



VALIDATION REPORT

YUNNAN MANGLI HYDROPOWER PROJECT IN CHINA

REPORT NO. 2010-1180

REVISION NO. 03

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2010-12-01		ConCert Project No.: PRJC-127598-2009-CCS-CHN	
Recommended for approval by: Lai Chee Keong	Approved by: Hendrik W. Brinks	Organisational unit: DNV Climate Change and Environmental Services	
Client: China National Water Resources & Electric Power Materials & Equipment Co., Ltd.		Client ref.: Ms. Li Ying	

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Summary:

Project Name: Yunnan Mangli Hydropower Project

Country: China

Methodology: ACM0002

Version: 12.1.0

GHG reducing Measure/Technology: Sectoral scope 01, Electricity generation by hydropower

ER estimate: 113 189 tCO₂e per year (average)

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 project activity "Yunnan Mangli Hydropower Project" in China, as described in the PDD, version 02 of 28 December 2010, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.1.0. Hence DNV requests the registration of the project as a CDM project activity. This report has been revised in response to the review requested by three members of CDM Executive Board.

Report No.: 2010-1180		Subject Group: Environment	
Report title: Yunnan Mangli Hydropower Project in China			
Work carried out by: Lin Wu, Wang Guolian			
Work verified by: Agnes Dudek			
Date of this revision: 2011-10-05	Rev. No.: 03	Number of pages: 35	
Indexing terms Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism ☒ No distribution without permission from the client or responsible organisational unit ☐ free distribution within DNV after 3 years ☐ Strictly confidential ☐ Unrestricted distribution			
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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(s)
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CSPG	China Southern Power Grid
CWEME	China National Water Resources & Electric Power Materials & Equipment Co., Ltd.
DNA	Designated National Authority
DNV	Det Norske Veritas
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
LoA	Letter of approval
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PLF	Plant Load Factor
PP	Project Participant
RMB	Renminbi, Chinese currency (Yuan)
SFSR	Supplementary Feasibility Study Report
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added tax



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity “Yunnan Mangli Hydropower Project” in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is China and the Annex I Party is Japan. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants Datang Mangli Hydropower Development Company Limited and Sumitomo Corporation. The DNA from China confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0002, version 12.1.0 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

Yunnan Mangli Hydropower Project will displace electricity in the China Southern Power Grid by generating renewable energy. As a result, 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 113 189 tCO₂e per year over the selected 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.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV’s opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV’s opinion that the project activity “Yunnan Mangli Hydropower Project” in China, as described in the PDD, version 02 dated 28 December 2010, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.1.0. Hence, DNV requests the registration of the project as a CDM project activity.

Beijing and Oslo, 2011-10-05

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2 INTRODUCTION

CWEME has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the Yunnan Mangli Hydropower Project in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 12.1.0). The validation was based on the recommendations in the Validation and Verification Manual /58/.

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.



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 tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

- /1/ CWEME: *CDM-PDD for project activity "Yunnan Mangli Hydropower Project" in China*, version 01 dated 13 July 2010 and version 02 dated 28 December 2010
- /2/ CWEME: *IRR calculation spreadsheet for Yunnan Mangli Hydropower Project based on the installed capacity of 36 MW*
- /3/ CWEME: *ER calculation spreadsheet for Yunnan Mangli Hydropower Project*
- /4/ Kunming Survey and Design Institute of Water Conservancy and Hydropower: *Feasibility Study Report (FSR) of Yunnan Mangli Hydropower Project (Supplementary report in which CDM was considered, called "SFSR" in the text)*, April 2008
- /5/ Kunming Survey and Design Institute of Water Resources and Hydropower: *Original FSR of Yunnan Mangli Hydropower Project*, April 2005
Development & Reform Commission of Yunnan Province: *The approval for the FSR of Yunnan Mangli Hydropower Project*, 27 June 2006
- /6/ Development & Reform Commission of Yunnan Province: *The approval for SFSR of Yunnan Mangli Hydropower Project*, 21 November 2008
- /7/ Yunnan University: *Environment Impact Assessment (EIA) of Yunnan Mangli Hydropower Project*, July 2005
- /8/ Yunnan Provincial Environmental Protection Bureau: *Approval for EIA of Yunnan Mangli Hydropower Project*, 27 October 2005
- /9/ Kunming Construction Consulting Supervision Company: *Notification on the starting of construction of Mangli hydropower station*, 28 October 2006
- /10/ Sinohydro Engineering Bureau 8 Co., Ltd.: *Meeting minutes of proseminar on construction*, 11 December 2006
- /11/ Kunming Construction Consulting Supervision Company: *Notification on ceasing construction of Mangli hydropower station*, 29 January 2007
- /12/ China Datang Corporation Yunnan Branch (the parent company of Datang Mangli Hydropower Development Company Limited) and Yunnan CDM Technology Service Center: *CDM Consultant Contract*, 25 June 2007
- /13/ Datang Mangli Hydropower Development Company Limited and Deyuan Electric Power Development Co., Ltd.: *Assignment agreement on the shareholding of the*



- project, 7 August 2007*
- /14/ Datang Mangli Hydropower Development Company Limited: *Board meeting decision for determining CDM development of the project*, 21 June 2008
 - /15/ Datang Mangli Hydropower Development Company Limited and Sinohydro Engineering Bureau 8 Co., Ltd.: *Construction contract*, 30 June 2008
 - /16/ Supervision Department of Sichuan Ertan International Engineering Consulting Co., Ltd: *Construction permit of the Yunnan Mangli Hydropower Project*, 2 July 2008
 - /17/ Datang Mangli Hydropower Development Company Limited and Hangzhou Resource Power Equipment Co., Ltd.: *The purchase contract of the water-turbine generators equipments*, 18 August 2008
 - /18/ Datang Mangli Hydropower Development Company Limited: *Other financial commitments (including purchasing transformers and cables, strengthen engineering on side slope etc)*, from July 2008 to November 2009
 - /19/ Datang Mangli Hydropower Development Company Limited & CWEME: *CDM Consultant Contract*, 28 June 2008
 - /20/ China National Water Resources & Electric Power Materials & Equipment Co., Ltd. & Sumitomo Corporation: *Emission reduction purchase agreement*, 26 February 2009.
 - /21/ Datang Mangli Hydropower Development Company Limited: *100 copies of public survey questionnaires for the stakeholders' comments on the project activity*, from 18 June 2009 to 30 June 2009.
 - /22/ China Economic Net: *Biomass power project has high cost and low payoff in China*, 28 June 2007
http://www.ce.cn/cysc/ny/dl/200706/28/t20070628_11978768.shtml
 - /23/ Shanghai Stock News: *The solar PV in China has high operating cost and less of national policies*, 20 September 2007
<http://finance.people.com.cn/GB/1038/59942/59949/6294546.html>
 - /24/ Aikai Data Research Center: *The investment analysis and investigation report in industry of the geothermal power generation*, March 2010
http://www.168report.cn/Product_Detail_P_ID_32040920.html
 - /25/ Baidu Net: *Brief introduction of the conditions around the proposed project site (Mangshi town)*, 18 June 2010
<http://baike.baidu.com/view/1197098.htm>
 - /26/ China Power Net: *The hydropower development was encouraged by the Chinese government*, 18 March 2006
<http://www.chinapower.com.cn/article/1021/art1021546.asp>
 - /27/ Yunnan Government Website: *The information about completion of the Laodukou Hydropower project*, dated 29 January 2008
<http://km.xxgk.yn.gov.cn/newsview.aspx?id=35101>
 - /28/ Weishan Government Website: *The information about the commission of Xiashilong Hydro project and the completion of Maomaotiao Hydro project*, dated 28 March 2006
<http://www.ynws.gov.cn/Detail.aspx?ID=9540>
 - /29/ National Engineering Consultant Net: *The information about the Yanziya Hydro project*
<http://www.cnaec.com.cn/Info/Show.asp?ID=78270&SortID>
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- /32/ Sina News: *The information about Nantinghe Hydropower Plant*, 30 December 2004
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- /33/ Dehong tuanjie newspaper: *The information about the operation of mengdianhe hydropower plant*, dated 30 December 2004
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- /34/ Ministry of Commerce of China Net: *The introduce of the Yinjiang Xingyun company of Yunnan*, dated 30 May 2008
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- /35/ Yunnan Government Website: *The information about the Xima Xingyun Aluminium Factory Hydro project*, dated 28 July 2008
http://xxgk.yn.gov.cn/canton_model2/newsview.aspx?id=182977
- /36/ South Design & Research Institute net: *The news about the Chongjianghe hydropower project FSR has been approved*, dated 12 November 2003
<http://www.giwp.org.cn/index.do?act=mess&modu=123&mess=1>
- /37/ Yunan Baoshan Supahe Hydropower Development Co.,Ltd. net: *The news about Wunihe hydropower project ready for application for VCS validation*, dated 26 August 2009
<http://www.ynsph.com.cn/information/1571.whtml>
- /38/ NDRC: *The Mengdianhe 2nd Hydropower Project has been approved by NCRC for CDM application*, dated 4 September 2007
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1464.pdf>
- /39/ Beijing Tianqing Power International CDM Consulting Co., Ltd: *Notification on stakeholder consultation meeting for Xiashilong hydropower VER project*, 25 August 2007
<http://cn.tqcdmchina.com/news/guanyuyunnanshengguangnanxianxiashilongshuidianzhangongchengshenqingxiangmuzhaokailiyixiangguanfangzixunhuiyidetongzhi.shtml>
- /40/ Weishan Government Website: *The 10th Five-year development planning on Wenshan power*, dated 12 October 2008
http://km.xxgk.yn.gov.cn/canton_model24/newsview.aspx?id=230735
- /41/ Yunnan News Net: *The news on the special check and accept for water and soil conservation of Nanting River Hydropower*, 28 November 2005
<http://www.ydxw.cn/showinfo.asp?id=25717>
- /42/ News Center of Sina Net: *Maomaotiao hydropower station providing the electricity to Vietnam*, dated 4 August 2005
<http://news.sina.com.cn/c/2005-08-04/09276608613s.shtml>
- /43/ Finance and Economics of Sina Net: *The information about the tariff of the electricity delivering to the Vietnam*, dated 12 March 2009
http://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=600995&id=399715
- /44/ China rural hydropower information net: *The 10th Five-Year' layout and the status of hydropower development in Yunnan Province*, dated 19 July 2002



