.gov.cn/website/cdm/upfile/file1358.pdf>)
- /26/ The bulletin from the Ministry of Water Resources of the People's Republic of China about the effective technical standards listing (No.5 2006) (http://www.chinawater.net.cn/jishujiandu/CWSNews_View.asp?CWSNewsID=24696)
- Ministry of Water Resources' bulletin on technical standards currently in effect (Bulletin No.1, 2009 dated 16 January 2009) announced that the SL16-95 <Economic Evaluation Code for Small Hydropower Projects> is still valid.



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- /27/ Training plan dated 13 December 2007
- /28/ Monitoring manual dated 1 March 2008
- /29/ Stakeholder questionnaire dated 10 January 2007
- /30/ IRR part in PDRs – English translation
- /31/ Letter from the Agriculture Development Bank of China, 30 December 2006
- /32/ Approval of the loan from the Agriculture Development Bank of China document [2008] No.111, 14 May 2008
- /33/ Ex-factory price indices of industrial products, national bureau of statistics of china, 2006
<http://www.stats.gov.cn/tjsj/ndsj/2006/html/i0913C.HTM>
- /34/ Construction contract between project owner and construction company signed 20 December 2006 (Stage 1 and 2) and 18 January 2008 (Stage 3)
- /35/ Declaration letter from project owner dated 6 October 2008 – explanation of back-up power source
- /36/ Letter provided by Mabian DRC about construction of the diversion channel dated 28 May 2008
- /37/ Contract between project owner and land owners for compensation – Letter of Agreement of Land Transfer and Expropriation, dated 8 September 2006 + receipts of payment for 145 832 and 50 000 Yuan dated 11 and 3 April 2007
- /38/ General Office of the State Council of China, Notice on Strictly Prohibiting the Construction of Fuel-fired power plants with installed Capacity of 135 MW or below, 15 April 2002
- /39/ Ministry of Electric Power Industry, Interim Regulations on the Construction and Management of Small-scale Thermal Power Plants (No. 431 Dianji [1997]), 7 Aug. 1997
- /40/ Chinas website for renewable resources :
<http://www.crein.org.cn/view/viewnews.aspx?id=20080130165749765> (wind)
<http://www.crein.org.cn/view/viewnews.aspx?id=20080131100451953> (solar)
<http://www.crein.org.cn/view/viewnews.aspx?id=20080410133557851> (geothermal)
<http://www.crein.org.cn/view/viewnews.aspx?id=20070907140635625> (tide and wave)
- /41/ Framework Agreement on Agency Cooperation for CDM Project in China between Enecore carbon and Sichuan Unitar Clean Energy Consulting dated on 26 October 2007
- /42/ Cosign Letter of Mabian Xuekoushan River Three Stage CDM Projects from Sichuan Unitar Clean Energy Consulting Co., Ltd dated on 10 March 2007
- /43/ Construction Project Insurance and Transmission fee documents for all 3 stages and for Lengba 35 kV electricity line
- /44/ Letter of intent between ČEZ and Sichuan Mabian Tianhe Power Co., Ltd dated 22 March 2008 and 2 April 2008 and ERPA dated 26 May 2008
- /45/ Cosign Letter between Unitar Clean Energy Consulting Co., Ltd. And Sichuan Mabian Tianhe Power Co., Ltd dated on 10 March 2007
- /46/ Memorandum between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd, where Mabian Tianhe Power Co., Ltd confirm assigned Unitar Clean Energy as CDM developer, dated 28 October 2006
- /47/ CDM Project Development Cooperation Agreement between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd, where Mabian Tianhe Power



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- Co., Ltd dated 9 April 2007
- /48/ NDRC: Brief Explanation on Electricity Tariff of China Renewable Energy Electricity Generation Project dated on 4 May 2009
 - /49/ Ref 1498, Baji River Stage I 10MW Run-of-river Hydropower Project, CDM consideration in 2006, electricity tariff (ex VAT) of 0.200 Yuan/kWh from Power Purchase Agreement.
Ref 1814, Yuexi Dayan Small Hydropower Project, CDM consideration in 2006, electricity tariff (ex VAT) of 0.160 yuan/kWh from Power Purchase Agreement.
 - /50/ The electricity tariff of a 4 MW hydropower project operated in 2006 in Mabian County was 0.192 Yuan/kWh (exclude VAT), which was approved by Sichuan Provincial Bureau of Price. (<http://scjc.scpi.gov.cn/flfg-content.asp?id=356> - dated 30 March 2004)
 - /51/ The electricity invoice for Mabian Jixin Hydropower Station for company Mabian Power Co., Ltd. (0.18 Yuan/kWh), dated 4 August 2006
 - /52/ Manufacture contract of turbine-generator for Lengshuikou and Jinyuhe dated on 17 February 2007 and for Xuekoushan dated on 17 September 2008
 - /53/ Hydro Energy Design Code for Small Hydropower Projects (SL76-94)
 - /54/ Guidelines for the reporting and validation of plant load factors, version 01, EB 48 report, Annex 11 dated on 17 July 2009
 - /55/ Average salary in Sichuan Province for years 2006, 2007 and 2008:
http://www.sctzlcw.com/zh/cjzx/News_Display.php?NID=1879
http://www.sctzlcw.com/zh/cjzx/News_Display.php?NID=1879
http://www.sctzlcw.com/zh/cjzx/News_Display.php?NID=1879
 - /56/ Power Generation Price Cost Audit Method issued by Sichuan Province Price Bureau on 25 August 2006
<http://www.scpi.gov.cn/cbdc/cbdcjc.asp?page=2&lbid=1>
<http://www.scpi.gov.cn/cbdc/cbdcjc-content.asp?Id=50&lbid=1>
 - /57/ Explanation about the effective power generation provided by Leshan City Hydropower Construction Reconnaissance Design and Research Institute + project location plan
 - /58/ The answer of Sichuan Price Bureau on the local power grids' authority on tariff dated 6 July 2004 and confirmed 13 August 2007 – confirmation local power grid responsibility for tariff setting
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=512>
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=2768>
 - /59/ Information from website of Sichuan Price Bureau about two Hydropower stations tariff in Leshan City – 0.203 RBM/kWh
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=2719>
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=2718>
 - /60/ Notice of NDRC on the adjustment tariff in CCPG dated 19 November 2009, which set protective tariff for SCC hydropower project 0.14 RBM/kWh
http://www.sc.gov.cn/zwgk/gggs/wj/200911/t20091120_854602.shtm
 - /61/ State Council, The Law of the People's Republic of China on Enterprise Income Tax, 1 January 2008.
 - /62/ State Council, City construction tax and Additional education fee Policy, 1 January



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- 1999.
- /63/ State Council, Provisional Regulations of the People's Republic of China on City Maintenance and Construction Tax, 1985.
 - /64/ The Statute of People's Republic of China on value added tax, 1 January 2009:
http://www.chinaacc.com/new/63_67_/2008_11_17_wa8088515201711180021980.shtml
 - /65/ The Statement on the Electricity Generation of Lengshuikou Hydropower Station dated 22 February 2010 issued by Mabian Changhe Power Co., Ltd. – explanation of effective coefficient and line loss
 - /66/ Asset evaluation for Lengshuikou hydropower station dated 20 July 2009
 - /67/ Table of links with individual tariff prices in Sichuan Province in period 2003 till 2007 provided by Enecore Carbon on 10 March 2010
 - /68/ Notice of Opinions on the Implementation of Some Policies and Measures for the Great Development of China's West, Document No. [2000]33,Guofa, Date of issue 26 October 2000.
 - /69/ Audit report from 2009 for Sichuan Mabian Tianhe Power Co. Ltd, No. [2010]035 on the date 31 December 2009
 - /70/ Leshan Price Bureau: Approval of the electricity tariff sold from Mabian Power Grid to Muchuan Power Grid dated 7 January 2008, valid from April 2007 – tariff 0.369 RMB/kWh in low-water season, 0.28 RMB/kWh in normal-water season and 0.24 RMB/kWh in high-water season
 - /71/ Investment analysis spreadsheet for the aggregated assessment: IRR aggregated 20100826.xls dated 28 September 2010.

Updated versions of IRR dated 1 February 2011 – for tariff 0.25 RMB/kWh for every stages and aggregated and the same for highest tariff 0.29 RMB/kWh:
IRR aggregated 0.25RMB.xls
IRR-Lengshuikou(Stage1) 0.25RMB.xls
IRR-Jinyuhe(Stage2) 0.25RMB.xls
IRR-Xuekoushan(Stage3) 0.25RMB.xls
IRR aggregated HAT0.29RMB.xls
IRR-Lengshuikou(Stage1) HAT0.29RMB.xls
IRR-Jinyuhe(Stage2) HAT0.29RMB.xls
IRR-Xuekoushan(Stage3) HAT0.29RMB.xls
 - /72/ New PPA for Lengshuikou (stage 1) , Jinyuhe (stage 2) and Xuekoushan (stage 3) signed with Mabian Changhe Electricity Co. Ltd. dated 24 September 2010 – new electricity tariff 0.25 RMB/kWh including VAT
 - /73/ CDM Executive Board: Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the Peoples republic in China, Version 1, June 2010
 - /74/ Sichuan Meteorological Bureau: Climate Bulletin for 2009 and Sichuan Climate Impact Assessment for individual months in 2010



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- <http://www.scqx.gov.cn/qxfw/qhjc/index.html?pages=1>
- /75/ Chengdu Labor and social insurance bureau: Social Insurance Policies and Guidelines: based on legislation [2005]156, [2009]52, [2010]06
<http://www.cdldbz.gov.cn/PD0608070818/WD1007221196.asp>
and Leshan Municipal Labor and Social Security Bureau: Notice on implementation of “Improving workers the basic pension insurance system” issued by Leshan Civil Government, dated 23 November 2009 based on follow legislation ([2006]96, [2005]38, [2006]13, [2006]21 and [2004]99)
<http://www.leshan.gov.cn/Site/SiteLaoDongJu/NewsView.asp?ID=63566>
- /76/ Leshan Civil Government, Leshan Municipal Labor and Social Security Bureau: Implementation Notice of Improving workers basic pension insurance system, dated 23 November 2009 (confirmation and implementation of previous documents from 2005 and 2006)
<http://www.leshan.gov.cn/Site/SiteLaoDongJu/NewsView.asp?ID=63566>
- /77/ Leshan Civil Government: Water resource fees, dated 1 June 2005
<http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=1275>
- /78/ Beijing Trusafe Insurance Agency: Company Property insurance Rate Regulation,
http://www.trusafe.cn/TiaoKuan/renbao_caichanxian_4.doc
- /79/ The State-owned Assets Supervision and Administration Commission of Sichuan Province, Sichuan Provincial Construction Department and Sichuan Provincial Department of Finance: Notice on further regulating housing fund management business, dated 26 June 2006
- /80/ The salaries lists for employees of Lengshuikou and Jinyuhe from June, July and October 2010
- /81/ Mabian Changhe Co. and Mabian Tianhe Co. (Lenghuikou hydropower station): electricity generation settlement shoing the Lenghuikou hydropower station average net electricity generation to the grid from December 2008 to January 2010, dated 2 February 2010.

Major changes in the PDD:

The PDD /1/ was changed regarding to DNV requirements and the main differences between the PDD published and the revised PDD are:

- 1) Revised the sensitivity analysis as per latest requirement
- 2) Revised the description of CDM consideration and project's starting date;
- 3) Revised the discussion and analysis of alternative baseline scenarios
- 4) Added practical assessment to investment analysis;
- 5) Updated the starting date of the first crediting period and the starting date of the project;



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- 6) Revised calculation baseline and project emission reduction;
- 7) Electricity coefficient discussion, sources.

Main changes between the PDD version 7 submitted for registration and PDD version 8 dated 8 September 2010 submitted in response the issues raised in the completeness check:

- 8) Updated versions of the applied methodology AMS-I.D and the “Tool to calculate the emission factor for an electricity system;
- 9) Revised the starting date of the crediting period;
- 10) Correction of IRR calculation.

3.2 Follow-up Interviews with Project Stakeholders

The interview meeting was performed in Enecore Carbon Ltd. office in Beijing on 23 May 2008 and planned physical site visit was cancelled because of the earthquake. The desk meeting was focused on topics described below in the table and it was performed by Guo Kang and Mario Vöröš from DNV.