- <http://www.shp.com.cn/news/info/2002/7/19/17401655.html>
- /45/ Xinhua net: *Qujing government supports the main industry projects*, dated 29 July 2003
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- /47/ Chinaccm net: *The policy of the foreign industry in China*, dated 18 June 2003
<http://www.chinaccm.com/40/4011/401104/news/20030618/161219.asp>
- /48/ Yunnan Xingnong Information Net: *Brief introduction on Zhangwo hydropower project*, 7 March 2005
<http://www.ynnw.gov.cn/Modules/Document/InfoShow.aspx?kid=8783>
- /49/ Dehong Prefecture Government: *Notice on on-grid tariff of Dehong Prefecture*, Dezhengfa [2003] No. 367, 17 December 2003
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- /50/ Yunnan Dehong Power Co., Ltd. & Deyuan Electric Power Development Co., Ltd.: *Agreement of Grid Access of Yunnan Mangli Hydropower Project*, 16 May 2005
- /51/ Land and Resources Bureau of Yunnan Province: *Preliminary Opinion on the land expropriation of Yunnan Mangli Hydropower Project*, 27 April 2006
- /52/ Resettlement Office of Dehong Prefecture: *Approval for the resettlement scheme of Yunnan Mangli Hydropower Project*, 23 April 2006
- /53/ People's Government of Dehong Prefecture: *Approval for the land use and flooding compensation of Yunnan Mangli Hydropower Project*, 1 June 2006
- /54/ People's Government of Luxi City and Datang Mangli Hydropower Development Company Limited: *Agreement on the lump work for the land expropriation and flooding compensation*, 15 July 2008
- /55/ Statistic Bureau of Yunnan Province: *Natioinal Economy and Social Development Statistic Bulletin for 2008 in Yunnan Province*, 7 February 2009
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3.1.2 Letters of approval

- /56/ National Development and Reform Commission (DNA of China): *Letter of approval* dated April 2009
 China CDM website: *Notification on getting the LoA of Yunnan Mangli Hydropower Project by NDRC*, dated 24 April 2009
<http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3552>
- /57/ Minister of Economy, Trade and Industry (DNA of Japan): *Letter of approval* dated 6 July 2009
 DNA fo Janpan: *Approval for Yunnan Mangli Hydropower Project by Japanese DNA*.
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3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

- /58/ CDM Executive Board: *Validation and Verification Manual*. Version 1.2
- /59/ CDM Executive Board: *Baseline and monitoring methodology* "Consolidated baseline



- methodology for grid-connected electricity generation from renewable sources”*
ACM0002, version 12.1.0
- /60/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 5.2, EB 39 Annex 10, dated 26 August 2008
 - /61/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 2.1, EB 50 Annex 14, dated 16 October 2009
 - /62/ CDM Executive Board: Guidance for request for deviation titled “*Application of AM0005 and AMS-I.D in China*”
<http://cdm.unfccc.int/Projects/deviations/87512>
 - /63/ CDM Executive Board: *Guidelines on the assessment of investment analysis*, Version 3.1, EB 51 Annex 58, dated 15 January 2010
 - /64/ CDM Executive Board: *Guidelines for the reporting and validation of plant load factors*, Version 01, EB 48 Annex 11, dated 17 July 2009
 - /65/ CDM Executive Board: *Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)*, Version 7
 - /66/ IPCC: *2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual*, 2006
 - /67/ CDM Executive Board: *Guidance on the demonstration and assessment of prior consideration of the CDM*, Version 3, EB 49 Annex 22, dated 11 September 2009
 - /68/ CDM Executive Board: *Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the People’s Republic of China*, version 01, dated June 2010

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

- /69/ State Power Corporation of China: *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*, Beijing: China Electric Power Press, 2003
- /70/ Ministry of Water Resources of People’s Republic of China: *Economic Evaluation Code for Small Hydropower Projects (SL16-95)*, dated 2 June 1995
- /71/ DNV & CWEME: *CDM validation contract*, signed on 11 November 2008 (CWEME) and 25 February 2009 (DNV)
- /72/ National Bureau of Statistics and NDRC: *China Energy Statistics Yearbook 2006 to 2008*
- /73/ Compiling Committee of China Electric Power Yearbooks: *China Electric Power Yearbook 2004 to 2008*
- /74/ Compiling Committee of China Water Resource Yearbook: *China Water Resource Yearbook 2006 to 2008*
- /75/ National Development and Reform Commission: *Notification on Determining Baseline Emission Factor of China’s Grid*, dated 2 July 2009
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- /76/ Ministry of Water Resources of China: *Hydrological Calculation Norms for Small Hydro Power (SL77-94)*, 5 April 1994.



- /77/ Ministry of Water Resources of China: *Hydro energy Design Code for Small Hydro Power Projects (SL76/94)*, 3 March 1994.
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- /79/ State Council Office: *Notice on Strictly Prohibiting the Installation of Thermal Power Plant with the Capacity less than 135 MW*, Decree No.: 2002.6, dated 15 April 2002
http://www.gov.cn/gongbao/content/2002/content_61480.htm
- /80/ State Council: *Implementation Rules for Law of the People's Republic of China on Enterprise Income Tax*, State Council Order No. 512, dated 6 December 2007 and put into effective from 1 January 2008
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- /81/ State Tax Bureau and Ministry of Finance: *Interim Regulations of the People's Republic of China on Value Add Tax*, State Council Order [1993] No.134, dated 1 January 1994
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- /82/ State Council: *Provisional Regulations of the People's Republic of China on Urban Maintenance and Construction Tax*, dated 08 February 1985
http://www.gov.cn/banshi/2005-08/19/content_24817.htm
- /83/ State Council: *Decision on the Revision of "Provisional Regulations of the People's Republic of China on Educational Surtax"*, dated 24 September 2005
<http://wiki.mbalib.com/wiki/%E6%95%99%E8%82%B2%E9%99%84%E5%8A%A0>
- /84/ State Tax Bureau: *Notification on determination of residual rate for enterprise fixed asset*, dated 14 September 2005
<http://www.chinatax.gov.cn/n8136506/n8136563/n8193451/n8193526/n8194270/8245508.html>
- /85/ China Power Net: *Successful Damming achieved by Datang Mangli Hydro Power Station*, dated 3 December 2007
<http://www.chinapower.com.cn/article/1104/art1104782.asp>
- /86/ Sinohydro Bureau 8 Co., Ltd.: *Construction records on Mangli hydropower engineering*, dated 12 September 2009
<http://8j.sinohydro.com/Web/News/NewsShow.asp?ID=4674>
- /87/ National People's Congress: *Decision on the revision of the Renewable Energy Law of the People's Republic of China*, dated 26 December 2009 and effective on 1 April 2010.
<http://www.imau.edu.cn/special/show.php?itemid=208>
- /88/ UNFCCC website: *Information of Maguan Daliangzi Hydro Power Project* (ref.0791, the first registered hydropower project in Yunnan Province), registered on 18 March 2007
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1165304196.32/view>
- /89/ Chinese Broadcasting Net: *Information on the commission of Zhangwo Hydropower Plant*, 7 February 2006



- <http://news.sina.com.cn/c/2006-02-07/09548142550s.shtml>
- /90/ UNFCCC website: *Information of Fujian Zhangpu Liua 30.6 MW Wind Power Project* (ref.0388), registered on 27 July 2006
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1145978917.74/view>
- /91/ China Datang Corporation Yunnan Branch: *Application of investment on Mangli hydropower project*, 26 May 2007
- /92/ CWEME: *IRR calculation spreadsheet for Yunnan Mangli Hydropower Project based on the installed capacity of 30 MW*

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration:

1. Changes related to the CAR and CLs identified in DNV's draft validation report;
2. The version of applied methodology ACM0002 was updated to the latest version 12.1.0;
3. The version of "Tool to calculate the emission factor for an electricity system" was updated to the latest version 2.1.
4. The geographical coordinates of the blocking dam were changed from X°Y'Z" to decimal format.

After reviewing the revised PDD (version 02 dated 28 December 2010), DNV issued this final validation report and opinion.

3.2 Follow-up interviews with project stakeholders

On 28 October 2010, DNV auditors Mr. Lin Wu and Ms. Wang Guolian visited the project site of Yunnan Mangli Hydropower Project in Luxi City, Yunnan Province of China, and performed interviews with the project consultant China National Water Resources & Electric Power Materials & Equipment Co., Ltd., the project owner Datang Mangli Hydropower Development Company Limited and local stakeholders to resolve the issues identified during the desk review. The project has been in operation at the time of performing the site visit.

The issues discussed during the follow-up interview were provided in the table below:

	Date	Name	Organization	Topic
/93/	2010-10-28	Ms. Li Ying Ms. Zheng Yue Mr. Li Shangze	China National Water Resources & Electric Power Materials & Equipment Co., Ltd.	➤ Applicability of selected methodology ACM0002; ➤ Baseline determination of the project; ➤ Issues related to the additionality; ➤ Common practice analysis; ➤ Emission reductions calculation; ➤ Emission reduction monitoring plan and project management.
/94/	2010-10-28	Mr. Luo Xianjun	Datang Mangli Hydropower Development Company Limited	➤ Information of project construction and operation; ➤ The development of hydro power project in Yunnan Province the project located;



				➤ The approval status (incl. EIA, FSR and CDM project approval); ➤ Project management; ➤ Investment barriers; ➤ Training plan and records; ➤ Emission reduction monitoring plan; ➤ Consulting process for stakeholder's comments; ➤ Land compensation. ➤ Consulting process for stakeholders' comments; ➤ Impact on stakeholders by the project ➤ Compensation of land and other expropriations.
/95/	2010-10-28	Mr. Dou Zemin Mr. Chen Chexiao Mr. He Lu Ms. Xiao Li La Ba Mr. He Nongcheng	Stakeholders from local government and local villages	

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:

- 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 four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "Yunnan Mangli Hydropower Project" in China is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

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

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	Reference	Conclusion
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK) or a corrective action request (CAR) if a requirement is not met.

Validation Protocol Table 2: Requirement Checklist				
Checklist question	Reference	Means of verification (MoV)	Assessment by DNV	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	Gives reference to documents where the answer to the checklist question or item is found.	Means of verification (MoV) are document review (DR) , interview (I) or any other follow-up actions (e.g., on site visit and telephone or email interviews) and cross-checking (CC) with available information relating to projects or technologies similar to the proposed CDM project activity under validation.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A corrective action request (CAR) is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A forward action request (FAR) during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/or clarification requests	Ref. to checklist question in table 2	Response by project participants	Validation conclusion
The CARs and/ or CLs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusions of the CARs and/or CLs.

Validation Protocol Table 4: Forward Action Requests		
Forward action request	Ref. to checklist question in table 2	Response by project participants
The FARs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by project participants on how forward action request will be addressed prior to first verification.

Figure 1 Validation protocol tables



3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

Role	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence
Team leader (Validator)	Lin	Wu	China	✓	✓	✓	✓		✓
Assessor Under Training	Wang	Guolian	China	✓	✓	✓			
Technical reviewer	Dudek	Agnes	Norway					✓	✓

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



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 PDD, version 02 dated 28 December 2010.

4.1 Participation requirements

The project participants are Datang Mangli Hydropower Development Company Limited of China and Sumitomo Corporation of Japan. The host Party (China) and the Annex I Party (Japan) meet all relevant participation requirements.

A letter of approval (LoA) /56/ was issued by DNA of China in April 2009, authorizing Datang Mangli Hydropower Development Company Limited as project participant and confirming that the project assists in achieving sustainable development. The DNA of Japan issued the LoA /57/ on 06 July 2009 and authorized Sumitomo Corporation as project participant.

The letters of approval were received from the project participants. DNV has verified the website of Clean Development Mechanism in China /56/ and the website of Minister of Economy, Trade and Industry (DNA of Japan) /57/, and can confirm the authenticity of the LoAs from China and Japan. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /58/.

By verifying the SFSR /4/ and its approval /6/ provided by the project participant, DNV considers that the project will not receive any public funding from Annex I Party. 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 project is located on Mangshi River, in Luxi City of Yunnan Province of China. The geographic coordinates are east longitude of 98.3145° and north latitude of 24.3083° which can be confirmed by the SFSR /4/.

The project involves the installation and operation of a new reservoir type hydropower project with the total installed capacity of 36 MW, which comprises of two sets of water-turbine (rated power of 18.66 MW) and associated generator (rated power of 18 MW). DNV has checked and confirmed the consistence of all the parameters of the turbines and generators indicated in the PDD /1/ against the parameters of the actually installed equipments, which can be verified by the nameplates during the site visit. The water-turbines and generators are produced by Hangzhou Resource Power Equipment Co., Ltd., which is a domestic water-turbine generator manufacturer. Hence, it does not involve any technology transfer from Annex I party. Based on the sectoral experience, the technology used by the project activity is widely applied in hydropower sector in China and reflects current good practices. It is expected that the proposed project will supply appropriately 143 652 MWh net electricity per year to the CSPG /4/ /50/ when it is full in operation at a plant load factor (PLF) of 46.2%.



The project boundary includes the project geographical location and the CSPG, which is in line with the delineation of the grid boundaries regulated by DNA of China /75/.

Being a renewable electricity project, the project activity will generate greenhouse gas (GHG) emission reductions by avoiding the CO₂ emissions from the electricity generation by fossil fuel power projects.

The starting date of the project activity is 30 June 2008 which is the date of the construction contract signed /15/. The expected operational lifetime of the project activity is 25 years according to the SFSR /4/. A renewable crediting period of 7 years has been chosen for the project, starting from 1 July 2011 (or the date of registration, whichever is later). The emission reductions are estimated to be 113 189 tCO₂e per year and 792 323 tCO₂e over the first seven-year crediting period.

4.3 Application of selected baseline and monitoring methodology

The project applies the approved consolidated baseline and monitoring methodology ACM0002 version 12.1.0, titled “*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*” /59/. The applied baseline methodology is justified as it has been demonstrated that the proposed project activity fulfils the following criteria:

- The project is a grid connected renewable power generation activity from hydropower plant with a new reservoir, and the power density of the project is 12.1 W/m² /4/, which is greater than 4 W/m²;
- DNV was able to confirm through the validation of the SFSR and the site visit that the project is a newly built hydropower plant, and therefore the project does not involve switching from fossil fuel to renewable energy at the project site /4/.
- The project is connected to the CSPG /4/ /50/, and the geographical and system boundaries are clearly identified and information on the characteristics of the grid is available /75/.

The assessment of the project’s compliance with the applicability criteria of ACM0002 (version 12.1.0) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Project boundary

The spatial extent of the project boundary is clearly defined as the site of project activity and the grid system boundaries include all power plants connected physically to the CSPG including Guangdong, Guangxi, Guizhou and Yunnan power grids, to which the project is connected. This is in line with the delineation of grid boundaries as provided by the DNA of China /75/.

Emission sources and gases included in the project boundary are:

	<i>GHGs involved</i>	<i>Description</i>
<i>Baseline emissions</i>	CO ₂	Emissions equivalent to the same quantity of electricity generated by the project activity, which would have been otherwise generated in the fossil fuel intense grid as



		reflected by the grid emission factor. The grid emission factor is determined ex-ante as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM) of the CSPG.
<i>Project emissions</i>	<i>N/A</i>	Project emissions are regarded as zero as the project is a renewable energy (hydro source) project and the power density is 12.1 W/m ² greater than 10 W/m ² .
<i>Leakage</i>	<i>N/A</i>	There are no leakages that need to be considered by applying this methodology.

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 12.1.0).

4.5 Baseline determination

The baseline scenario is defined as the following since the project activity is the installation of a new grid-connected renewable power plant/unit as per ACM0002 version 12.1.0 /59/:

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

The connected power grid for the proposed project is the CSPG. The CSPG is dominated by coal-fired power plants. And it is deemed likely that coal-fired power plants will continue to dominate the power sector due to the local availability of low-cost coal. It is expected that renewable capacity additions will not have significant effects on the mix of the CSPG during the first crediting period. Therefore, the baseline scenario is the continuation of the current situation, i.e. to get equivalent supply from the CSPG.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumptions and data used by the project participants are listed in the PDD and/or supporting documents. All documentations relevant for establishing the baseline scenario are correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.



4.6 Additionality

The additionality of the proposed project is demonstrated by applying “*Tool for the demonstration and assessment of additionality*” version 5.2 /60/ approved by CDM EB.

4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

Timeline of project activity implementation

Early in 2006, the proposed project was owned by Deyuan Electric Power Development Co., Ltd. The initial construction was commenced on 28 October 2006 /9/ which was four months after the original FSR got its approval on 27 June 2006 /5/. Whereas the unpredictable bad geological conditions /10/ resulted in the great increasing investment, finally Deyuan Electric Power Development Co., Ltd ceased the construction due to the fund shortage and unresolved fundraising (Deyuan Electric Power Development Co., Ltd. was invested by the private investor), which has been evidenced by the notification from the supervision company /11/. DNV has also verified the publicly available information from the construction company website /86/ and can confirm it is the case.

Afterwards, China Datang Corporation Yunnan Branch was interested in the project as the first successfully registered CDM hydropower project in Yunnan province took place on 18 March 2007 /88/. Furthermore, China Datang Corporation (the parent company of China Datang Corporation Yunnan Branch) has successful registration CDM project in wind power sector in July 2006 /90/. All of these enforced their confidence to consider that the CDM revenue may improve the project’s financial attractiveness. Hence, on 26 May 2007, the “Application of investment on Mangli hydropower project” was raised by China Datang Corporation Yunnan Branch to China Datang Corporation /91/, in which it was clearly stated that the financial unattractiveness of the Mangli hydropower project, and the intention to seek CDM support to improve financial benefit of the proposed project. It was also emphasized in the “Application” that the construction was suspended due to fund shortage and unresolved fundraising. Subsequently, “Assignment agreement on the shareholding of the project” was signed between China Datang Corporation Yunnan Branch and Deyuan Electric Power Development Co., Ltd. on 7 August 2007 /13/, in which all the rights and interests of Deyuan Electric Power Development Co., Ltd. were transferred to the later registered Datang Mangli Hydropower Development Company Limited as shares (China Datang Corporation has 51% shares). After assessment on the project characteristics, the project owner Datang Mangli Hydropower Development Company Limited decided to increase the installed capacity to optimize water resource utilization; considering the additional investment cost due to the increased installed capacity and unfavourable geological conditions, the project owner commissioned Kunming Survey and Design Institute of Water Conservancy and Hydropower in April 2008 to compile the Supplementary Feasibility Study Report (SFSR) /4/, which was further approved by Development & Reform Commission of Yunnan Province on 21 November 2008 /6/.

Starting date of the project activity:

According to the “Glossary of CDM terms”, for the circumstances in which an investment decision is taken and the project activity implementation is subsequently ceased, if such project activities are restarted due to consideration of the benefits of the CDM the cessation of



project implementation must be demonstrated by means of credible evidence such as cancellation of contracts or revocation of government permits. DNV has assessed and verified the evidences and timeline for the starting date of the project activity as follows:

- Original construction was ceased on 29 January 2007 /11/
- The re-construction contract was signed on 30 June 2008 /15/;
- The construction of the project was permitted to restart by Supervision Department of Sichuan Ertan International Engineering Consulting Co., Ltd on 2 July 2008 /16/;
- The purchase contract of water-turbine generators equipments was signed on 18 August 2008 /17/.

Thus according to the definition for the starting date of a CDM project activity in the terms of paragraph 67 of EB 41st meeting report, the date of the re-construction contract signed on 30 June 2008 was considered by DNV as the project activity starting date.

The agreement was signed between China Datang Corporation Yunnan Branch and Deyuan Electric Power Development Co., Ltd., in which all the rights and interests of Deyuan Electric Power Development Co., Ltd. were transferred to the later registered Datang Mangli Hydropower Development Company Limited as shares /13/. In light of the definition of “Glossary of CDM terms” for the start date of a CDM project activity, the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity itself. DNV considered that the shareholding transfer was not related to the implementation or construction of the project activity, just shares transfer from the original company to new company. After that, the new company Datang Mangli Hydropower Development Company Limited took over the project as a separate legal entity to proceed with the implementation of the project. Hence, DNV considers the date of the re-construction contract signed on 30 June 2008 was more appropriate as the project starting date.