	Date	Name	Organization	Topic
/82/	2008-05-23	Li Junfeng	Mabian Tianhe Electricity Power Co., Ltd.	<ul style="list-style-type: none"> - Project background information - Project technology, operation, maintenance and monitoring capability
/83/	2008-05-23	Zhao Ying	Enecore Carbon Ltd.	<ul style="list-style-type: none"> - Project additionality - Project financial structure - Project monitoring and management plan - Project approval status - Stakeholder consultation process - Project design document - Baseline determination - Emission reductions calculation - Project additionality

3.3 Resolution of Outstanding Issues

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



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

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project is enclosed in Appendix A to this report.

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

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

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



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

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

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

Figure 1: Validation protocol tables



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3.4 Internal Quality Control

The validation report underwent a technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / Technical team leader	Guo	Kang	China	✓	✓	✓	✓		
Project manager/ GHG auditor	Vöröš	Mario	Czech republic		✓				
GHG auditor	Andrtová	Zuzana	Czech republic	✓		✓			
GHG auditor	Flagstad	Ole Andreas	Norway	✓					
Sector expertise	Němeček	Lumír	Czech Republic						✓
Technical reviewer (Draft)	Chaudhary	Anu	India					✓	
Technical reviewers (Final)	Sharma	Anjana	India.					✓	
	Leiroz	Andrea	Brazil						

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



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4 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the revised project design documentation.

4.1 Participation Requirements

The project's host Party is China and the participating Annex I Party is the Netherlands. Both China and Netherlands fulfil the participation requirements and have ratified the Kyoto Protocol. The project participants are Sichuan Mabian Tianhe Power Co., Ltd. (as the project owner) and ČEZ a.s. (as the CER buyer).

The DNA of China issued a Letter of Approval (LoA) /9/ authorising Sichuan Mabian Tianhe Power Co., Ltd as a project participant and confirming that the project assists in achieving sustainable development.

The DNA of Netherlands issued the Letter of Approval /10/ authorizing ČEZ a.s. as project participant.

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

4.2 Project Design

The proposed project is a bundle of three small scale run-of-river hydropower plants namely Lengshuikou, Jinyuhe and Xuekoushan, developed by Sichuan Mabian Tianhe Power Co., Ltd. The main objective of the proposed project is to produce electricity from the renewable source. All the three hydropower stations are located on Xuekoushan River, the first-level branch on the left bank of Mabian River in Mabian Yi Autonomous County, Leshan City, Sichuan Province, China.

Each stage utilizes two sets of turbine-generator. Turbine and generators are manufactured by Sichuan Taiji Electrical and Mechanical Equipment Co., Ltd. The proposed project has the total aggregated installed capacity of 12.1 MW, with the annual total net electricity generation of 47 898 MWh. The electricity generated by three hydropower stations will be transmitted through the Mabian Bajiaoxi Substation where it is transformed from 35 kV to 110 kV and then connected to Mabian County Grid, which is a part of the Central China Power Grid.

All three stages are newly built hydropower stations. The detailed description regarding the three stages is as provided below:

- The Lengshuikou project (stage 1) has installed capacity 6.4 MW with a designed water head of 357 m, a designed water flow of 2.26 m³/s, an average annual gross electricity output of 31 682 MWh. The effective coefficient of electricity is estimated to 80%, whereas the self-consumption is 0.5% and the line loss 4%. Thus an annual net electricity output of 24 210 MWh, i.e. a net load factor of 43%.



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- Similarly, the Jinyuhe project (stage 2) has installed capacity 2.5 MW with a designed water head of 154.4 m, a designed water flow of 1.40 m³/s, an average gross annual electricity output of 12 500 MWh. The effective coefficient of electricity is estimated to 87%, whereas the self-consumption is 0.5% and the line loss 3.5%. Thus an annual net electricity output of 10 466 MWh, i.e a net load factor of 48%.
- And the Xuekoushan project (stage 3) has installed capacity 3.2 MW with a designed water head of 120.3 m, the designed water flow of 3.30 m³/s, an average gross annual electricity output of 15 700 MWh. The effective coefficient of electricity is estimated to 87%, whereas the self-consumption is 0.5% and the line loss 3%. Thus an annual net electricity output of 13 223 MWh, i.e. a net load factor of 47%

The auxiliary and line loss are in compliance with Hydro Energy Design Code for Small Hydropower Projects (SL76-94) /53/ which states that transformer and line losses should not exceed 11% of power generation and that auxiliary consumption should be between 0.5% and 1.0%. Additionally the line losses are depended on transmission distance and voltage level. The transmission lines are 35 kV and distances of individual stages generate different line losses from Stage 1 to Stage 3 as they are remote from Mabian Bijaoxi Transformer Substation.

The annual electricity generation is based on historical hydrology data for latest 48 years described in hydrology section in PDRs /11/. The net output is relatively lower compared to the annual electricity but this differences are set in PDRs /11/ as electricity coefficient (S1) or effective electricity output (S2 and S3) and justified from mentioned hydrology data as loss due to water discharge (S2 and S3) or adjusted capabilities of the power plant and real situation of the Mabian Grid (S1). The calculation was provided according to Economic Evaluation Code for Small Hydropower Project (SL16-95) /24/, where is determined the coefficient of effective electricity between 0.7 to 0.9 for the grid connected, monthly/weekly/daily/no regulating (run-of-river) hydropower stations. The project stages are all run-of-river hydropower plants without possibility of regulation. Ministry of Water Resources' bulletin on technical standards currently in effect /26/ announced that the SL16-95 /24/ is still valid. Furthermore, the grid company confirmed /65/ the claim of coefficient of effective electricity including to the calculation and line losses coefficient from the PDRs. The company confirmed that the delivery electricity is not fixed and it is depend on the water quantity and local electricity demand.

Even with a coefficient of effective electricity of 1, the aggregated IRR for all three stages is 9.67% and below the benchmark of 10%.

It is expected that the implementation of the proposed project as planned would result in reduction of approximately 46 679 tCO_{2e} per year on an average.

The construction start dates of the different stages of the project were verified as:

Stage 1: 1 January 2007, according to the construction contract between project owner and construction company signed 20 December 2006 /34/

Stage 2: 1 January 2008, according to the construction contract between project owner and construction company signed 20 December 2006 /34/



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Stage 3: 24 September 2008, according to the construction contract between project owner and construction company signed 18 January 2008 /34/

The start date for this bundled project is 20 December 2006 (construction contract for Stage 1 and Stage 2) as the earliest financial commitment for the project activity.

The expected operational lifetime of the three hydropower stations is 20 years for stage 1 and 30 years for stage 2 and 3, according to the PDR /11/.

The project developer has selected a renewable crediting period of seven years starting from 1 January 2011 or at the date of registration, whichever is later.

4.3 Application of selected baseline and monitoring methodology

The project applies and complies with the approved methodology AMS-I.D version 16 /2/. The applicability of this methodology is justified since:

- The total newly installed capacity (combining all the stages) is 12.1 MW is smaller than the qualifying limit of type I small scale project activity i.e. 15 MW /11/;
- The generated electricity is renewable source based /11/
- The generated electricity displaces the equivalent amount of fossil fuel based electricity in the grid i.e. Central China Power Grid (CCPG) /11/, /21/.
- No cogeneration is involved /11/
- The power density of new build reservoirs is 91 428 W/m² (S1), 2 924 W/m² (S2) and 660 W/m² (S3), which is in all pages more than 10 W/m² /11/

4.4 Baseline Determination

A) Baseline determination

The baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by addition of new generation sources.

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor as reflected in the combined margin.

In accordance with the approved methodology AMS-I.D version 16 /2/, a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) is calculated as per the procedures prescribed in the “Tool to calculate the emission factor for an electricity system” version 2 /3/. The *ex-ante* method was selected on OM and BM calculation based on the most recent information available. DNV can confirm that the baseline determination is transparent and reasonable.

B) Project boundary

The project boundary is set as the physical and geographical site of hydropower plant and the CCPG (composed of Henan Provincial Power Grid, Hubei Provincial Power Grid, Hunan Provincial Power Grid, Jiangxi Provincial Power Grid, Sichuan Provincial Power Grid and Chongqing Power Grid), where the project will be connected. Boundary setting was confirmed during the site visit and crosschecked with the information from DNA of China /25/. The defined project boundary is in line with AMS-I.D version 16 /2/. DNV can confirm the project boundary is complete and reasonable.



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Emission sources and gases included in the project boundary are:

	GHGs involved	Description
Baseline emissions	CO ₂	CCPG
Project emissions	N/A	Project emission is regarded as zero as the project is a renewable energy (hydro power) project with power densities 91 428 W/m ² (S1), 2 924 W/m ² (S2) and 660 W/m ² (S3) and thus greater than 10 W/m ² .
Leakage	N/A	Leakage is considered as zero because this project is a new project and all the equipments are new and were bought from manufactories /52/ /56/.

4.5 Additionality

The additionality of the proposed bundled project has been demonstrated using the "Tool for the demonstration and assessment of additionality" (version 5.2) /4/.

4.5.1 CDM consideration and continued action to secure CDM status

The starting date of the bundled project was determined as contract date for construction of first two stages with the Sichuan Leshan Jialing Construction Company dated on 20 December 2006 /34/. The contracts for turbine generators were signed subsequently on 12 February 2007 for S1 and S2 and 17 September 2008 for S3 /52/.

Based on financial analysis elaborated in PDRs /11/ and compare with real electricity tariff /49/ /50/ /51/ in time of decision, the financial return was found not to be attractive, and the Board of Director's of the Company decided to avail the benefits of CDM revenues for the proposed project. This was verified from the Board meeting minutes for CDM consideration dated 5 September 2006 /17/. Hence, CDM was seriously considered in the decision to proceed with the project activity. This decision was confirmed by answer from the Agriculture Development Bank of China dated 30 December 2006 /31/, where was mentioned CDM revenue as condition for the issuance of the loan.

Real action to secure CDM status was evidenced through:

- Cosign Letter between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd for CDM development rights dated 10 March 2007 /45/.



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- CDM Project Development Cooperation Agreement between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd, where Mabian Tianhe Power Co., Ltd dated 9 April 2007 /47/.
- Agreement on CDM development cooperation was signed between Unitar Clean Energy Consulting Co., Ltd and the CDM consultant Enecore Carbon was signed on 26 October 2007 /41/.
- The project participant commissioned DNV to perform a validation on 3 March 2008, and the PDD was made publicly available on DNV's climate change website on 13 April 2008.

In DNV's opinion, it has been sufficiently demonstrated serious efforts to secure CDM status in parallel with the physical implementation of the project activity.

4.5.2 Identification of the alternatives to the project activity consistent with the current laws and regulations

As shown in Section 4.3, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by addition of new generation sources. The scenario is in compliance with legislation and local standards.

4.5.3 Investment analysis: Choice of approach

Since the proposed project generates financial and economic benefits through the sales of electricity other than CDM-related income and the alternative does not involve any investment, a benchmark analysis is applicable.

4.5.4 Investment analysis: Benchmark selection

The 10% IRR was used as benchmark value as common value for small-scale project in China, which is determined in Economic Evaluation Code for Small Hydropower Projects issued by the Ministry of Water Resources (Document No: SL16-95) /24/ and which is determined directly in PDRs /11/ too. This value was officially confirmed as still valid by the bulletin from the Ministry of Water Resources of the People's Republic of China about the effective technical standards listing (No.5 2006) /26/.

This benchmark is applied normally for HPP projects in China and its validity was officially confirmed China's government /26/. Thus DNV is able to confirm suitability of this benchmark.

4.5.5 Investment analysis: Input parameters

The data source for investment analysis calculation was PDRs /11/ except the electricity tariff, which is sourced from PPA with Mabian Changhe Electricity Co. Ltd. dated 15 April 2007 /16/.