Even if the date of 7 August 2007 was considered as the project starting date, prior consideration of the CDM can be justified as shown below under “Prior CDM consideration”. Also, if August 2007 was taken as the project starting date, DNV can substantiate the suitability of the input values at this time of investment decision in line with paragraph 6 of EB 51 Annex 58. The input parameters used except the electricity tariff in the financial analysis of this project are taken from the original FSR developed by Kunming Survey and Design Institute of Water Resources and Hydropower in April 2005 and approved by Development & Reform Commission of Yunnan Province on 27 June 2006 /5/. The electricity tariff used in the original FSR was the assumed value from inverse calculation to reach the project-IRR benchmark of 8%, and hence only an assumed value. The electricity tariff used in the financial assessment was thus derived from the tariff approval issued by local government on 17 December 2003 /49/, which was the latest tariff available before 7 August 2007. The input parameters used in the financial analysis can thus be considered by DNV as information provided by an independent and recognised source.

According to EB’s *Guidelines on the assessment of investment analysis* /63/, DNV assessed the financial parameters used to calculate the project IRR provided in a spreadsheet, and detail assessment for critical parameters has been in the following section 4.6.3. The calculations were verified and found to be correct by DNV. The project IRR without CDM



revenues is 3.14% (this evidence has submitted jointly with updated validation report) /92/, which confirms that the project in the absence of CDM benefits and compared to the benchmark is not financially attractive.

Hence, DNV confirms that even the project starting date was identified as 7 August 2007, the project has been seriously considered as a CDM project prior to the time of investment decision to proceed with the project, and the project was also financial unattractive without CDM benefits based on the input value at the time of investment decision.

Prior consideration of CDM:

The project starting date of 30 June 2008 is before 2 August 2008. Thus, in line with the latest the CDM guidance /67/ the prior consideration of CDM for the project activity was demonstrated as follow:

- On 26 May 2007, the “Application of investment on Mangli hydropower project” was raised by China Datang Corporation Yunnan Branch to China Datang Corporation /91/, in which it was clearly stated that the financial unattractiveness of the Mangli hydropower project and this could be improved by seeking CDM support for the proposed project (referring to the evidence submitted jointly with the validation report version 3 dated 28 September 2011). After September 2007, Datang Mangli Hydropower Development Company Limited operated as a separate legal entity to execute the project activity, including the formal decision as the executant to determine CDM development for the project made on the board meeting on 21 June 2008 /14/. Hence, DNV can confirm that the CDM prior consideration for the project has been taken by the different project executant in each two stages;
- The SFSR was prepared by the third party Kunming Survey and Design Institute of Water Conservancy and Hydropower in April 2008 /4/, in which the CDM revenue was considered in the investment analysis, and then the SFSR was approved by Development & Reform Commission of Yunnan Province on 21 November 2008 /6/;
- The decision to determine CDM development for the project was made on the board meeting on 21 June 2008 /14/;

The relevant evidences have been provided and verified by DNV which can justify prior to the time of decision to proceed with the project. DNV can confirm that the proposed project has been seriously considered as a CDM project prior to the time of investment decision to proceed with the project.

Continuous efforts to secure CDM status:

Since the project starting date of 30 June 2008 is before 2 August 2008, as per the latest CDM EB guidance /67/ it is also requested to substantiate that the continuing and real actions have been taken to secure CDM status for the project in parallel with its implementation. Thus the following activities are assessed:

- The initial CDM consultant contract was signed between China Datang Corporation Yunnan Branch (the parent company of Datang Mangli Hydropower Development Company Limited) and Yunnan CDM Technology Service Center on 25 June 2007 /12/;



- The project owner signed another CDM consultant contract with CWEME on 28 June 2008 after they terminated the cooperation with Yunnan CDM Technology Service Center /19/;
- The CDM validation contract was signed between CWEME and DNV on 25 February 2009 /71/;
- The Emission reduction purchase agreement was signed between CWEME and Sumitomo Corporation on 26 February 2009 /20/;
- PDD was published for global stakeholder consultation from 3 August 2010 on the UNFCCC website.

Since there were no gaps of more than two years between initiatives by the project participants to secure CDM status, DNV can conclude that continuing and real actions have been taken to secure CDM status for the project activity.

It is DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /67/.

4.6.2 Identification of alternatives to the project activity

Four alternative baseline scenarios for the project activity have been suitably identified as:

- a) The proposed project itself, but not undertaken as a CDM project activity;
- b) Construction of a coal-fired power plant with equivalent installed capacity or annual electricity generation;
- c) Construction of a power plant using other renewable energy, such as wind and biomass power plant with equivalent installed capacity or annual electricity generation;
- d) Equivalent electricity service provided by the CSPG.

DNV considers the listed of alternatives to be credible and complete.

Alternative a): The construction of hydro power plant is in compliance with China Renewable Energy Law, regulations and policies /87/;

Alternative b): This scenario is not consistent with the regulation "*Notice on Strictly Prohibiting the Installation of Thermal Power Generation Units with the Capacity of 135 MW or below*" /79/. Considering the same annual power generation capacity, the alternative baseline scenario for the project should be a coal-fired power plant with installed capacity less than 30 MW. However, thermal power plants with a capacity less than 135 MW are prohibited to be built in areas covered by large grids such as provincial grid. Hence, alternative b) can not be considered as a realistic and credible alternative;

Alternative c): Other renewable energy sources, such as solar PV, geothermal, biomass and wind have been eliminated from the baseline analysis. DNV was able to verify other renewable energy sources are either not commercially viable at present /22/ /23/ /24/ or not available /25/ in the geographical area of the project. Alternative c) is thus not a likely alternative;

Alternative d): This Alternative is also in compliance with Chinese legal and regulatory requirement.



Hence, DNV can confirm that it has been adequately demonstrated that alternative a) and d) are the alternatives consistent with current laws and regulations as potential alternatives and thus will be discussed at the next steps.

4.6.3 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.

Benchmark selection

According to the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects /69/*, in China, a project IRR of 8% (after tax) for the total investment of a project is regarded as a benchmark for investing in the power industry.

DNV was able to confirm this is suitable and reasonable as following:

1. This benchmark was determined by the national administration of this industry in China /69/;
2. This benchmark is for project and after tax and the investment analysis for this project is for project and after tax also;
3. This Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects /69/ is referred to the risk premiums of hydropower project.

Therefore, DNV is able to confirm the benchmark of 8% (after tax) is applicable for this project.

Input parameters

The input parameters used in the financial analysis of this project are taken from the SFSR developed by Kunming Survey and Design Institute of Water Conservancy and Hydropower in April 2008 and approved by Development & Reform Commission of Yunnan Province on 21 November 2008 /4/. The input parameters used in the financial analysis can thus be considered as information provided by an independent and recognised source. The SFSR is deemed reasonable to be as the basis of the investment decision to restart the implementation of the project because in which the incentives from the CDM accruing from continuation of the investment is taken into account. As mentioned above, the date 30 June 2008 of construction contract signed is considered as the project starting date after the construction was resumed. According to EB's *Guidelines on the assessment of investment analysis /63/*, any expenditures occurred prior to the decision to proceed with the investment in the project will not impact the final investment decision as such expenses sunk costs which remain unaffected by the decision to proceed or not with a project activity. For the proposed project, the expenditures incurred prior to decision to recommence the project are 31.1 million RMB as per the *assignment agreement on the shareholding of the project /13/*. By verifying the IRR spreadsheet, it can be confirmed that the sunk costs has been deducted from total static investment, which resulted in the increasing of project-IRR from 3.33% to 4.46%, and is deemed to be conservative.



DNV compared the input parameters for the financial analysis included in the PDD (version 02 of 28 December 2010) /1/ with the parameters stated in the SFSR /4/ and the value presented in the *assignment agreement on the shareholding of the project* /13/, and was able to confirm that the values applied in the PDD are consistent with the values stated in relevant documents.

The SFSR was completed on April 2008 /4/ and thus only two months prior to the decision to proceed with the project activity (i.e. the starting date of the project activity) which was on 30 June 2008. The SFSR was further approved by Development & Reform Commission of Yunnan Province on 21 November 2008 /6/. Given this short period of time between finalization of the SFSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed. It is thus reasonable to assume that the SFSR has been the basis of the decision to proceed with the investment in the project.

The input parameters used in the financial analysis were compared with data reported for other registered CDM hydropower projects in Yunnan Province with similar power production capacity ($\pm 50\%$ of the installation capacity of the proposed project) as shown in Table 1 below.

Table 1: Comparison of financial indicators between the registered hydro power CDM projects in Yunnan Province (18 MW to 54 MW)

Ref.	Project	Installed capacity (MW)	Investment per kW (RMB)	Percentage of annual O&M costs relative to the total static investment	Tariff (incl. VAT)
2828	Yunnan Kunming Dongchuan Xiaoqing River	24	3 985.8	2.31%	0.178
2625	Yunnan Maguan Laqi Hydropower Project	50	4 671.3	2.27%	0.190
2874	Sidehe 24.8MW Hydropower Project in Yunnan Province	24.8	4 723.8	2.99%	0.180
2815	Yunnan Yingjiang Binglangjiang Shizishan Hydropower Station Project	24	5 279.6	2.56%	0.175
2859	Houpayan Hydropower Project in Qiubei County Yunnan Province, China	24	6 238.3	1.40%	0.212
2080	Binglang River Tucang Hydropower station in Yunnan Province	35	3 547.8	3.27%	0.164
2376	Yunnan Tengchong Longchuan River Stage I Hydropower Plant	24	6 417.9	2.25%	0.205
2075	Expansion Project of Sanjiangkou Hydro-electric Power Station in the reach of Supa River, Yunnan Province, China	32	5 382.8	4.11%	0.162
2048	Lufeng 36MW Hydropower Project in Yunnan Province	36	5 500.5	2.68%	0.215
2010	Dachunhe 50 MW Hydropower Project in Yunnan Province	50	4 890.2	1.85%	0.178



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2086	Yunnan Gangquhe No.1Hydropower Project	60	6 816.2	2.71%	0.215
1862	Yunnan Lushui County Laowohe 25MW Hydropower Project	25	4 114.8	2.94%	0.140
1605	Shaba 24MW Hydropower Project in Yunnan Province, China	24	5 275.0	2.14%	0.160
1388	Yunnan Dali Yang_er 49.8 MW Hydropower Project	49.8	7 548.9	1.60%	0.215
1102	Yunnan Heier 25MW Hydropower Project	25	4 600.0	8.66%	0.212
0791	Maguan Daliangzi Hydro Power Project	32	5 868.8	2.04%	0.159
2030	Fugong Mukeji Hydropower Project	31.5	6 185.7	1.27%	0.180
2050	Shangri-La Langdu River 1st Level Hydropower Station	21.6	4 074.2	2.31%	0.140
2054	Shangri-La Langdu River 2nd Level Hydropower Station	22.5	4 151.5	2.28%	0.140
2057	Shangri-La Langdu River 4th Level Hydropower Station	24	3 984.3	2.53%	0.140
2144	Lijiang Wulanghe Secondary Hydropower Project	32	4 851.9	3.45%	0.176
2199	48MW Duduluo River Hydroelectric Power Plant	48	4 136.9	2.97%	0.151
2624	Baoshan Supahe Chaoyang Hydropower Station	40	6 959.2	2.07%	0.205
2688	Fugong Labuluo Hydropower Project	24	4 920.8	2.62%	0.180
2690	Shangri-La Xinglonghe Cascade Hydropower Project	24	5 105.5	2.88%	0.155
2037	Yangliutan Hydro Power Project	54	7 373.0	1.86%	0.215
1074	Yunnan Yingjiang Nandihe Hydro Power Project	20	6 596.5	1.96%	0.207
1995	Guangnan Shangshilong Hydro Project	20	4 032.0	3.24%	0.200
3357	Yunnan Ma'er Hydro Power Project	24	4 102.5	2.57%	0.160
4233	Yunnan Sigangli 18.9MW Hydro Project	18.9	6 317.3	2.11%	0.180
The following registered projects are located in Dehong Prefecture, Yunnan Province.					
2016	Yunnan Yingjiang Xiangbai River Zhina Hydropower Station	21	4 083.8	2.92%	0.152



2052	Yunnan Yingjiang Wakuhe Hydropower Station	51	5 544.7	2.65%	0.180
2106	Yunnan Lianghe Hulukou Hydropower Station	20	4 744.5	3.12%	0.158
2116	Yunnan Yingjiang Mangya River 1st Hydropower Station	24.9	6 050.2	2.49%	0.161
2150	Yunnan Langwaihe Hydroelectric Power Station	45	3 633.0	3.12%	0.145
2803	Yunnan Yingjiang Binglang River Mengnai Hydropower Station Project	24	4 941.7	2.90%	0.164
-	The proposed project	36	7 427.2*	2.21%	0.15 (dry period, from January to May); 0.210 (wet period, from June to December)

*The sunk cost is included in the value, and the investment per kW will be 6563.25 RMB after the deducting the sunk cost.

Total static investment

The total static investment used in the financial analysis of the project was 267.38 million RMB. The unit cost was compared with the data of other registered CDM projects in the region. As shown in Table 1, the investment cost per kW of the proposed project is 7 427.2 RMB/kW (including the sunk cost, the investment per kW will be 6 563.3 RMB/kW after deducting the sunk cost), which is within the range of the value from 3 547.8 RMB/kW to 7 548.9 RMB/kW but on the high side of the range. Considering the unfavourable geological conditions at the project site /10/ (also mentioned above Sec. 4.6.1), DNV considers it is reasonable.

Moreover, the investment costs were further justified by cross-checking the costs in the signed contracts including construction and installation, water-turbine generators equipments, and others /15/ /17/ /18/. The total values in these contracts have reached to 266.77 million RMB (excluding sunk costs) which is only 0.2% lower than the estimated total static investment cost of 267.38 million RMB in the SFSR /4/. Considering the expenditures of 31.1 million RMB (sunk cost) were incurred prior to the investment decision to restart the implementation of the project, the actual cost including sunk cost has exceeded the estimated total static investment in the SFSR. DNV considers that the total static investment in the SFSR is reasonable and appropriate.

Electricity Tariff

The applied tariff in the PDD is 0.20 RMB/kWh for dry period from January to May and 0.15 RMB/kWh for wet period from June to December (incl. VAT) sourced from the SFSR dated April 2008 /4/. It is based on “Notice on on-grid tariff of Dehong Prefecture” Dezhengfa [2003] No. 367 issued by Dehong Prefecture government on 17 December 2003 /49/ which is the latest tariff available at the time of investment decision by the project developer. A weighted tariff can be calculated to be 0.171 RMB/kWh (time weighted, (0.20*5 months +0.15*7 months)/12) according to Dezhengfa [2003] No. 367. It can be found from Table 1



that all the hydropower projects located in the same region Dehong Prefecture has similar tariff as the proposed project. Therefore, the tariff guidance of Dezhengfa [2003] No. 367 used in the SFSR is deemed reasonable.

It is shown in Table 1 that the range of tariffs for other similar hydro projects in Yunnan Province is from 0.140 to 0.215 RMB/kWh (incl. VAT). Thus, the tariff applied for the proposed project is within the range of tariffs of other similar projects in the same region. DNV has also verified the “*Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the People’s Republic of China*” /68/ issued by CDM EB in which the highest tariff for hydro project in Yunnan Province is 0.215 RMB/kWh (incl. VAT). Through introducing this highest tariff into the financial analysis of the proposed project, the IRR becomes 7.63% which is still lower than the benchmark of 8%.

DNV is able to confirm that the tariff of the proposed project sourced from the SFSR is reasonable.

Annual electricity output

According to the “*Hydrological Calculation Norms for Small Hydro Power*” /76/ and the “*Hydro energy Design Code for Small Hydro Power Projects*” /77/ issued by the Ministry of Water Resources of China and widely used in China, the following procedures are applied to determine the theoretical annual average power generation, which was also followed by the proposed project:

- The accredited third party Kunming Survey and Design Institute of Water Conservancy and Hydropower calculated the theoretical runoff series with widely used professional application software based on the 47 years of historical runoff data (1959-2005) /4/;
- The proposed project is a monthly adjusted reservoir hydro power and its normal water height is determined as 849 meters and its dead water height is 839 meters /4/;
- Kunming Survey and Design Institute of Water Conservancy and Hydropower compared three capacities of 30 MW, 36 MW and 38 MW, and finally determined that 38 MW was most feasible and economical for the proposed project /4/.

The theoretical annual average power generation is determined based on hydrological computation with amount of annual precipitation, the reservoir capacity, and synchronizing with up and down stream hydro stations, to give a total theoretical annual generation of be 145 840 MWh for the proposed project as indicated in the SFSR /4/. 100% was taken as the coefficient of effective electricity supply for the project. As per the SFSR, the coefficient of effective electricity is 100%, and the rate of electricity consumption for internal use and transmission loss is 1.5%/4/. Based on sectoral expertise, DNV can verify that it is reasonable. Thus, after deducting the self-consumption and transmission lose, the project is expected to delivered 143 652 MWh electricity to the grid /4/. In DNV’s opinion, the calculating processes for the electricity delivery to the grid are reasonable.

Annex 11 of CDM EB’s 48th meeting report gives a guideline for validation of plant load factor for renewable energy. There are two options of selecting a plant load factor for renewable energy, namely a) to use plant load factor provided to the government while applying the project activity for implementation approval; b) to use the plant load factor



determined by a third party contracted by the project participants (e.g. an engineering company). Hence according to current CDM regulation, the checking that the values are in line with the SFSR is deemed sufficient for validation of plant load factor. This was the case for this project.

Hence, it is concluded by DNV that the estimated net electricity delivered to the grid from the FSR is reasonable and acceptable.

Annual O&M costs

The O&M cost may vary by site location, applied technology, operational skill of workers and regional inflation. The annual O&M costs of the proposed project accounts for 2.21% of the total static investment, which is within the range from 1.40% to 8.66% of other similar projects in the region as shown in Table 1. Therefore, it can be confirmed that the annual O&M costs of the project is reasonable and appropriate.

The term “other cost” refers to additional production expenses, administrative expenses and operating expenses in the O&M costs (exclusive of depreciation, maintenance, insurance, material, salary and welfare). This definition was derived from the rule “*Economic Evaluation Code for Small Hydropower Projects*” /70/ which was considered as the financing assessment basis and source for preparing the SFSR. In this rule /70/, it is stipulated that the other cost will be 12 RMB/kW for the hydro power projects with an installed capacity above 12 MW. DNV has verified that the other cost sourced from the SFSR is 12 RMB/kW. Therefore, it can be confirmed that the “other cost” used for the project is appropriate and in line with the relevant regulation in China /70/. For comparison purposes, even if the “other cost” was assumed to be zero, the project IRR without CER revenue will be 4.69%, which is still much lower than the benchmark of 8%. DNV can confirm the other cost identified in the SFSR is appropriate.

Tax and Depreciation

(a) VAT

DNV has verified that the VAT is 6% is derived from the SFSR /4/. This value is in accordance with the Chinese law “*Interim Regulations of the People’s Republic of China on Value Add Tax*”, from State Tax Bureau and Ministry of Finance, dated 1 January 1994 /81/. DNV considers the VAT value used in the investment analysis reasonable and in accordance with the national regulation.

(b) Income tax

The income tax of Yunnan Mangli Hydropower Project is chosen as 25% that is in line with the Law of the People's Republic of China on Enterprise Income Tax /80/. The income tax rate is in accordance with the regulation in force at the time of the investment decision. In addition, the actual interest payable has been taken into account in the calculation of income tax.

(c) Surcharge taxes

The tax of city maintenance & construction and education is included and calculated as a fraction of VAT.



The city maintenance and construction tax rate is 1% of VAT and the additional education tax is 3% of VAT for Yunnan Mangli Hydropower Project. These two values derived from the SFSR and also are in line with national regulations in China /82/ /83/.

(d) Depreciation and residual value

The depreciation has been taken into account in the income tax calculation. The depreciation period of 25 years is with normal accounting practice of those similar hydropower projects in China. The residual value of the fixed assets uses the upper limited value as 5%, which is stipulated by the government /84/. The residual value of the fixed assets has been recovered at the end year of the operational time in the IRR calculation. DNV can verify based on the relevant regulation and local sectoral expertise that 5% of the residual value is deemed to be reasonable.