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DNV would like to state that the electricity tariff in the PDR was back-calculated (fixing other parameters) so that the project IRR crosses the benchmark of 10%. However, tariff as calculated in the PDR (0.246, 0.251 and 0.254 RMB excl. VAT for the three stages, respectively) are not realistic values. The actual tariff prevalent in the region at that point of time, i.e. end of 2006, is significantly lower. The project dispatch electricity to Mabian County Grid. This is local grid and The Sichuan Price Bureau decided on 6 July 2004 that these grids are responsible for tariff setting /58/ and confirmed by response for SHP of Hejiang County on 13 August 2007 /58/. This information about situation related to tariff setting was basis for decision to apply CDM for project. Moreover the website of Sichuan Price Bureau presented tariff setting for two hydropower station by Leshan City set by Leshan Price Bureau on 10 April 2007 /59/. This projects are presented regarding to Mabian County is in the city too. The projects applied tariff 0.203 RBM/kWh during normal water period. Information about the real values of tariff prices for 2006 for several different small hydro powers plant /49//50//51/ is lower (0.200 Yuan/kWh and 0.160 Yuan/kWh /49/; 0.192 Yuan/kWh /50/ and 0.18 Yuan/kWh /51/). Additionally average of tariff for registered CDM projects from Sichuan Province with installed capacity under 50 MW is 0.203 RMB/kWh excl. VAT. Thus it is clear that used value from PPA /16/ is conservative value regarding to it is 0.205 RBM/kWh excl. VAT. Hence, considering the tariff from the PDR for financial analysis is not justified as it would not present the actual financial position of the project (considering the electricity market scenario).

The input parameters used in the financial analysis can thus be considered information provided by an independent and recognized source.

DNV compared values stated in PDD /1/ with values determined in PDR /11/ and PPA /16/ and DNV is able to confirm that the input values are applied correct in PDD /1/.

The PDR of Lengshuikou (stage 1) was issued by Sichuan university engineering designing institute and Huali hydropower consulting Co., Ltd. in August 2006 and it was approved by Leshan DRC NDRC on 21 September 2007. The PDR of Jinyuhe (stage 2) and PDR of Xuekoushan (stage 3) were issued by Leshan hydropower construction designing institute in July 2006 and they were approved by Mabian DRC on 13 September 2007. The approvals of all stages' PDRs are later than starting date and regarding to all major parameters were crosschecked for confirmation about correctness their values.

Given this relative short period of time between issue of the PDRs /11/ (August and July 2006) and the decision to proceed with the project activity /17/ (5 September 2006) and the project activity start date /34/ (20 December 2006), it is unlikely in the context of the project that the input values would have materially changed and that it is thus reasonable to assume that the PDRs /11/ together with information about present electricity tariff /16/ /49//50//51/ /58/ /59/ have been the basis of the decision to proceed with the investment in the project.

The input parameters used in the financial analyses were compared with the data reported for other registered HPP projects in Sichuan province, by comparing, electricity tariff, and percentage of O&M costs relative to total investment costs.



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Table 1 – All registered CDM hydropower projects in the Sichuan Province.

UNFCCC No.	Project	MW	Load factor	RBM/MW	RMB/MWh	%O&M-I	El price [RMB/kWh]
1515	Caoying Small Hydropower Project	4.8	48%	6 963 208	1 658	3.11%	0.226
1190	Pingwu Renjiaba 12.6 MW Small Hydropower Project, P.R.China	12.6	70%	7 432 540	1 209	1.82%	0.180
1322	Sichuan Banzigou Small Hydropower Project, P.R. China (stage 1)	6.4	50%	4 609 375	1 053	2.77%	0.193
1322	Sichuan Banzigou Small Hydropower Project, P.R. China (stage 2)	5	48%	5 360 000	1 277	2.77%	0.193
1231	Shanmugou Small Hydropower Project	10	54%	5 874 570	1 235	3.74%	0.240
2788	Luodu Small Hydropower Project	10.5	52%	10 099 314	2 224	2.66%	0.240
1508	Lixian Yikeyin Small Hydropower Project (Stage 1)	4	52%	6 252 500	1 367	1.88%	0.173
1508	Lixian Yikeyin Small Hydropower Project (Stage 2)	9.6	49%	4 351 667	1 023	2,78%	0.173
2616	Shimian Danihe Hydropower Project	5	56%	10 258 000	2 084	2.03%	0.246
2592	Sichuan Yonghe Yulong Hydropower Project	2.06	52%	9 883 495	2 173	1.67%	0.246
2071	Sichuan provincial Longchi & Caoyuan 9 MW Small-scale Hydro Power Bundle Project (Longchi Hydro Power Plant)	5	64%	7 774 000	1 388	2.32%	0.180
2071	Sichuan provincial Longchi & Caoyuan 9 MW Small-scale Hydro Power Bundle Project (Caoyuan Hydro Power Plant)	4	62%	9 050 000	1 656	2.49%	0.180
2256	Shilong Small-Scale Hydro Power Project	10	51%	5 075 960	1 129	0.97%	0.170
2154	Cangxi Donghe Beituo Hydropower Station	10	39%	7 716 000	2 244	1.83%	0.274
2069	Cangxi Donghe Dongxi Hydropower Station	10	38%	7 463 000	2 269	1.85%	0.274
2084	Cangxi Donghe Yangmouisi Hydropower Station	8	40%	7 703 750	2 187	2.21%	0.274
2066	Cangxi Liyuan Hydropower Station	12	39%	5 836 667	1 721	2.76%	0.272
2082	Cangxi Donghe Fengziyan Hydroelectric Power Station	12	42%	6 190 000	1 664	3.22%	0.272
2058	Cangxi Donghe Likou Hydroelectric Power Station	10	40%	7 741 000	2 182	2.12%	0.274
	AVERAGE values	7.9	50%	7 138 687	1 671	2.37%	0.225
	The Lengshuikou project (S 1)	6.4	43%	5 087 219	1 345	4.25%	0.205
	Jinyuhe project (S 2)	2.5	48%	6 119 080	1 462	4.92%	0.205
	Xuekoushan project (S 3)	3.2	47%	6 084 188	1 471	4.50%	0.205



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Investment costs

For the proposed project, the investment per MWh is 1 345 RMB/MWh (S1), 1 462 RMB/MWh (S2) and 1 471 RMB/MWh (S3), which is in the range of 1 023 – 2 269 (RMB/MWh) registered small hydro plants in Sichuan Province.

The investment costs were further attempted cross-checked against real cost. The contracts for turbine –generator units /52/ were available for each stage and construction contract values /34/ for stage 1 and 2. Stage 3 is under construction and the price of the construction did not included in the contract /34/, but the price of the construction is included in the asset report for the Sichuan Mabian Tianhe Power /69/. The value of the construction is almost 14 million RBM and the total value is 19 469 400 RBM in PDR /11/.

The prices are following:

	Turbine-generator procurement contract	Construction contract	Sum	% of proposed total investment
Lengshuikou (Stage 1)	2 800 000 RMB	13 312 000 RMB	16 112 000 RMB	49,5%
Jinyuhe (Stage 2)	1 770 000 RMB	6 190 000 RMB	7 960 000 RMB	52%
Xuekoushan (Stage 3)	2 160 000 RMB	-		

As the additional works and the metal structure and installation were or will be provided in time, which represent relative long period, it is clear that the increasing of the prices as is represent in statistic /22/ increasing of the final total investment values for each stages as is presented in Annual assets report of project owner for 2009 /69/.

The investment cost estimated was considered reasonable.

O&M costs

The O&M costs for hydro power projects may vary by site locations. The O&M cost ratio per investment for the project is in range 4.25% ~ 4.92%. For comparison other hydro projects in Sichuan province O&M costs are in the range 0.97% to 3.74%.

DNV took note during the validation of the project activity that the ratio of O&M costs per investment costs for the project is higher than for other CDM projects in the same province. In this context, DNV has compared the project activity investment costs per MW to other registered CDM hydropower projects in the Sichuan province (see Table 1) and crossed checked individually each component of the project O&M costs.

According to Table 1, the average investment costs per MW for registered CDM hydropower projects in the Sichuan province is 7 138 687 RMB/MW. According to the project PDRs /11/, the investment costs per MW for Stage 1 is 5 087 219 RMB/MW, for Stage 2 is 6 119 080 RMB/MW and for Stage 3 is 6 084 188 RMB/MW, i.e. 28.7%, 14.3% and 14.8% respectively lower than the average for other similar CDM projects. The investment costs estimated in the PDRs are low in comparison to other similar project activity which results in a high ratio of O&M cost per investment cost.

Although DNV considers the O&M costs assumed to be appropriate, DNV has verified what would be the IRR for the project activity if a 2% O&M per investment costs ratio is applied. Based on DNV's technical area competence within hydropower, the typical annual O&M cost for hydropower project is about 2% of the investment costs for hydropower plants. The



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resulting IRR is 9.40% with the tariff from PPA signed in 2007 /16/ (0.205 RMB/kWh excl. VAT), and 9.77% with a tariff from the PPA signed in 2010 /72/ (0.214 RMB/kWh excl. VAT), and the IRR thus remains below the selected benchmark for the project activity (i.e. 10%).

DNV have cross checked individually each component of the O&M cost as described in the PDRs /11/ i.e. salaries, other fee, repair rate, water resource fee, material fee, maintenance fee and insurance fee (in majority from salary costs (47.7~34.5% of costs for individual stages) and repair cost (38.4~32.7% of cost for individual stages).

The salary is set to 15 000 RMB/person and repair cost as 1.5% of investment to station. The value of salary cost was confirmed by average salary for the year 2006 in Sichuan Province /55/, which were 17 852 RMB. Thus, the chosen salary 15 000 RMB per person is reasonable.

Furthermore, average of the actual salaries rates for Stage 1 and for Stage 2 /80/, which are in operation now, are higher than initially estimated:

Lengshuikou (Stage 1)		
	PDR	Reality
Employee member	22 person	16 ~ 17 person
Salary per month and person	1 250 RMB	2 096 RMB
Total Salary annually per Stage 1	330 000 RMB	418 640 RMB
Jinyuhe (Stage 2)		
Employee member	16 person	20 ~ 21 person
Salary per month and person	1 250 RMB	1 528.12 RMB
Total Salary annually per Stage 2	240 000 RMB	379 491.9 RMB

The welfare as percentage rate of total salary is determined by government legislation as presented below:

Item	Paid by Enterprise	Paid by Individual	Reference
Endowment Insurance	20%	8%	/75/, /76/
Medical Care Insurance	6.5%	2%	/75/
Unemployment Insurance	2%	1%	/75/
Maternity Insurance	0.6%	-	/75/
Employment Injury Insurance	0.6%~2%	-	/75/
Medical Care Insurance Supplement	1%	-	/75/
Housing Fund	5%~12%	5%~12%	/79/
Total	35.7%~44.1%	16%~23%	-

The project applied for total welfare 41% value, which is in compliance with the governmental legislation.



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The additional costs were set according to the preliminary document Power Generation Price Cost Audit Methods issued by Sichuan Province Price Bureau in 25 August 2006 /56/ which applies to hydro, thermal, wind, biomass and others power generation projects, regulates in its section 15 that a repair fee rate ranging from 1% to 2.5% is considered appropriate. Thus used 1.5% for repair cost is adequately set.

The water fee is determined by Sichuan Civil Government /77/ between 0.0025 and 0.005 RMB/kWh, i.e. the value applied to the project investment analysis 0.005 RMB/kWh is reasonable.

The insurance rate for the project activity is 0.25%. The insurance rate is between 2% to 2.4% for third level industry (i.e. hydropower plants) according to Company Property insurance Rate Regulation /78/.

The material fee for the project activity is 5 RMB/kW. DNV has verified that the material fee range for other registered CDM projects in the Sichuan Province is 0 ~ 10 RMB/kW. Thus the material fee applied for the project activity is within the range of other registered CDM project in the province.

Other Costs

Other costs are estimated in accordance with the economic evaluation code for SHP (SL 16-95) /53/. This code /53/ estimates other costs to 12 – 18 RBM/kWh for 6-12 MW power plants and to 18 - 21.6 RMB/kWh for 0.5 – 6 MW power plants, but for remote areas, which is the case of the present project, 10 ~ 25% may be added. Other costs at 22.50 RBM/kWh (S1) and 24 RBM/kWh (S2 and S3) are therefore reasonable.

Electricity generation

According to PDRs /11/, Stage 1 will produced an annual net electricity output of 24 210 MWh and it is calculated from an average annual gross electricity output of 31 682 MWh on the basis of the 80% effective coefficient of electricity, the 0.5% self-consumption and the 4% line loss. Thus a net load factor is 43%. The Stage 2 will produced an annual net electricity output of 10 466 MWh, which is calculated from an average gross annual electricity output of 12 500 MWh on the basis of the 87% effective coefficient of electricity, the 0.5% self-consumption and the 3.5% line loss. Thus a net load factor is 48%. Similarly Stage 3 will produced an annual net electricity output of 13 223 MWh, which is calculated from an average gross annual electricity output of 15 700 MWh on the basis of the 87% effective coefficient of electricity, the 0.5% self-consumption and the 3% line loss. Thus a net load factor is 47%.

1. Auxiliary and line losses

The auxiliary and line losses are in compliance with the Hydro Energy Design Code for Small Hydropower Projects (SL76-94) /53/. The Code /53/ determined that transformer and line losses should not exceed 11% of power generation and that auxiliary consumption should be between 0.5% and 1.0%. Thus the line losses (4%, 3.5% and 3%) and self consumptions (0.5%) determined in the individual PDRs /11/ are fully in compliance with the Code /53/.



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Furthermore, the line losses are also dependant on the transmission line length and voltage level. The transmission lines voltage for each stages are 35 kV and DNV has cross checked the distances of each individual stages from the Mabian Bijaoxi Transformer Substation according to the project activity installation layout plan /57/ and confirm that the estimated line losses (4%, 3.5% and 3%) are consistent with the evidence reviewed.

2. The coefficient of effective electricity

The PDRs /11/ were prepared by the Leshan Water Resource and Hydroelectric Investigation & Design Institute (LWRHIDI) with second class design qualification and approved by Sichuan Development and Reform Commission (SDRC). All the 3 stations are designed by LWRHIDI as a run-of-river project without regulation, and the volume of the reservoirs are 43m³ (Lengshuikou – S1), 1 610m³ (Jinyuhe – S2) and 13 000m³ (Xuekoushan – S3).

The coefficient of effective electricity in the PDRs /11/ is 0.8 for Stage 1 and 0.87 for Stage 2 and 3. DNV has cross checked these values against the PPA signed in 2007 /16/ which shows an aggregated coefficient of effective electricity for stage 1, 2 and 3 of 0.85, hence the value in the PDRs are consistent with the value given by the grid company through the issuance of the PPA /16/. Furthermore, DNV has verified the coefficient of effective electricity for Stage 1 through the review of a letter from the grid company /65/ which confirms that Lengshuikou station (Stage 1) as a coefficient of effective electricity of 0.80 when it was in operation.

According to the Economic Evaluation Code for Small Hydropower Project (SL16-95) /24/, the coefficient of effective electricity for the grid connected, monthly/weekly/daily/no regulating (run-of-river) hydropower stations is between 0.7 to 0.9. All three project activity stages are run-of-river hydropower plants without possibility of regulation, thus with a coefficient of effective electricity of 0.8 for Stage 1 and 0.87 for Stage 2 and 3, all three projects are in compliance with the Code /24/.

Even with a coefficient of effective electricity of 1, the aggregated IRR for all three stages is 9.67% and below the benchmark of 10%.

In addition, DNV was able to assess the coefficient of effective electricity against measured net electricity generation from Stage 1 as the plant is in operation since December 2008. The annual output was 18 785 MWh in 2009, which is correspond to an effective coefficient 62.1%. DNV has verified the measured data against the electricity generation settlement between Mabian Changhe Co. and Lengshukou hydropower station /81/, and confirms that the Lengshukou average net electricity generation to the grid in 2009 was 18 785 MWh. As the rainfall condition was in normal during this years and total rainfall was 4.4% less than long term average only, it is not probably that the effective coefficient will significantly increase in next years.

Rainfall of Sichuan Province in 2009 and 2010 (ml) /74/

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Rainfall
2009	7.3	7.6	22.8	64.4	69.0	143.4	219.6	170.3	122.7	59.1	20.5	8.7	915.4
Average value (history data)	10.4	15.5	25.7	55.0	97.1	145.2	204.9	176.7	134.0	60.9	22.3	9.8	957.6
Deviation	-4.40%												



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Thus coefficient of effective electricity for S1 is therefore reasonable.

3. Plant load factor

The plant load factor for the project is in interval 43% ~ 48% and by comparing with plant load factors of other projects in province is confirmed that its value is reasonable.

PLF (%)	
The proposed project	43% ~ 48%
Other hydro power projects in Sichuan Province	50% (average) 38% – 70%

The parameters used for plant load factor calculation are resourced from PDRs /11/, which was provided by engineering company contracted by project participant, as is requested in Annex 11 of EB 48th meeting in guideline for its validation. As well as option is to use plant load factor provided to the government while applying the project activity for implementation approval as was provided by approval of PDRs /12/. PDRs /11/ and grid company letter /65/ are consistent with the PDD /1/.

The plant load factors are based on these parameters, which are reasonable.

Electricity tariff

Electricity tariff was sourced from the PPA signed in 2007 /16/ as 0.205 RMB/kWh excluding VAT. DNV acknowledges that the PPA is dated after the project starting but as demonstrated below, it is the most conservative approach to be adopted for this project activity.

DNV has verified the project PDRs prepared in July and August 2006 /11/, these artificially estimate the tariff for each Stage of the project (0.246, 0.251 and 0.254 RMB/kWh excluding VAT for stage 1, 2 and 3 respectively) so that the project IRR crosses the benchmark. DNV would like to emphasize that the tariffs artificially estimated in the PDRs are not real tariffs and should only be considered as the tariffs calculated for the hypothetical condition that the IRR is equal to the benchmark. In this context, DNV does not consider these tariffs to be realistic.

At the time of the project investment decision, i.e. 20 December 2006 /34/, DNV has verified that the most recent information available to the project participant with regards to the electricity tariffs were as follow:

- A tariff approval from the Sichuan Provincial Bureau of Price for a 4 MW hydropower project operated in 2006 in Mabian County indicating a tariff of 0.192 RMB/kWh (excluding VAT) i.e. 0.225 RMB/kWh (including VAT); the information was issued on 30 March 2004 on Bureau's webpage /50/.
- The electricity invoice for Mabian Jixin Hydropower Station from company Mabian Power Co., Ltd. indicating a tariff of 0.18 RMB/kWh (excluding VAT) i.e. 0.211 RMB/kWh, dated 4 August 2006 /51/.



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DNV has verified that when applying these tariffs (0.192 RMB/kWh and 0.18 RMB/kWh both excluding VAT) the project IRR become 5.45% and 6.19%, which is below the benchmark and a lower IRR than if applying the tariff stipulated by the PPA.

During the validation of the project activity the project participant proposed to use the tariff from the PPA signed in 2007 /16/ indicating a tariff of 0.205 RMB/kWh excluding VAT. Although the PPA /16/ was issued after the project starting date DNV accepted and validated this tariff because it was more conservative to use the PPA tariff /16/ than the latest information available to the project participant at the time of the investment decision /50/ /51/.

Furthermore, in response to the review raised by the CDM EB for this project, DNV has assessed the tariff selected for the project activity against the CDM EB information note *on the highest tariffs applied by the executive board in its decisions on registration of projects in the Peoples republic in China* /73/. DNV would like to highlight that the project was submitted for registration on the 30 March 2010 whereas the information note was issued in June 2010.

According to the CDM EB information note /73/, the highest tariff for the Sichuan province is 0.29 RMB/kWh (including VAT) i.e. 0.248 MB/kWh (excluding VAT).

The IRR calculations for the project activity with the highest tariff of 0.29 RMB/kWh (including VAT) according to the information note /73/ are over benchmark value for S1 stage of the project, but the aggregated IRR for all project's stages is 9.46%, which is still lower than the benchmark.

Furthermore, DNV would like to emphasize that the project is connected to the local grid /16/ /57/ and not directly to main Sichuan grid. This situation was verified through the notice of NDRC on the adjustment of Tariff in CCPG /60/ dated on 19 November 2009, where is determined protective tariff for SCC hydropower project as 0.14 RMB/kWh excluding VAT.

The project is connected to the local Mabian Power Grid (Leshan City) and according to Sichuan Price Bureau; this local grid company is responsible for grid tariff setting /58/. Comparing with tariff for other projects from the same area (Leshan City) /59/ (dated in April 2007), which is available officially on Sichuan Price Bureau website and which is 0.203 RMB/kWh excluding VAT. The local grids are main part of the Sichuan power grid and mainly part of these local grids is rural. Previous connected stations (from 2002 was only three - Sichuan Mabian Yi-Autonomous County Bajiaoxi Hydro Power Station, Mabian Yinhe Hydropower station and Mabian Jixin Hydropower Station) have lower tariffs 0.18 ~ 0.192 RMB/kWh excluding VAT. The Mabian Power Grid (Leshan City) is a small local grid but given the project's stages location /57/, they do not have the possibility to choose another grid. The highest tariff found in this grid is 0.22 RMB/kWh excluding VAT /67/. When this tariff is applied, all stages are lower than benchmark. The Stage 1 reach 8.59% and the other two are 8.05% and 7.67%.

As the level of prices was set 0.369 RMB/kWh in low-water season, 0.28 RMB/kWh in normal-water season and 0.24 RMB/kWh in high-water season for selling from Mabian Power Grid to Muchuan Power Grid from April 2007 (all excluding VAT) /70/, it is clear that



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prices for delivered electricity to Mabian Grid have to be lower than 0.28 RMB/kWh and the highest tariff found for selling to the Mabian power grid of 0.22 RMB/kWh excluding VAT is reasonable.

Tariff (RMB/kWh) excluding VAT	
The proposed project	0.205
Other hydro power projects in Sichuan Province	0.225 (average) 0.170 – 0.274

As was presented in this report, the tariff is strictly dependent on the local grid companies according to legislation. Further project owner presented variation of the tariff prices in Sichuan province for period 2002 to 2007 /68/, which are public available. The information confirm situation, that the prices in the Sichuan provincial grid are significantly higher (0.29 RMB/kWh) than in the local grids. As the project's stages cannot be connected to the provincial grid directly, this tariff is not available to the project participants.

At the time of the request for review raised by the CDM EB, additional evidence was available to validate the tariff. A new PPA was signed in September 2010 /72/ for the project and was reviewed by DNV. The new PPA determined a new tariff 0.25 RMB/kWh (including VAT) i.e. 0.214 RMB/kWh (excluding VAT) for all 3 stages. This tariff is fixed through the PPA until 2013. The tariff from the new PPA /72/ is lower than found in the EB information note /73/. DNV has verified that when applying this new tariff (0.214 RMB/kWh excl. VAT) the IRR becomes 7.47% which is below the benchmark.

DNV was able to confirm value of tariff as reasonable.

Taxes

The other parameters in the financial assessment are listed as:

Table 3 the other parameters in the financial assessment

Items	Value	Reference
Value added tax	17%	/64/
Income tax	33%	/61/
Education tax (of the VAT)	5%	/62/
City building and maintenance tax (of the VAT)	1%	/63/

According to "Notice of Opinions on the Implementation of Some Policies and Measures for the Great Development of China's West" /68/, for the newly initiated transportation, electric power, water conservancy, postal, broadcasting and television, and other enterprises in the western region, the business income taxes will be exempted in the first two profit-making years and reduced by half in the ensuing three years. The tax holiday on income tax (zero for the first two years and half for the 3rd to 5th year) has been considered during IRR calculation of the 3 stages according to this Notice.

Tax benefit from interest payment is included in the income tax calculation.

By cross checking with the national taxation regulations and sectoral regulations /61/ /62/ /63/ /64/ DNV was able to confirm that the taxation rates in the financial assessment are all in line with national regulations.



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From the above comparison table, crosschecking of individual parameters and by applying our sectoral competence, DNV is able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

4.5.6 Investment analysis: Calculation and conclusion

The project-IRRs calculation over 22 (S1), 32 (S2 and S3) years were provided in a spreadsheet /6/ - /8/. The IRR is demonstrated to be results without CDM revenue are in interval from 6.83% to 7.59% for all three individual stages. Results with CDM revenue are in interval from 13.64% to 14.51%. Further aggregated IRR without CDM revenues is 6.96% and with CDM revenues the IRR increases to 13.36%. Therefore, the project is not economically attractive without CDM revenue.