In conclusion, all the input parameters for this project are reasonable and comparative with other projects in the same region. In addition, by applying our sectoral competence and checking the available public data, DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

Calculation and conclusion

The project IRR calculations were provided in a spreadsheet /2/. The calculations were verified and found to be correct by DNV. An operational period of 25 years was used for the IRR calculation according to the SFSR /4/. The assumptions used in the calculations were deemed to be correct by DNV. The project IRR without CDM revenues is 4.46%, which confirms that the project in the absence of CDM benefits and compared to the benchmark is not financially attractive. With CER revenues the project IRR increases to 10.56%, which is above the benchmark.

Sensitivity analysis

A sensitivity analysis was carried out for parameters contributing to more than 20% of the revenues or costs in order to check the robustness of the financial analysis. Reasonable variations of the total static investment, annual O&M costs, and annual 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. The variation necessary for each parameter to reach the benchmark is indicated in the following table:

Table 2 - Variation of the parameter to make the project IRR reach the benchmark of 8%

Total static investment (Excl. sunk cost)	Electricity tariff (Excl. VAT)	Annual electricity output	Annual O&M cost
-28%	37.3%	39.9%	-118.5%

1) Total Static Investment

DNV was able to confirm that the reduction by 28% in investment costs (excl. sunk cost) is unlikely to happen. As mentioned above, the total value of 266.77 million RMB in the signed contracts provided by PP /15/ /17/ /18/ is very close to the estimated total investment cost of 267.38 million RMB in the SFSR, in which the expenses for the purchase and installation of



main equipments and construction exceed the assumed values in SFSR. According to the official statistics, the price of industrial products and labour cost has increased from 2007 to 2008 in Yunnan Province /55/. So the total investment is not likely to decrease by 28%.

2) Electricity tariff

It was also observed that if the tariff increases by 37.3%, the project IRR will equal the benchmark. However, the electricity tariff of the project has been regulated by Dehong Prefecture government on 17 December 2003 /49/. As the tariff price is mainly decided by the government with a general policy of maintaining the tariff price stable, DNV considers that the tariff will remain stable for the project IRR calculation. Therefore, it is unlikely for the electricity tariff to increase by 37.3%.

3) Annual electricity output

The project IRR will reach the 8% benchmark if net electricity generation increases by 39.9%. However, the net electricity generation has been calculated based on the water flow data of the past 47 years (1959-2005) measured by an accredited party and the data reflects the reality of the electricity generation /4/. Additionally, as a newly built power plant with a monthly adjusted reservoir, the project's power generation will not fluctuate much through the whole operational period. Hence, it is highly unlikely to increase by 39.9%.

4) Annual O&M cost

The project-IRR can reach the benchmark if the annual O&M cost decreases by 118.5%. The annual O&M cost consisted of material cost, salary, insurance cost and other cost. It is apparently impossible for the hydro power project without the O&M cost during the project operation, i.e. even when the O&M cost is assumed to be zero, the project-IRR is 7.48% which is still below the benchmark.

In conclusion, the investment analysis and sensitivity assessment have shown that the project activity is not financially attractive.

Additional assessment on the financial parameters of the installed capacity of 30 MW

Table: Basic parameters for financial analysis for installed capacity of 30 MW

Items	Unit	Value	Data Source
Installed Capacity	MW	30	FSR
Total investment	Million RMB	216.22	FSR
Static investment	Million RMB	204.10	FSR
Annual operation hour	Hour	4 218	FSR
Annual electricity generation	MWh	126 540	FSR
Annual electric output	MWh	113 380	FSR
Annual electric output(wet period)	MWh	66 138	FSR
Annual electric output(dry	MWh	47 242	FSR



period)			
Tariff including VAT(RMB/MWh, wet period)	RMB/KWh	0.15	Price document [2003]367
Tariff including VAT(RMB/MWh, dry period)	RMB/KWh	0.20	Price document [2003]367
Operational lifetime	Year	25	FSR
Income tax rate	%	33	FSR
Value-add tax rate	%	17	FSR
Residual value rate	%	0	FSR
Surtax for education expenses	%	3	FSR
city maintenance tax	%	1	FSR
Depreciation rate	%	4	FSR
Welfare rate	%	49.5	FSR
Employee number		32	FSR
Maintenance cost rate	%	1	FSR
Insurance cost rate	%	0	FSR
Material cost	RMB/kW	5	FSR
Reservoir maintenance fund rate	RMB/kWh	0	FSR
Other expenses rate	RMB/kW	15	FSR
Water resources fee rate	RMB/kW	0.002	FSR
Long term interest rate	%	6.12	FSR

Total static investment

The total static investment used in the financial analysis of the project was 204.10 million RMB. The unit cost was compared with the data of other registered CDM projects in the region. As shown in Table 1, the investment cost per kW of the proposed project is 6 803.3 RMB/kW, which is within the range of the value from 3 547.8 RMB/kW to 7 548.9 RMB/kW. In addition, the unit cost for the installed capacity of 30 MW also seems to be similar as the value 6 563.3 RMB/kW for the installed capacity of 36 MW. DNV considers it is reasonable.

Electricity Tariff

The applied tariff for the installed capacity is 0.20 RMB/kWh for dry period from January to May and 0.15 RMB/kWh for wet period from June to December (incl. VAT) sourced from “Notice on on-grid tariff of Dehong Prefecture” Dezhengfa [2003] No. 367 issued by Dehong Prefecture government on 17 December 2003 /49/, which is the same as the tariff applied for the installed capacity of 36 MW and has been assessed above. DNV has also verified the



“Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the People’s Republic of China” /68/ issued by CDM EB in which the highest tariff for hydro project in Yunnan Province is 0.215 RMB/kWh (incl. VAT). Through introducing this highest tariff into the financial analysis of the proposed project, the IRR becomes 5.41% which is still lower than the benchmark of 8%.

DNV is able to confirm that the tariff of the proposed project sourced from the SFSR is reasonable.

Annual electricity output

As stated in above assessment on annual electricity output for the installed capacity of 36 MW, DNV can confirm that the calculating processes for the electricity delivery to the grid for the installed capacity of 30 MW was also determined based on hydrological computation with amount of annual precipitation, the reservoir capacity, and synchronizing with up and down stream hydro stations, to give a total theoretical annual generation to be 126 540 MWh for the proposed project as indicated in the FSR /5/. 90% was taken as the coefficient of effective electricity supply for the project and the rate of electricity consumption for internal use is 0.4%. The project is thus expected to delivered 113 380 MWh electricity to the grid /5/. In DNV’s opinion, the calculating processes for the electricity delivery to the grid are reasonable. However, in order to further substantiate the additionality of the project activity, the coefficient for effective electricity supply of the project was considered to be 100% and applied to the calculation of annual output delivered to the grid of 126 034 MWh. It was found that even if the coefficient for effective electricity supply was 100%, the project-IRR without CDM revenues is 4.28%, which is still below the benchmark of 8% (after tax). Moreover, by comparing the annual operating hours, 4 218 hours for the installed capacity of 30 MW is higher than 3 990 hours for the installed capacity of 36 MW. Hence, DNV considers the annual electricity output for the installed capacity of 30 MW is more conservative.

Annual O&M costs

The O&M cost may vary by site location, applied technology, operational skill of workers and regional inflation. The annual O&M costs of the proposed project accounts for 1.71% of the total static investment, which is within the range from 1.40% to 8.66% of other similar projects in the region as shown in Table 1, and also lower than the annual O&M costs for the installed capacity of 36 MW. Therefore, it can be confirmed that the annual O&M costs of the project is reasonable and appropriate.

For other cose, even if the “other cost” was assumed to be zero, the project IRR without CER revenue will be 3.43%, which is still much lower than the benchmark of 8%.

Tax and Depreciation

Except income tax, VAT and residual value, other tax rates and depreciation period are same as the values for the installed capacity of 36 MW.



(a) VAT

In order to encourage the development of small scale hydro power project (in China, the installed capacity less than 50 MW is considered as small scale hydro project), China government agreed the project owner to adopt the VAT of 6% or 17% for the small scale hydro power project, which as stipulated in the “*Interim Regulations of the People’s Republic of China on Value Add Tax*”, from State Tax Bureau and Ministry of Finance, dated 1 January 1994 /81/. DNV considers the VAT value used in the investment analysis reasonable and in accordance with the national regulation.

(b) Income tax

The Law of the People's Republic of China on Enterprise Income Tax was put into effective from 1 January 2008 /80/, in which the income tax was changed from 33% to 25%. The income tax rate 33% applied for the installed capacity of 30 MW is in accordance with the regulation in force at the time of the investment decision. In addition, the actual interest payable has also been taken into account in the calculation of income tax.

(c) Residual value

The residual value of the fixed assets uses 0, which also is in compliance with the rules by the government /84/. DNV can verify that even the residual value of the fixed assets use the upper limit of 5%, the project IRR without CER revenue will be 3.33%, which is still much lower than the benchmark of 8%.

In conclusion, by applying our sectoral competence and checking the available public data, DNV was able to confirm that the input parameters used in the financial analysis for the installed capacity of 30 MW are reasonable and adequately represent the economic situation of the project.

4.6.4 Barrier analysis

The barrier analysis is not applied for the project.

4.6.5 Common practice analysis

In China, most policies are promulgated in provincial level by combining the national policy with the region’s condition. In addition, abundant water resources in Yunnan Province make this region different from other regions in the aspect of electricity output, eventually in the aspect of economic feasibility. It is thus reasonable to select Yunnan Province as scope for common practice analysis.

The hydropower plants built after year 2002 when China implemented power sector reform to establish a more commercialized power market /78/ have been taken into account in the common practice analysis. It is therefore reasonable to choose project operated after 2002 for comparison, as these projects can be considered similar to the proposed project by operating under the same policy scheme.

The projects with an installed capacity $\pm 50\%$ (18~54 MW) of the project installed capacity were considered for the common practice. In addition, according to *Tool for the demonstration and assessment of additionality* /60/, other CDM project activities are not to be included in the common practice analysis. Hence, the CDM projects should be excluded due to the same financial unattractiveness as the proposed project activity.



Based on the above assumptions in Yunnan Province, according to China Water Resource Yearbook (2006 to 2008) /74/, the information on similar hydropower projects are listed in Table 2.