4.5.7 Investment analysis: Sensitivity analysis

Moreover, a sensitivity analysis was carried out for parameters contributing more than 20% to revenues or costs in order to check the robustness of the financial analysis. Reasonable variations of the fixed asset investment, annual operational costs, electricity output and on-grid tariff were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correlation.

- The fixed asset investment shall decrease in interval 18.05 – 26.98% for individual stages for reaching to benchmark value (about 24.35% for aggregated IRR). DNV was able to verify from the official data from national bureau of statistic of China /33/ which showed that the prices indices have increased during the period from 1998-2005 and there is very low probability of a significant reduction in the following years. The contracts for turbine-generators /52/ sets and constructions contracts /34/, which were available in time investment decisions covered between 80% and 96% of total investment for this parts in mentioned in PDRs /11/. As the contracts /52/ /34/ did not cover all investment related to this parts the value of the investment indicate that the decreasing about above mentioned percentage is not reasonable. Further the assets evaluation for stage 1 /66/, which was available during validation, was over 40 million RMB, which is higher about 23% than proposed investment for this stage. The report scope was Stage 1 only and the replacement cost method was adopted for evaluation of the market value of assets assessed on the assessment criteria day. Provided Financial report for 2009 included all 3 stages together with other hydropower plant. Assets for stage 2 is over 25 million RMB, which is higher about 73% for this stage and the last stage, which is in construction phase now, has investment in construction almost 14 million yet /69/, which is 71% of value presented in FSR /11/. Hence, in DNV's opinion, the fall in fixed asset investment to interval 18.05 – 26.98% seems highly unlikely.
- The operational cost shall decrease in interval 53.57 – 70.26% for individual stages for reaching benchmark value (about 83% in aggregated IRR). Above arguments hold



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good for operation cost as well where, keeping in view the above market trend, the scope of fall and this decreasing is highly unlikely. Thus, in DNV's opinion that fall of cost about more than 50% is unlikely.

- The power generation shall increase in interval 18.02 – 30.55% for individual stages for reaching value (about 26.4% in aggregated IRR). DNV would like to mention that the power generation is dependent mainly on the water resources availability. And it has been verified by DNV that the generation capacity of the power plants considered under the project activity has been estimated based on hydrological data for latest 20 years as is documented in hydrology sections of PDRs for individual stages /11/. Additionally the IRR calculation was checked for using 0.9 and 1 coefficient as more conservative approach and resulting IRRs were still under benchmark for 0.9 coefficient (in range 7.18% ~ 9.27%). When will be IRR calculated with effective coefficient equal 1, the stage 1 is closely up benchmark (10.91%) only and other two stages are still under benchmark (8.99% and 7.18%). Aggregated IRR for all three stages is 9.31% only. Though there might be a variation in the operating hours of the power plants depending on the seasonal flows, however, the variation up to an extent of 20% (approximately) seems to be highly unlikely. And as it is confirmed by grid company /65/ that although the electricity could increase, the demand will be probably lower and thus it is unlikely that all electricity will be possible delivered to grid.
- The electricity tariff shall increase in interval 17.58 – 28.99% for achievement of 10% IRR (about 25.5% in aggregated IRR), which is benchmark value. DNV would like to mention that the tariff for the investment analysis of proposed project has been determined in PPA /16/. The price has been fixed for the next five years and after that, the same will be regulated by national laws. As the PPA was signed after PDRs /11/ approvals the price was deeply crosschecked with other projects in Sichuan province for investigation its reasonability. It was investigated registered projects in Sichuan under 50 MW have the same average in years 2004 till 2006 (i.e. 0.204 RMB/kWh, 0.203 RMB/kWh and 0.204 RMB/kWh). However higher tariffs 0.288 RMB/kWh were found, when was investigated all projects in Sichuan province, these tariff are not available in the Local Leshan city grid, where is highest tariff 0.22 RMB/kWh excluded VAT. This is reason why it is unlikely increasing of price in this interval.

The sensitivity analysis provided evidence that key indicators are robust and IRR of the project is lower than the benchmark.

The sensitivity and investment analyses have shown that the project is unlikely to be the most financially attractive option. The financial calculation and assumptions have been assessed by DNV and are considered correct and conservative. The project IRR with CER revenues for the project is estimated above the benchmark.

4.6 Monitoring

The project applies the approved monitoring methodology AMS-I.D “Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories” version 16 /2/. The selected monitoring methodology is applicable for the project.



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In order to keep the monitoring activities under control, a monitoring manual /28/ for the project was prepared.

The monitoring manual /28/ contains principles and concepts on which it is based, operational and monitoring obligations of the project owner like resources involved in the monitoring process, training, support activities, calibration and collection data, quality assurance procedures, data management, electronic support tools, etc.

4.6.1 Parameters determined ex-ante

Ex-ante emission factor in year y $EF_{grid,CM,y}$ (tCO₂/MWh) is determined as combined margin (CM), which is combined from operating margin (OM) and build margin (BM) according to the “Tool to calculate the emission factor for an electricity system”/3/ and it will be recalculated during the first crediting period. CCPG was determined as the relevant grid system.

Data and Parameters	Unit	Value applied	Sourced data
OM emission factor ($EF_{grid,OM,y}$)	tCO ₂ /MWh	1.2899	China Energy Statistic Yearbook (2004-2007); China Electric Power Yearbook (2002-2007) /21//22/ and Baseline Emission Factors for Power Grids in China (renewed 9 August 2007) /25/
Build Margin emission factor ($EF_{grid,BM,y}$)	tCO ₂ /MWh	0.6592	
Combined emission factor ($EF_{grid,CM,y}$)	tCO ₂ /MWh	0.97455	Calculated
Installed capacity before implementation of the project (CAP_{BL})	W	0	The project is new run-of-river hydropower plants
Flooded area (A_{BL}) before implementation of the project	m ²	0	The project is new run-of-river hydropower plants

Vintage data from the years 2003 - 2006 /21//22/.was applied for the calculation of OM and BM, as this was the latest available data at the time of web-hosting the PDD in April 2008. This is in compliance with the tool to calculate the emission factor for and electricity system /3/. Thus, DNV can confirm that the data sources are reliable and that the calculation and results are correct /25/

4.6.2 Parameters monitored ex-post

The parameters monitored *ex-post* are the electricity supplied to the grid by all stages, electricity bought from grid by all stages individually only, the area of the reservoirs of individual stages and the installed capacity of the individual hydropower plants.



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These measurement devices are according to national standards include QA/QC procedures. Totally four electricity meters should be installed finally. Three will be for individual metering of each stage. These will be used as back-up metering. The fourth will be major electricity meter installed in front of transformer substation to the Mabian County Grid. All of them will fulfil Chinese standard "electricity meter installation technical management code" (DL/T448-2000) and will be calibrated according to local standards. These metering technology and fulfillment of determined conditions will be subject of initial and periodic verifications.

The area of the reservoirs of individual stages measured in the surface of the water will be measured annually from topographical surveys and the installed capacity of the individual hydropower plants will be determined annually based on the recognized standards.

4.6.3 Management system and quality assurance

The project applies the approved monitoring methodology AMS-I.D "Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories" version 16 /2/. The selected monitoring methodology is applicable for the project. Roles and responsibilities for data collection, monitoring and reviewing are defined in the Monitoring manual /28/. An internal auditing process, with corrective actions and data management system, are also foreseen in the Monitoring Plan in order to ensure the correctness of the monitoring process.

The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

Project emissions are considered zero since the project is a run-of-river with power densities up to 10 W/m². Leakage consideration is not applicable for the project by AMS-I.D (version 16) /2/ and has not been considered for the project.

The application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.

4.7 Estimate of GHG Emissions

The application of the baseline methodology is transparent and conservative. The emission reduction ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

- 1) Baseline emissions: Baseline emissions (BE_y in tCO₂) are the product of the baseline emissions factor (EF_y in tCO₂/MWh) multiple the net electricity supplied by the project activity to the grid (EG_y in MWh).
- 2) Project emissions: No project emissions are calculated regarding to project is new a run-of-river diversion type of small scale hydro power station with power densities 91 428 W/m² (S1), 2 924 W/m² (S2) and 660 W/m² (S3), which is in all cases greater than 10 W/m² /11/. The power densities are calculated from areas of individual reservoirs and installed capacity:

$$S1 = 6400000 \text{ W} / 70 \text{ m}^2 = 91\,428 \text{ W/m}^2$$

$$S2 = 2500000 \text{ W} / 855 \text{ m}^2 = 2\,924 \text{ W/m}^2$$



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$$S3 = 3200000 \text{ W} / 4\,848 \text{ m}^2 = 660 \text{ W/m}^2$$

3) Leakage: No leakage has to be considered for the proposed project activity.

Thus emission reductions are equal with baseline emission and they are calculated according next formula:

$$ER_y = BE_y = EG_y \times EF_{grid,CM,y}$$

Emissions related to production, transportation and distribution of fuel used for the power plants in the baseline are not included within the project boundary, as these do not occur at the physical and geographical site of the project. Emissions related to transportation are also excluded from the project boundary (these assumptions comply with guidance and rules for small-scale project activities).

The baseline emission factor for the project is determined *ex-ante* as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM) according to “Tool to calculate the emission factor for an electricity system” of version 2 /3/.

The PDD was published on 21 March 2008 with the data for calculation of the grid emission factor at the time of requesting registration of the project to the latest data available; Yearbooks from 2007, showing 2006 data vintage /21/ /22/. The calculation is furthermore in accordance with the calculation of the combined margin emission factor published by the DNA of China /25/.

Aggregated generation and fuel consumption data are used due to the fact that more specific data for the power plants are not available in the CCPG (option C). Country specific data for net calorific value of each type of fossil fuel, country specific data for emission factors for the fuel /22/, IPCC 2006 default values for the oxidation factor of each type of fossil fuel and the total electricity delivered to the CCPG /21/ were selected and deemed reasonable.

The grid emission factor of the CCPG is determined *ex-ante* for the 7 years crediting period following “Tool to calculate the emission factor for an electricity system” of version 2 /3/. It has been calculated as the weighted average ($w_{OM} = 0.5 : w_{BM} = 0.5$) of the operating margin and the build margin emission factors.

According to the data from China Electric Power Yearbook 2004-2007 /21/, the low-cost/must-run resources in the latest five years including year 2003 to 2006 constitute less than 50% of the total grid generation (in Central China Power Grid, the renewable energy sources only possesses 34.43%, 38.37% and 38.59% of its total electricity generation in year 2003, 2004 and 2005 respectively). Therefore, it is justified that the OM is calculated using the “simple OM” method. OM is calculated to be 1.2899 tCO₂e/MWh as a generation weighted average for the years 2003, 2004, 2005 and 2006 /53/.

Because plant specific fuel consumption and electricity generation data are not publicly available in China, the guidance requested by DNV from the CDM Executive Board for a deviation of the baseline methodology of AM0005 has been applied for calculation of the build margin (BM) emission factor for this project /5/:

- Use of capacity additions from the years 2002 to 2005 is chosen and reaches 24.60% of the total installed capacity /13/;



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- Use of weights estimated using installed capacity in place of annual electricity generation. Thermal power plant accounts for 69.52% of the total installed capacity additions in this period /13/. Since specific data for each technology is not available, the fraction of fuels (coal 99.47%, natural gas 0.36% and oil 0.17% /21/) was estimated from the CO₂ intensity for the fuels used in the CCPG;
- Use of the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption. This is 35.82% for coal power plants and 47.67% for oil power plants and gas power plants /21/. The efficiency values were available at the time of PDD webhosting.

The BM is calculated to be 0.6592 tCO₂e/MWh. The resulting combined margin emission factor is 0.97455 tCO₂e/MWh, and the annual electricity delivered to the CCPG is expected to be 47 898 MWh /53/. The baseline emission is 46 679 tCO₂e per year.

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

In summary, the GHG calculations are complete and transparent, and the data accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.8 Environmental Impacts

The complete Environmental Impact Assessment (EIA) for Stage 1, Stage 2 and stage 3 of Sichuan Lengshuikou 12.1 MW Small-Scale Bundled Hydropower Project /13/, have been respectively approved by Leshan Environmental Protection Bureau in 2007 with document number of [2007]432, [2007]430, [2007]431 /15/.

No major impacts to environment were identified but there are some immigrant and land compensation due to the project activity (according to the FSR and EIA). The land compensation was contracted /37/ and immigrant compensation did not need regarding to deviation of the diversion channel deviation.

4.9 Comments by Local Stakeholders

The stakeholder consultation process has been conducted according to Chinese Environmental regulations (first consultation with stakeholders was performed as obligatory part of EIA), a consultation meeting of the project was organized on 10 January 2007 and simultaneously questionnaires were distributed in order to obtain opinions from stakeholders. Thirty questionnaires were obtained from local stakeholders. A summary of the stakeholder comments have been included in the PDD /1/. All comments were positive and it has been verified that all comments have been satisfactorily addressed.

4.10 Comments by Parties, Stakeholders and NGOs

The PDD Version 02 of 21 March 2008 was made publicly available on DNV's climate



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change website

(http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1813) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period respectively from 13 April to 12 May 2008.

No comments were received.

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	N.A.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK

Requirement	Reference	Conclusion
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
About small-scale project activities (if applicable)		
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
13. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK
About stakeholder involvement		
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		

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Requirement	Reference	Conclusion
17. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
19. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
20. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
21. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR	Yes, the project covers 3 stages, which are located as follows: – The Lengshuikou project is located in Wenquandang Town, 40 km from Mabian County (east longitude of 103°25' 01" and north latitude of 28°55'13"); the Jinyuhe project is located in Wenshuidang Town, 29 km from Mabian County (east longitude of 103°26'13" and north latitude of 28°54'30") and The Xuekoushan project is located in Xuekoushan Town, 25 km from Mabian County (east longitude of 103°27'53" and north latitude of 28°55'43"). Boundaries include the physical, geographical sites of renewable generation resources inclusive all generation power units of all three plants and power grid they connected, i.e. CCPG.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	Yes, the proposed project assumes supply of electricity to Mabian Bajiaoxi Transformer Substation which is a part of Sichuan Provincial Power Grid which is a part of		OK

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

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			Central China Power Grid (CCPG) according to the PPA, how is described above.		
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>	§ 51 – 54 125 - 127				
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	<p>Involved Parties</p> <p>People's Republic of China as Host Country, and Netherland as Annex I Country.</p> <p>Project Participants</p> <p>Sichuan Mabian Tianhe Power Co., Ltd. As the project owner, and CEZ a.s. as the CER buyer</p>		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/ /9/ /10/	DR	<p>China issued the LoA in October 2008, No 1514.</p> <p>Netherlands issued the LoA 27 November 2008</p> <p>.</p>	CAR1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/ /9/ /10/	DR	<p>Ratification of the KP: China ratified the Kyoto Protocol on 30 August 2002, and and Netherlands ratified the Kyoto Protocol on 31 May 2002</p> <p>Voluntary Participation: China, which issued</p>	CAR1	OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			the LoA in October 2008, No 1514. Netherlands: LoA was issued 27 November 2008 Designated National Authority: DNA China is under the National Development and Reform Commission of the People's Republic of China, while the DNA of Netherlands is under Ministry of Housing, Spatial Planning and the Environment,		
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	No public funding used for the project activity.		OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>	§ 58 - 64				
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes. The project design engineering reflects good practices.		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/ /11/	DR	The project results in the use state of the art technology. All stages have two sets of turbine-generator 1.Stage (CJA237-W100/2×9.8 and SFW3200-8/1730), 2.Stage	CL7	OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<p>(HLA542-WJ-71 and SFW1250-6/1180) and 3.Stage (HLA542-WJ-84 and SFW1600-8/1730); all are produced by local Chinese companies – Sichuan Taiji Electrical and Mechanical Equipment Co., Ltd.</p> <p>The electricity coefficients shall be clarified.</p> <p>The coefficients are set according to PDRs for individual stages:</p> <p>Lengshuikou – electricity coefficient 0.80, self-consumptions 1% and line loss 4.0%</p> <p>Jinyuhe – electricity coefficient 0.87, self-consumptions 0.5% and line loss 3.5%</p> <p>Xuekoushan – electricity coefficient 0.87, self-consumptions 0.5% and line loss 3.0%</p> <p>For Jinyuhe and Xuekoushan were coefficients recalculated from determined effective electricity.</p>		
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	All of the activities will be monitored by experienced technical experts. Training will be provided to all the employees according to the training plan.		OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project	/1/	DR	Yes. It is declared in the LoA, which China	CAR-1	OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
assists it in achieving sustainable development?	/9/		issued in October 2008, No 1514.		
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes, the project activity will provide employment opportunities to the local population and thereby help alleviate poverty. The project also helps enhance the local investment environment and improve the local economy.		OK
A.5. Small scale project activity <i>It is assessed whether the project qualifies as small-scale CDM project activity</i>					
A.5.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 I of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	The project activity is a renewable energy generation project (hydroelectric). The total installed capacity of the proposed bundled project is 12.1 MW and hence it fulfils the criteria for type I small scale projects. The electricity generated will be supplied to Central China power grid and hence will displace same amount of electricity generated by fossil fuel based electricity in the grid.		OK
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	/1/	DR	The Project participants did not register within the previous two years and will not apply to register another small scale CDM project activity in the same project category and technology/measure, within a 1 km		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			boundary of the proposed project.		
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>	§65 - 76				
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/ /2/ /3/ /4/	DR	Yes. The project applies AMS-I.D., version 13 “Grid connected renewable electricity generation”. Additionally, it uses “Tool to calculate the emission factor for an electricity system” (version 01) and “Tool for demonstration and assessment of additionality”(version 04)		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	Yes. The renewable energy will be produced using hydro resources, furthermore the power generated by the project activity will be exported to the Central China Grid; the proposed capacity is 12.1 MW (less than 15 MW) and it uses renewable power generation.		OK
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely</i>	§ 81 - 88				

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

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR	The baseline scenario is power supplied by the Central China Grid.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/ /3/ /6/ /7/ /8/	DR	<p><u>The proposed scenario without CDM project activity</u> – it is according to China law but not financially attractive according to Investment analysis</p> <p><u>A thermal power plant with the same installed capacity as the project</u> – it does not comply with relevant Chinese laws which prohibit the construction of thermal power plants with capacity lower than 135MW, and also the construction of thermal plants, with a capacity lower than 100MW, are strictly controlled by the authority, therefore this option is not feasible.</p> <p><u>Installation using other renewable resources with the same capacity or annual electricity generation</u> – no potential for wave or tidal energy nor for geothermal energy; no biomass based power plant with a similar scale to the project has previously been built in the region; solar energy is too expensive and wind potential is too poor.</p>		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			<u>The proposed scenario under CDM</u> – it is in compliance with the Chinese regulations.		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/ /2/ /3/	DR	Yes. According to AMS-I.D. (version 13) method (a) is used to calculate the baseline emissions factor ($EF_{grid,CM,y}$) as the combined margin (CM), consisting of combination of the operating margin (OM) and the build margin (BM) according to the procedures described in the ‘tool to calculate the emission factor for an electricity system’.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /3/ /5/	DR	For <u>OM emission factor</u> is used simple OM method with option C based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (A + B option was denied because consumption data for power plants are commercially confident and Nuclear and renewable power generations are considered low-cost / must-run power plants / units within the CCPG). Ex ante option with a 3-year generation-weighted average was used for OM emission factor. The factors are calculated for years 2004, 2005 and 2006. For <u>BM emission factor</u> is used Option1 calculation Ex-ante (based on the most recent information available on plants already built		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			for sample group m at the time of PDD submission) and deviation according Letter from DNV to EB /5/. It is the weighs of capacity addition of different technologies and application of efficiency factor, which represent the best technology commercial available. The EF_{BM} value will not be reviewed in the first crediting period. For <u>CM emission factor</u> the following formula is used: $EF_{grid,CM,y} = EF_{grid,OMsimple,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$, where $w_{OM}=0.5$ and $w_{BM}=0.5$		
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Bulletin on the Baseline Emission Factor of China's Regional Grids", which is renewed and published by the DNA (Office of National Coordination Committee on Climate Change) in China, of 9 August 2007, is the main data source.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	Yes.		OK
B.3. Additionality Determination	§ 94 —				

* MoV = Means of Verification, DR= Document Review, I= Interview
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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>	121 § 98 - 103				
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR	Yes, attachment A to Appendix B of the simplified modalities and procedures for CDM small scale project activities.		OK
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /6/ /7/ /8/ /31/ /32/ /33/	DR I	<p><u>Investment barriers</u> –the IRR is lower than 10 % (S1 – 7.49%, S2 – 7.30%, S3 – 7.61%) without CDM contribution, the PP provided full open calculation in excel spradsheed</p> <p>Sensitivity analysis (\pm 10%) was performed on IRR of the project activity without CDM contribution using four sensitivity factors (total investment, annual O&M cost, go-to-grid electricity and electricity tarif), the conclusion of this analysis is that the project activity without CDM contribution faces significant economic and financial barriers.</p> <p>New revised PDD accept requirements related CAR2.</p> <p><u>Financing barriers</u> – 70 % of the total investment will be loaned from a bank. And project owner is applying for a bank loan, if the bank will consider the improved re-payment ability when the project is developed as a CDM project. It was</p>	CAR2	OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			demonstrate with contract with bank /31/ /32/ The requirements for information about data resources were fulfilled in revised PDD /2/ Evidence of electricity tariff was provided /33/.		
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Yes	CAR2	OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /34/	DR I	The starting date according to the interview as follows: Lengshuikou: January 2007 Jinyuhe: January 2007 Xuekoushan: September 2008 evidence needed – the construction contract was provided board meeting minutes dated 5 September 2006 as CDM consideration The 20 December 2006, the date of signature of construction contract, was chosen as correct starting date. It is earliest contract related to project activity.	CL1	OK
B.4. Calculation of GHG Emission Reductions – Project	§ 89				

* MoV = Means of Verification, DR= Document Review, I= Interview
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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>	- 93				
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /11/ /35/	DR I	For ex ante emission reduction calculations, the project emissions have been considered as zero on the basis that the project is based on zero emission sources. According to the PDR, all three projects are of the run-of- the river type without reservoir. So no power density needs to be considered. However, the project developer needs to clarify if there is a use of any fossil fuel in emergencies/start-up. This question was clarified by letter from project owner /35/.	CL2	OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/ /11/ /35/	DR I	The project developer needs to clarify the use of any fossil fuel in emergencies/start-up. Yes. It was clarified.	CL2	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?			According to the PDRs, all three projects are of the run of the river type without reservoir. So no power density needs to be considered.		OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions	§ 89 - 93				

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

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	<p>Assumptions to obtain the emission factor are described on B.2.4.</p> <p>Considering that:</p> <ul style="list-style-type: none"> - Leakage for project is zero, this is confirmed by PDR, all three hydro stations are of the run of the river type without reservoir. - GHG for the project activity is zero <p>the annual emission reductions (Bey) in the first crediting period are equal to:</p> $B_{ey} = E_{gy} \times E_{fy} = 46\,679 \text{ tCO}_2\text{e}$ <p>Please clarify the status of Wenshuidan hydro power station, and how do you ensure that the electricity generation will not be counted in the project activity.</p> <p>The Wenshuidan hydro power station is part of the project, which was not realized according to PP decision.</p>	CL3	OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	The IPCC 2006 values are considered in the emission factor calculation for CO ₂ emission		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			factor and oxidation factors. The grid emission factor has been sourced from the Central China power Grid.		
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes.		OK
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>	§ 89 - 93				
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	No leakage is required to be considered since the project does not involve transfer of any energy generating equipment from another activity nor is any existing equipment transferred to another activity.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?			same as above		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?			same as above		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable</i>	§ 199				

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

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>and give long-term benefits related to the mitigation of climate change.</i>	– 203				
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	<p>Please clarify the status of Wenshuihan hydro power station and how do you ensure the electricity generation will not be counted in the project activity. How was declared above it was cancelled.</p> <p>Please clarify when did the project start operation? Given commission date are: S1 – July 2008, S2 – March 2009 and S3 – December 2009.</p>	CL3 CL4	OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>	§ 122 - 124				
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR I	The monitoring plan is described in the PDD and is in accordance with the simplified approved methodology, AMS I.D version 16.		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Yes. The only parameter to be monitored is the net electricity supplied to the grid and this is done by metering. It is clearly mentioned in the PDD that the monitored data will be kept for two years after the end of the crediting period.		OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan</i>	§ 122 -				