Table 2 Similar hydro power stations located in Yunnan Province

No.	Project Name	Installed Capacity (MW)	Construction Starting year	Operation Starting year	Investment cost per kW (RMB/kW)
1	Laodukou Hydro	36	2003	2007	5 323
2	Xiashilong Hydro	25	2003	2005	4 320
3	Yanziya Hydro	25	2003	2005	4 800
4	Wuni River Hydro	28	2003	2005	6 071
5	Maomaotiao Hydro	40	2003	2005	3 000
6	Houqiao Hydro	48	2003	2005	6 197
7	Nanting River Hydro	34	2003	2004	4 529
8	Mengdianhe (2 nd cascade) Hydro	33	2003	2004	3 818
9	Xima Xingyun Aluminium Factory Hydro	26	2002	2004	N/A
10	Chongjianghe (Phase II) Expansion Hydro	48	2003	2006	N/A

Xima Xingyun Aluminium Factory Hydropower Station is the captive station of Yunnan Yingjiang Xingyun Co., Ltd. /35/. Chongjianghe (Phase II) Expansion hydropower station is an expansion station in an existing power station /36/. The Wunihe Hydropower Project which has applied for Voluntary Emission Reductions under the VCS Programme /37/. The Mengdianhe 2nd Hydropower Station Project has been approved by NCRC for CDM application /38/. Xiashilong Hydropower Station had applied as a VER project /39/. Therefore these five projects are not comparable to the proposed project and excluded from the common practice.

According to *The 10th Five-year development planning on Wenshan power* /40/, the hydropower station developed under this plan will obtain national and local support by appropriate policy, funding, taxation, land acquisition and resettlement, etc. Nanting River Hydropower Station and Maomaotiao Hydropower Station were developed in Wenshan Prefecture and they were all benefited from this programme. Further, it can be found that Nanting River Hydropower project has the higher annual operation hours (5 726 hours /41/) compared to the proposed project (4 051 hours); Maomaotiao hydropower project enjoys a preferable electricity tariff (0.28 RMB/kWh) /43/ as it takes on the mission of transferring electricity to Vietnam /42/.

Houqiao Hydropower Station is connected to the West-East Electricity Transmission Projects and belongs to the China's Western Development Programmes /44/. Under these two principals, the hydropower projects developed during 10th Five-year will obtain national and local support. Laodukou Hydropower Station developed under financial support by the local government /45/. Yanziya Hydropower Station project is invested by foreign-capital /45/. Foreign investment in china enjoys many preferential policies /47/.



In DNV's opinion, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions resulting from the project are additional.

4.7 Monitoring

The project applies the approved monitoring methodology ACM0002 12.1.0, "*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*" /59/.

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

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

4.7.1 Parameters determined ex-ante

The combined margin emission factor is determined *ex-ante* based on the most recent information available at the time when the PDD was submitted for validation. Detailed calculations of the combined margin emission factor are described in the following section 4.8. The parameters are listed in below table:

<i>Data and Parameters</i>	<i>Unit</i>	<i>Value applied</i>	<i>Source of data used</i>
Operating margin of CSPG (OM)	tCO ₂ /MWh	0.9987	China Electric Power Yearbook /73/; China Energy Statistical Yearbook /72/; IPCC 2006 /66/.
Build Margin of CSPG (BM)	tCO ₂ /MWh	0.5772	
Emission factor of CSPG (CM)	tCO ₂ /MWh	0.7879	

4.7.2 Parameters monitored ex-post

According to the approved monitoring methodology ACM0002 12.1.0, the following parameters shall be monitored ex-post:

- The electricity supplied by the project activity to the grid;
- The electricity imported by the project activity from the grid;
- The electricity imported through backup line from the grid;
- The installed capacity of the hydro power plant after the implementation of the project activity ;
- The surface area of reservoir at full water level after the implementation of the project activity when the reservoir is full.

The power exported to and imported from the CSPG will be measured continuously and recorded on a monthly basis by the bidirectional meters with with accuracy grade at least 0.5 installed at the substation of Grid company and project site. In addition, the electricity imported through backup line from the grid also needs to be monitored by the meter with accuracy 2% or higher. Electricity Transaction Notes (ETNs) will be provided for data quality control and cross check. All the electricity meters would be calibrated annually by an accredited calibration agency according to the sectoral requirement.



The installed capacity will be checked and recorded annually according to recognized standards, while the surface area will be measured by professional design institute when the project activity becomes operational. The data will be archived at least for 2 years after the end of the last crediting period by means of electronic and paper backup.

4.7.3 Management system and quality assurance

The following are included in the monitoring plan of the PDD:

- Description of monitoring system;
- Management structure;
- Quality assurance and quality control;
- Monitoring training.

Detailed procedures have been elaborated in the PDD /1/. These will be maintained and implemented to enable subsequent verification of emission reductions.

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

4.8 Algorithms and/or formulae used to determine emission reductions

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 ($EF_{grid,CM,y}$ in tCO₂/MWh) times the electricity supplied by the project activity to the grid (EG_y in MWh).
- 2) Project emissions: The power density of the proposed project (12.1 W/m²) is greater than 10 W/m². Thus project emissions can be considered as zero according to ACM0002.
- 3) Leakage: No leakage needs to be considered for the proposed project activity as per ACM0002.

The baseline emission factor for the project is determined ex-ante as a combined margin, consisting of the operating margin (OM) and build margin (BM) according to “*Tool to calculate the emission factor for an electricity system*” Version 2.1 /61/. The grid emission factor of the CSPG is determined ex-ante for the 7 years crediting period following ACM0002 version 12.1.0, based on the most recent information available at the time when the PDD was web-hosted on 3 August 2010. It has been calculated as the weighting average ($w_{OM} = 0.5$; $w_{BM} = 0.5$) of the operating margin and the build margin.

The data used in the EF calculation is in accordance with data in the China Electric Power Yearbook from 2004-2008 /73/, China Energy Statistics Yearbook from 2006-2008 /72/ and the IPCC 2006 default values /66/.

Operating Margin: Simple OM was chosen and this is justified since the low cost /must run resources constitute less than 50% of total grid generation /73/.

Aggregated generation (sourced from China Electric Power Yearbook /73/) and fuel consumption data (sourced from China Energy Statistics Yearbook /72/) are used due to the



fact that more disaggregated data are not available in the CSPG (option B). The total electricity delivered to the CSPG has been used which are obtained from the China Electric Power Yearbook from 2006-2008 (published annually) /73/. Country specific data for net calorific value of each type of fossil fuel are obtained from the China Energy Statistical Yearbook from 2006-2008 /72/ and the IPCC 2006 default values /66/ for the lower limit of the 95% percent confidence intervals for CO₂ emission factor of fossil fuels are deemed reasonable.

The OM is calculated to be 0.9987 tCO₂e/MWh. The sources and calculation has been verified by DNV.

Build Margin: Build margin was determined ex-ante. 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 /62/ of the baseline methodology of AM0005 has been applied for calculation of the build margin (BM) emission factor for this project.

- Use of capacity additions from the years 2005 to 2007 is chosen and reaches 29.01% of the total installed capacity /73/.
- Use of weights estimated using installed capacity in place of annual electricity generation. Thermal power plant accounts for 71.98% of the total installed capacity additions in this period /62/. Since specific data for each technology is not available, the fraction of fuels (coal 93.08%, gas 2.36% and oil 4.56% /73/) was estimated from the CO₂ intensity for the fuels used in the CSPG.
- Efficiencies of 38.10% for coal power plants and 49.99% for oil or gas power plants are defined as the best technology commercially available in China by the DNA of China /75/.

Country specific net calorific value of each kind of fuel from the China Energy Statistics Yearbook 2008 /62/, and IPCC 2006 default values /66/ for emission factors of each kind of fuel and carbon oxidization factor are used to calculate the BM in the CSPG. The official supporting documentation has been verified.

The BM is calculated to be 0.5772 tCO₂e/MWh, which was verified by the provided emission factor calculation spreadsheet /3/.

Combined Margin: The resulting combined margin emission factor of 0.7879 tCO₂e/MWh is fixed ex-ante for the first crediting period.

Emission Reduction:

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.

The annual electricity delivered to the CSPG is expected to be 143 652 MWh /4/. Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction conservatively calculated to be 113 189 tCO₂e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the



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

4.9 Environmental impacts

An Environmental Impact Assessment (EIA) of the project activity, completed by Yunnan University in July 2005 /7/, has been conducted according to Chinese law & regulation. The potential environmental impacts, such as waste water and sewage, dust and air quality, noise and soil erosion impact have been sufficiently identified. No significant environmental impacts are expected from the project activity. The Yunnan Provincial Environmental Protection Bureau approved the EIA on 27 October 2005 /8/.

According to the related laws and regulations of Chinese government /51/ /52/ /53/, an agreement on the compensation scheme was signed between the local government and the project participant /54/. During 13 to 14 May 2009, DNV visited and interviewed the local villagers who were affected by the project /95/. DNV was able to confirm that the compensation scheme has been implemented based on the national policies and the agreement on the compensation scheme through interview with local government officials and villagers /95/.

4.10 Comments by local stakeholders

The local stakeholder consultation process was conducted through the questionnaires survey in June 2009.

The project owner visited local stakeholders to collect comments and suggestions. In the survey, 100 questionnaires were distributed to the local stakeholders to collect their comments regarding the impacts by the proposed project and 100% questionnaires were returned back from 18 June 2009 to 30 June 2009. All the questionnaires have been provided by PP and reviewed by DNV. The survey covers people with different walks of life including farmers, officials, dealers, students and workers. The educational level includes primary school, junior high school, and senior high school level. The survey shows that the proposed project receives support from the local people.

DNV was able to confirm the adequacy of the local stakeholder consultation process by interview with the invited stakeholders during site visit /95/.

4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 13 July 2010, was made publicly available on the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/EOWHOX52GTSGWXR5C8X8BSRD6E9D5B/view.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 3 August 2010 to 1 September 2010.