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>provides for reliable and complete project emission data over time.</i>	124				
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/ /2/ /35/	DR	The project activity is a run-of-river renewable electricity generation without reservoir and hence no project emissions are expected to result from the project activity. However, the use of fossil fuel for emergencies/start-up needs to be clarified by the project developer. Hence, the resulting project emissions (if any) need to be monitored. It was clarified.	CL2	OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>	§ 122 - 124				
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR I	Yes. For baseline calculations, electricity supplied and bought by the project activity is to be monitored. They both is recorded by digital meters and the same will be documented. Please clarify the status of Wenshuihan hydro power station and how do you ensure that the electricity generation will not be counted in the project activity. Status was clarified	CL3	OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes.		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes.	CL3	OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR I	Yes. Two meters, reception and cross check meter will be installed and monitored for each of the hydro stations.		OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR I	Yes. Two meters, reception and cross check meter will be installed for each of the hydro stations. Every month the meter reading will be recorded and monitored. If the error of the reception or the cross check meter exceeds the allowable range, which is specified in the national standards, it will be replaced by new meter.		OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	The measured data will be collected and recorded monthly. It is in line with the monitoring methodology.		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR I	The procedures for records handling are identified in the monitoring plan.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the	/1/	DR	Yes, periodic checks will be conducted as per national standards. If the error of the		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
calibration intervals being observed?			reception or the cross check meter exceeds the allowable range specified in the national standards, the same will be replaced by new meter. The PP has clearly mentioned operational procedure and responsibilities for monitoring and quality assurance.		
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR I	Yes. The procedures for records handling are identified in the monitoring plan. The time of records keeping shall be clearly defined as time of crediting period + 2 years. It is declared in revised PDD but procedure for data storing should be checked during the Initial verification (in light to legibility and protection from overwriting)	CL6	OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>	§ 122 - 124				
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	According to AMS-I.D. leakage determination is not required for this type of project (they are zero).		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?			same as above		OK
B.11.3. Is the measurement method clearly stated for each			same as above		OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
leakage value to be monitored and deemed appropriate?					
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR I	Monitoring of sustainable development indicators is not required by the Chinese DNA. The environmental impacts are identified in the EIA that was approved on the 2 nd of March 2005.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /2/	DR	Chinese DNA, NDRC, does not require collection and archiving of data related to environmental, social and economic impacts. The environmental impacts will be monitored by a local environmental authority.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR I	Same as above.		OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR	Yes. Authority and responsibility of the project management is described in the PDD.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Yes, currently the project is not yet implemented so staff will be trained prior to start of monitoring duties. Training plan attached.		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Since the project activity is a run-of-river hydro power generation, there will be no unintended emissions.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	This is described in the PDD. Data and records will be checked prior to being stored and archived. Data from the project will be checked to identify possible errors or omissions. The data checks will include cross checks of the two electricity meters, and checks of the electricity figures on the receipts. All records will be checked for completeness.		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	Yes, corrective action identified in the PDD.		OK
C. Duration of the Project/ Crediting Period	§ 99				

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
<i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>	– 100, 104				
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/ /34/	DR I	According to the information found in the interview, the starting date for individual Stages is as follows: S1 – January 2007, S2 – January 2007, S3 – September 2008. Thus PP decided that the starting date of the bundled project is determined as 20 December 2006, what is construction contract for Stage 1 and Stage 2. Expected operational lifetime is 20 years for S1 and 30 years fro S2 and S3.	CL4	OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR I	Yes. 1 August 2009 or the four weeks after the submission of request for the project registration by the UNFCCC whichever is later. Please clarify when the project starts operation and the data of start of the crediting period should be changed accordingly. Given commission date are: S1 – July 2008, S2 – March 2009 and S3 – December 2009.	CL4	OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>	§ 131 - 133				
D.1. For Small-scale projects					
D.1.1. Does host country legislation require an analysis	/1/	DR	Yes, It is mentioned in the PDD, according to		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
of the environmental impacts of the project activity?		I	the clauses 13 and 19 of the Environmental protection law of China. DNV was able to verify the “Environmental impact assessment law”. The Law requires that all construction projects must carry out an environmental impact assessment before the project starts. The project entity must analyse the Environmental Impacts of the project activities in China.		
D.1.2. Does the project comply with environmental legislation in the host country?	/1/ /13/ /15/	DR I	Yes. An environmental impact assessment is required by Chinese law & regulation. The EIA has been approved by Leshan Environmental Protection Bureau. DNV was able to verify the approval by the EIA on the 23 August 2007.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/ /11/ /13/ /36/ /37/	DR I	No adverse environmental effects are observed as it is a small scale project activity. Some air pollution, noise pollution and land erosion will occur prior to the project activity due to construction activities. According to the PDR and EIA, there are some immigrant and land compensation due to the project activity required, but there is no approved resettlement plan and compensation in submitted records. Evidence about contract related land	CL5	OK

CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			compensation was provided /37/ and it was declared that no immigrant compensation will need /36/.		
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR I	Yes.		OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>	§ 128 - 130				
E.1.1. Have relevant stakeholders been consulted?	/1/ /15/	DR I	CDM stakeholder consultation meeting for the proposed project was organized on 21 March 2008 at the project site. And questionnaires were distributed too. The evidence for the same of these activities was checked during the interview.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /15/	DR I	Yes. It was checked with 38 questionnaires dated 17 January 2007, which were part of EIA.		OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR I	Yes. According to the requirement by the Measures for Operation and Management of the Clean Development Mechanism Projects in China and Environment Impact Assessment Law in China, the project needs to carry out a stakeholder consultation process.		OK

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CHECKLIST QUESTION	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR I	Yes. It is available in the PDD.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR I	The comments were positive in light of the local economy benefit and environment quality (100%), only majority of stakeholders (73%) worry about noise pollution and other negative impacts during the construction period.		OK

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.1. Letter of approval	§49				
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/1/ /9/ /10/	DR	The letters of approval from the DNA of both side has been obtained		OK
A.2. Project design	§64				
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/ /2/ /11/	DR	Yes, the project location, technology and install capacity are clearly described in the PDD and in line with the approved PDRs, system boundaries determination in line with the approved methodology AMS-I.D. and the	CL7	OK

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			<p>delineation of grid boundaries as provided by the DNA of China.</p> <p>Only CL related to electricity coefficient was requires.</p> <p>The coefficients were included to PDD in section related to technology descriptions.</p>		
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/	DR	The project is a new grid-connected renewable power plant use water resource in the Sichuan province in China. The project starting data was 20 December 2006, is earlier than the project PDD first publish date of 13 April 2008.		OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/ /9/	DR	<p>The project activity is a new grid-connected Hydro power project, the aggregated installed capacity is 12.1 MW, is lover than 15 MW, so it is a small scale project.</p> <p>On 23 May 2008, DNV's auditor Guo Kang performed on desk interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Mabian Tianhe Electricity Power Co., Ltd. and Enecore Carbon Ltd. were interviewed. The auditor checked the project background information, its financial structure and technology and other points mentioned in chapter 3.2.</p>		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and	/1/	DR	No. project is a new build hydro power		OK

post-project activity been clearly described in the PDD?	/4/		project.		
A.3. Project emissions not addressed by the methodology	§77				
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/	DR	The project is bundled 3 a new grid-connected renewable run-of-river power plants using water resources, applying the approved methodology AMS-I.D. version 13.		OK
A.4. Documentation of baseline emissions	§87				
A.4.1 Documentation of the baseline determination: a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/ /11/ /12/ /13/ /15/	DR	1) Yes, all data in the PDD used to determine the baseline emissions are from the EIAs, PDRs and other reference document. 2) Yes, according to the reference list, all documents of the baseline determination were correctly quoted and interpreted. 3) The EIAs were approved by Leshan Environment Protection Bureau and PDRs was approved by Leshan DRC and Mabian DRC. All other document of the baseline determination can be verified, the data can be deemed reasonable. 4) Relevant national include Chinese renewable law and China environment protection law and/or sectoral policies and circumstances such as the national industry standard of the Technical		OK

			Administrative Code of Electric Energy Metering (DL/T448-2000) are considered and listed in the PDD.		
			5) The project is a bundled 3 a new grid-connected renewable run-of-river power plants using water resources, does not involve switching from fossil fuels to renewable energy sources at the site of the project activity, the overall installed capacity is 12.1 MW, according to the Applicability of AMS-I.D. version 13, so this methodology is applicable to the project. The baseline determination is in line with the baseline methodology procedure in AMS-I.D.		
A.5. Documentation of the calculations	§92				
A.5.1 Algorithms and/or formulae used to determine emission reductions <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced All documentation is correctly quoted and interpreted. All values used can be deemed reasonable in the context of the project activity The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 	/1/ /11/ /13/	DR	1) Yes. The PDRs were approved by Leshan DRC and Mabian DRC, and all other document used to determine emission reductions can be verified, the data can be deemed reasonable. The data are properly referenced 2) Yes, according to the reference list, all documents used to determine emission reductions were correctly quoted and interpreted. 3) Yes. All values used can be deemed reasonable in the context of the project		OK

			activity 4) The project is a bundled 3 a new grid-connected renewable run-of-river power plants using water resources, does not involve switching from fossil fuels to renewable energy sources at the site of the project activity, the overall installed capacity is 12.1 MW, according to the Applicability of AMS-I.D. version 13, so this methodology is applicable to the project. The baseline determination is in line with the baseline methodology procedure in AMS-I.D.		
A.6. Implementation of the monitoring plan	§ 123				
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project by monitored ex-post and verified later by a DOE?	/1/ /28/	DR	The monitoring plan clearly defines the parameter, data management and QA/QC procedures. The monitoring plan is deemed feasible, the emission reductions achieved by the project can be monitored continuously and completely.		OK
A.7. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/ /11/ /12/ /17/ /31/	DR	The PDRs /11/ were completed and issued by Sichuan university engineering designing institute and Huali hydropower consulting Co., Ltd in August 2004 (Stage 1) and Leshan hydropower construction designing institute in July 2006 (Stages 2 and 3). The		OK

DET NORSKE VERITAS AS

	/41/ /45/ /46/ /47/ /49/ /50/ /51/	<p>PDRs were approved by Leshan DRC on 21 September 2006 and Mabian DRC on 13 September 2006 /12/.</p> <p>DNV is able to verify that the Board meeting of company was decided to avail the benefits of CDM revenues for the proposed project. This was verified from the Board meeting minutes for CDM consideration dated 5 September 2006 /17/. The decision was based on financial analysis elaborated in PDR /11/ and compare with real electricity tariff /50, 51, 52/ in time of decision and the financial return was found not to be attractive. Hence, CDM was seriously considered in the decision to proceed with the project activity.</p> <p>DNV is able to verify following additional documents to show real action to secure CDM status:</p> <ul style="list-style-type: none"> – The letter from the Agriculture Development Bank dated 30 December 2006 mentioned CDM revenue as condition for loan issuance /31/ – Memorandum between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd, where Mabian Tianhe Power Co., Ltd plans to appoint Unitar Clean Energy Consulting Co., Ltd as CDM developer for this project, dated
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DET NORSKE VERITAS AS

			<p>28 October 2006 /46/</p> <ul style="list-style-type: none">– Cosign Letter between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd for CDM development rights dated 10 March 2007 /45/– CDM Project Development Cooperation Agreement between Unitar Clean Energy Consulting Co., Ltd and Mabian Tianhe Power Co., Ltd, where Mabian Tianhe Power Co., Ltd dated 9 April 2007 /47/– Agreement on CDM development cooperation was signed between Unitar Clean Energy Consulting Co., Ltd and the CDM consultant Enecore Carbon was signed on 26 October 2007 /41/– The project participant commissioned DNV to perform a validation on 3 March 2008, and the PDD was made publicly available on DNV's climate change website on 13 April 2008. <p>DNV was thus able to verify that the incentive from CDM was seriously considered in the decision to proceed with the project activity.</p>	
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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.1 LoAs from both of them DNA is not yet provided. Provide evidence for confirmation of sustainable development with DNA.	A2.2 A2.3 A4.1	The project has been approved by China DNA and the information has been published on website /9/ http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1952.pdf The LoA for CEZ from Netherland was provided. /10/	The documents /9, 10/ were verified by DNV. CAR is closed
CAR 2 Some data in the IRR Calculation was not confirmed with the PDR (including total investment etc.). This needs to be clarified. Sensitivity analysis has to be revised accordingly. Evidence for loan conditions is required. Further evidence of electricity tariff should be provided.	B3.2 B3.3	IRR calculation has been checked: all data/parameters used for the IRR calculation are confirmed by the PDR; some mistake was found in the results of the calculation due to wrong computing of parameters (e.g. CER revenues considered over a 30 years period instead of 21 years; construction period considered of 24 months instead of 15). IRR calculation and PDD are revised accordingly. IRR part in PDR has been translated in english. Sensitivity analysis was revised according to indication received by DOE during validation, i.e. variation of parameters till reaching the benchmark. The parameter "Annual sale revenue"	The risk is exchange rate between EUR and RBM too; it decrease quantity of yuans at present and if will be yuan stronger in future, CDM revenues could not be sufficient for financial attractiveness with CDM revenues. CAR is closed

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>has been broken down into "electricity tariff" and "annula electricity generation". The PDD is revised accordingly.</p> <p>Two evidences for loan conditions are provided: i) aLetter from the Agriculture Development Bank of China (December 30th 2006) mentioning CDM revenues as a condition for the issuance of loans; ii) approval of the loan from the Agriculture Development Bank of China (May 14th 2008, document [2008] No.111) quoting the amount of loan.</p> <p>Two evidences are provided in support of the used electricity tariff: i) Power Purchase Agreement where the agreed electricity tariff (excluding VAT) is 0.205 Yuan (equal to 0.0205 Euro); ii) September, August and July 2008 electricity sale invoices of a small-scale hydro power project located in the same county and town of the Project, where the electricity tariff (excluding VAT) is also 0.205 Yuan.</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 1. According to the information found in interview, the starting date is as follows: S1 – January 2007, S2 – November 2007, S3 – June 2008. Expected operational lifetime is 20 years for S1 and 30 years for S2 and S3. Evidence should be provided.	B3.4 C1.1	The following evidence is provided in support of the given starting date: construction contract between the PO and the construction company and permission from government. The starting dates in the PDD are revised as follow: 20 December 2006, which is the date of construction contract for first two Stages. Each level lifetime is quoted in the relevant PDR, which is the evidence in support of the values given in the PDD, i.e. 20 years for S1 and 30 years for S2 and S3.	OK, the Construction contracts /34/ were verified and included to list of documents. And it was confirmed that the date of the contract is the earliest activity related to the project. CL is closed
CL 2. The project developer needs to clarify if there is a use of any fossil fuel in emergencies/start-up. The resulting project emissions need to be considered when calculating at the final emission reduction figure.	B4.1 B4.2 B9.1	No fossil fuel will be used in emergency and/or for start up. The power needed in these situations has been / will be electric power imported from the grid. The monitoring plan is revised accordingly, i.e. it clearly states what above. A declaration letter from the PO is provided in support.	OK, the declaration letter /35/ was checked by DNV. CL is closed
CL 3 Clarify the status of Wenshuidan hydro power station and how to ensure the electricity generation not counted in the project activity.	B5.1 B7.1 B10.1 B10.3	Wenshuidan it was considered as the fourth level of the cascade at project planning stage, as also stated in the PDR. The PO eventually decided to not proceed with the construction of	OK, explanation of situation is clear and sufficient, thus the CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		Wenshuidan 4th level. Therefore there is no conflict or interaction between Wenshuidan and the Project.	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL4 Clarify when the project starts operation and the data of start of the crediting period should be changed accordingly.	C1.2	The following evidence is provided in support of the given commission date: construction contract between the PO and the construction company. The given commission date are: S1 – June 2008, S2 – February 2009, S3 – November 2009. The starting date of crediting period was chosen 1 January 2011 or the four weeks after the submission of request for the project registration by the UNFCCC whichever is later.	OK, the contract /34/ was checked and revised date of crediting period was included to PDD /1/. The CL is closed.
CL5 According to the FSR and EIA, there are some immigrant and land compensation due to the project activity, but there is no approved resettlement plan and compensation records.	D1.3	The project does not cause any relocation of local residents. Only in case of the third level (i.e. xuekoushan), 5 people (1 family) were considered for relocation in the designing phase of the project. Since PO could not reach agreement about compensation with the family, the construction of the diversion channel was deviated to avoid relocation. This is explained in a letter provided by Mabian DRC. Compensation of occupied land already took place. This evidence by contracts signed between PO and land owners as well as by invoice of each occurred	OK, it was checked with mentioned documents /36/, /37/. These documents are enclosed in List of documents. The CL is closed

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		compensation.	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL6 The time of records keeping shall be clearly defined as time of crediting period + 2 years.	B.10.9	The monitoring plan is revised accordingly and it clearly states that all data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.	OK . Monitoring plan /1/, /28/ is rewritten correctly and archiving period is set in required length. The CL is closed.
CL7 The PP need to justify each load factor for three power stations range from 43-48%. It' also needs to justify beside hydrology issues in the PDR, there are also 16-24% power loss (net output compare with annual electricity). The PP need to justify these according to latest guideline of EB48. Evidence documents should be submitted for justification.	A.3.2.	The PDR of this project is designed by Leshan City Hydropower Construction Reconnaissance Design and Research Institute. The institute has sent a document named Explanation about the effective power generation, shows that the parameter of construction size and power generation of this project were determined by 48 years (1957-2005) hydrographic information and water resource quality information of the drainage area where the project is located, and the effective power generation is calculated according to Item 3.4 of SL16-95 <Economic Evaluation Code for Small Hydropower Projects>. The institute also determined the self consumption and line loss rate of this project respectively after visiting the equipments manufacturer and grid connected company of this project. The institute regards that the above	The document Explanation about the effective power generation was included to reference list. The information included in this document confirm using documents SL 16-95 for calculation of individual coefficients BUT: 1. the pp should justify why the 3 power stations fall into No.3 category. And even in that category, they should consider 0.9 for conservative reason 2. why they chose line loss 4% while others use 3%. 1. The explanation about categorization of power stations as run-off-river type and thus without possibility to regulation is clear. Simultaneously the calculation for 0.9 coefficient was

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>parameters are scientific and logical, which are in line with the relevant regulations such as <Economic Evaluation Code for Small Hydropower Projects>. (please see the Annex)</p> <p>According to the explanation supplied by PP, the load factors of this project are calculated to 0.5651, 0.5708 and 0.5601, which are logical.</p> <p>January 16, 2009, Ministry of Water Resources' bulletin on technical standards currently in effect (Bulletin No.1, 2009) announced that the SL16-95 <Economic Evaluation Code for Small Hydropower Projects> is still valid. http://www.fjwatersf.com/ArticleDetails.aspx?articleId=255)</p>	<p>provided and all 3 stages were under benchmark (7.19% ~ 9.26%). This part is closed.</p> <p>2. The explanation of distribution for losses is 4% for S1, 3.5% for S2 and 3% for S3 as dependence on line distance from substation and transmission 35 kV is sufficient for confirmation of chosen losses. Additionally were provided calculation with 3% losses for all 3 stations and all stages were under benchmark (6.83% ~ 7.73%). This part is closed.</p> <p>3. Combination of both more conservative coefficient is still under benchmark for all stages (7.19% ~ 9.42%)</p> <p>The CL is closed</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL8</p> <p>The PP need to justify OM cost (in terms of OM/Investment, OM/MW for each project) is relatively higher than other project in the same region. Evidence documents should be submitted for justification.</p>		<p>PP has checked the IRR calculation of this project and worked out inconsistency resulted from the check:</p> <ul style="list-style-type: none"> - Costs related to the electricity transmission line has been deleted since up to the Grid and not the Po; - The cost of use of water resource has been adjusted (from 001 RMB/kWh to 0.005 RMB/kWh in line with relevant regulation (http://slj.luzhou.gov.cn/ReadNews.asp?NewsID=710)) - The City Maintenance Construction Tax has been reduced (from 3% to 1%) in line with relevant regulations (http://202.123.110.3/banshi/2005-08/19/content_24817.htm) - The preliminary document Power Generation Price Cost Audit Methods issued by Sichuan Province Price Bureau in 25 August 2006 which applies to hydro, thermal, wind, biomass and others power generation 	<p>The provided additional evidences were included in list of references and verify as relevant for justification of OM costs.</p> <p>BUT</p> <ol style="list-style-type: none"> 1. since the PDR and PPA issued after the project starting date, it's need to be justify how the PDR determined EG. <p>However the PDRs were approved in September 2007 and starting date was chosen in December 2006, the issue of PDRs was in July and August 2006. The delay of approvals were due to finalization of other needs approvals like EIA approval. Leshan Hydro Power Architecture Prospect Design Institute which is an independent qualified Institute. The institute has 41 years experience in hydro project design and has the secondary qualification for hydro projects survey and design (http://jg.scjg.com.cn/company/mobon6/index.asp?ep_id=515).</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>projects, regulates in its section 15 that a repair fee rate ranging from 1% to 2,5% is considered appropriate. http://www.scpi.gov.cn/cbdc/cbdcjc-content.asp?Id=50&Ibid=1</p> <p>Through the above adjustment, the OM cost of this project is logical and reasonable. The adjusted IRR and revised PDD are made available to the DOE for consideration.</p>	<p>Therefore the contents including EG and IRR in PDRs are reliable and seriously. Additionally all parameters were crosschecked. – this part is closed</p> <p>2. It's need to be justified in sensitivity analysis use 100% coefficient (how to proof it's impossible to reach 100%) When were used 100% effective coefficient, one stage were up benchmark (S1 – 10.89%) and aggregated IRR for whole project was 9.71% only and this situation is not probably regarding to type of the project (run-of –river). This part is closed</p> <p>3. about tariff, the pp need to proof why the tariff is not 0.288 which can be found in publicized information from official source of Sichuan province. The information is related to large hydropower projects and the protective tariff for SCC HP is still 0.14 RMB/kWh (the last tariff setting from 19 November 2009 /60/). This part is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>4. the sensitivity analysis need to be analysis tariff in Sichuan province which also shows significant increase before project starting date. The sensitivity analysis were provided with several evidences /49/ /50/ /51//58/ /59/. This part is closed.</p> <p>5. Also since PDR was approved after the project starting date. We have to ask pp to provide evidence for every parameter in the IRR calculation and justification are needed. The evidences were provided in relation with previous points and CL7. This part is closed.</p> <p>6. OM cost and sensitivity analysis: OM cost is higher than other project and this is justified with supporting evidence. Also for sensitivity analysis, the tariff trend for Sichuan province before the project starting date should be presented and justified, especially for tariff (as I know there are signification</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>increase between 2003 to 2006). OM cost were specified for individual major contribution as salary /55/ (averages for 2006 till 2008 is 17 852 RMB, 21 312 RMB respective 20 648), maintenance cost including other costs /24/, water resource cost and repair fee rate. Tariff was discussed in previous point and CL7. This part is closed.</p> <p>The CL is closed.</p>

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Zuzana Andrtová

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

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

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Mario Voros

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

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

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Michael Lehmann

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CERTIFICATE OF COMPETENCE

Kang Guo

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

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

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CERTIFICATE OF COMPETENCE

Ole Andreas Flagstad

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

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

Høvik, 27 November 2009

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CERTIFICATE OF COMPETENCE

Anu Chaudhary

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

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

Høvik, 9 July 2009

Michael Lehmann

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Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Anjana Sharma

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

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

Høvik, 9 January 2009

Michael Lehmann

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CERTIFICATE OF COMPETENCE

Lumir Nemecek

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

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

Høvik, 9 November 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Andrea Leiroz

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

GHG Auditor:	Yes ¹				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas		Sept 2009 ¹			
Hydro power	Jan 2009 ¹	Jan 2009 ¹			
Renewables		Sept 2009 ¹			July 2009 ¹
Wind power					
Other renewable		Sept 2009 ¹			
Biomass	Jan 2009				June 2010
Grid connection of isolated system		Sept 2009 ¹			
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management	Jan 2009 ¹	Jan 2009 ¹			
Waste / wastewater treatment		Sept 2009 ¹			
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal		Sept 2009 ¹			
CO ₂ recovery					
Transport					
Non-renewable biomass		Sept 2009 ¹			
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 23 August 2010

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change and Environmental Services