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	OK
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
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	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	~~CL4~~ ~~CL5~~ ~~CL6~~

Requirement	Reference	Conclusion
that would have occurred in the absence of the registered CDM project activity.		~~CL-7~~ ~~CL-8~~ ~~CL-9~~ ~~CL-10~~ ~~CL-11~~ ~~CL-13~~ ~~CL-14~~ ~~CL-15~~ ~~CL-16~~ ~~CL-17~~ 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
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	~~CL-20~~ OK
About stakeholder involvement		
13. 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
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the	CDM Modalities and Procedures §37e	OK

Requirement	Reference	Conclusion
CDM Executive Board.		
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. 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	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity						
A.1 Title of the project activity (VVM para 55-57)						
A.1.1	Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.		OK
A.1.2	Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes		OK
A.2 Description of the project activity (VVM para 58-64)						
A.2.1	How was the design of the project assessed?	/1/	DR	<i>What type is the project?</i> ☐ Project in existing facility or utilizing existing equipment(s) ☐ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO ₂ e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO ₂ e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis. ☐ The project is an individual small scale project activity with emission reductions		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				not exceeding 15 000 tCO₂e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project <i>How was the design of the project assessed?</i> ☒ Physical site inspection ☒ Reviewing available designs and feasibility studies		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR I	The project is a greenfield project to generate electricity and deliver it to the CSPG. The project has been in operation at the time of validation commencement.		OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO ₂ e per year), justify the sampling through a statistical analysis:	/1/	DR	Not applicable. This is a large scale project.		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR	Yes. The description of the proposed project in PDD covers all relevant elements which is consistent with SFSR and provides the reader with a clear understanding of the nature of the project.		OK
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	No. This is a newly-built hydropower project and does not involve alteration of existing installations.		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/ /4/	DR	According to the SFSR prepared by an independent third party with rich experience, Kunming Survey and Design Institute of Water Conservancy and Hydropower, the project design engineering was determined based on the comparison of several schemes with various		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			scales. DNV can confirm the project design engineering reflect current good practices.		
A.2.7 Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/ /4/	DR I	The project involves installation and operation of two HLA551c-LJ-262 turbines and SF18-30/5050 generators manufactured by Hangzhou Resource Power Equipment Co., Ltd. which is a domestic enterprise. The technology applied for the project is mature and reflects the current good practices in China, and the transfer of technology from any Annex I Party is not involved.		OK
A.3 Participation requirements (VVM para 51-54, 123-125)					
A.3.1 Do all participating Parties fulfil the participation requirements as follows: a) Party has ratified the Kyoto Protocol b) Party has designated a Designated National Authority c) The assigned amount has been determined	/1/	DR	Yes. China (host) Japan Country Y ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☒ No ☒ Yes ☐ No ☐ Yes ☐ No		OK
A.3.2 Do the letters of approval meet the following requirements?	/1/ /56/ /57/	DR	The relevant evidence needs to be provided to substantiate the LoA of Japan is authentic. China (host) Japan Country Y ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No ☒ Yes ☐ No NA NA ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No	~~CL~~	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
f) The LoA is issued by the respective Party's DNA		☒ Yes	☐ No	☒ Yes ☐ No	☐ Yes ☐ No	
g) The LoA was received directly by the DNA or the PP		☐ DNA	☒ PP	☐ DNA ☒ PP	☐ DNA ☐ PP	
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic		DNV verified the website by Clean Development Mechanism in China, and confirm that the LoA of China is authentic.		The relevant evidence needs to be provided to substantiate the LoA of Japan is authentic.		
A.3.3	Have all private/public project participants been authorized by an involved Party?	/1/ /56/ /57/	DR	Yes. A letter of approval (LoA) was issued by DNA of China in April 2009, authorizing Datang Mangli Hydropower Development Company Limited as project participant. The DNA of Japan issued the LoA on 6 July 2009 and authorized Sumitomo Corporation as project participant.		OK
A.4 Technical description of the project activity (VVM para 58-64)						
A.4.1	Is the project's location clearly defined?	/1/ /4/	DR	Yes. The proposed project is located on Mangshi River, in Luxi City of Yunnan Province. The geographical coordinates of the blocking dam are 98°18'52" East longitude and 24°18'30" North latitude which can be confirmed by the SFSR.		OK
A.5 Public funding of the project activity						
A.5.1	In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided 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?	/1/	DR	The validation did not reveal any information indicating that the project can be seen as a diversion of official development assistance (ODA) funding towards China.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76)					
B.1.1 Does the project apply an approved methodology and the correct version thereof?	/1/ /59/	DR	Yes. The approved methodology ACM0002 Version 12.1.0 “Consolidated methodology for grid-connected electricity generation from renewable sources” is used for the proposed project.		OK
B.2 Applicability of methodology (and tools) (VVM para 65-76) <i>Insert a row for each applicability criteria of the applied methodology (and tools)</i>					
B.2.1 How was it validated that project complies with the following applicability criteria: The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m ² ?	/1/	DR	For power density of the power plant, two different values of 13.17 W/m ² and 35.72 W/m ² were indicated in the PDD. Clarification is requested to justify the correct one.	~~CL-2~~	OK
B.2.2 How was it validated that project complies with the following applicability criteria: The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit?	/1/ /4/	DR	According to the SFSR, the proposed project is a newly built hydropower plant which also can be confirmed by the site visit.		OK
B.2.3 How was it validated that project complies with the following applicability criteria: Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity?	/1/ /4/	DR	According to the SFSR, DNV can confirm that the project does not involve the switching from fossil fuels to renewable energy sources at the site of the project activity.		OK
B.2.4 How was it validated that project complies with the	/1/	DR	The project is connected to the CSPG, and the	~~CL-3~~	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
following applicability criteria: The geographic and system boundaries of the proposed project can be clearly identified?		/4/ /50/		geographical and system boundaries are clearly identified and information on the characteristics of the grid is available. However, as per the agreement of grid access of the proposed project, the project developer is inconsistent with the project owner stated in the PDD. Further clarification is requested for the difference.		
B.2.5	Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/ /59/	DR	The baseline scenario is defined as electricity delivered to the grid by the project activity would otherwise have been generated by the operation of grid-connected power plants and by the addition of new generation sources, which confirms the applicability of the methodology ACM0002.		OK
B.3 Project boundary (VVM para 77-79)						
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/ /4/	DR	Yes. The spatial extent of the project boundary is defined as the site of the project and all power plants connected physically to the CSPG including Guangdong Province, Guangxi Zhuang Autonomous Region, Yunnan Province and Guizhou Province, to which the project plant will be connected. There are no significant transmission constraints amongst the power plants of the CSPG, nor with the proposed project. It is DNV's opinion that the project boundary of Yunnan Mangli Hydropower Project is clearly defined.		OK
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/ /4/ /59/	DR	The GHG source is CO ₂ which is in line with the methodology ACM0002. The identified boundary cover all possible sources linked to the proposed project activity.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.3.3	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/ /59/	DR	Clarification is requested to justify which value of power density in the PDD is correct.	CL-2	OK
B.4 Baseline scenario determination (VVM para 80-87, 103-105)						
B.4.1	Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/ /59/	DR	Four scenarios have been identified as realistic and credible alternatives to the project activity: a) The proposed project itself, but not undertaken as a CDM project activity; b) Construction of a coal-fired power plant with equivalent installed capacity or annual electricity generation; c) Construction of a power plant using other renewable energy, such as wind and biomass power plant with equivalent installed capacity or annual electricity generation; d) Equivalent electricity service provided by the CSPG. DNV considers the list of realistic and credible alternatives to be complete.		OK
B.4.2	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/ /59/	DR	The baseline scenario has been determined by ACM0002.		OK
B.4.3	What is the baseline scenario?	/1/ /59/	DR	The baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.		OK
B.4.4	Is the determination of the baseline scenario in accordance	/1/	DR	Yes, the determination of the baseline scenario is		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	with the guidance in the methodology?	/59/		in accordance with the methodology ACM0002.		
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /59/	DR	This is not applicable because the baseline scenario is directly determined according to the methodology ACM0002 version 12.1.0.		OK
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /22/ /23/ /24/ /25/ /79/	DR	Yes. The national policy and China's conditions were considered in the baseline scenario determination.		OK
B.4.7	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes. The baseline scenario is determined compatible with the available data and all literature and sources are clearly referenced.		OK
B.4.8	Is the baseline determination adequately documented in the PDD? - 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. - All documentation is relevant as well as correctly quoted and interpreted. - Assumptions and data can be deemed reasonable - Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. - The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/	DR	Yes. the baseline determination has been adequately documented in the PDD: - All assumptions and data including their references and sources used by the project participants are listed in the PDD and properly referenced. - All documentation used is relevant and correctly quoted and interpreted. - Assumptions and data are justified appropriately and can be considered reasonable. - Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. The methodology has been correctly applied to identify the most reasonable baseline scenario.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5 Additionality determination (VVM para 93-119)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /59/ /60/	DR	The additionality of the project is demonstrated by applying “Tool for the demonstration and assessment of additionality” Version 5.2. This is in line with the ACM0002.		OK
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/ /79/	DR	Yes. The regulatory requirement, such as “ <i>Notice on Strictly Prohibiting the Installation of Thermal Power Plant with the Capacity less than 135 MW</i> ”, has been taken into account to evaluate the project activity and the alternatives.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /22/ /23/ /24/ /25/ /79/	DR	Yes. The sufficient evidences have been provided to support the relevance of the arguments made.		OK
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality is mainly based on the investment analysis.		OK
Prior consideration of CDM (VVM para 96-102)						
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /4/ /6/ /14/ /15/ /16/	DR	As per stated in the PDD version 01, the starting date of the proposed project is 30 June 2008 which is the date of construction contract signed. The construction permit of the project was signed on 2 July 2008. The evidence for CDM consideration are as follows: - The SFSR was completed in April 2008 and finally approved by Development & Reform Commission of Yunnan Province on 21 November 2008;		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			- The Directors' Meeting for the consideration of CDM was organized by the project owner on 21 June 2008 and CDM was decided to be developed as the means to overcome the financial barrier; - CDM consultant contract was signed on 28 June 2008. However, other financial commitments for the project activity need to be provided to substantiate the starting date of the project is in accordance with the "Glossary of CDM terms", i.e. by comparing the date of construction contract signed, the date of equipment contract signed, and the permission date of construction starting.	CL-4	
B.5.6 If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/	DR	The starting date of the proposed project needs to be further clarified.	CL-4	OK
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7 What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/ /20/ /56/ /57/ /71/	DR	The continued actions to secure CDM status in parallel with the implementation of the project activity have been demonstrated by the following actions: - The CDM validation contract was signed on 11 November 2008 by CWEME and 25 February 2009 by DNV; - The Emission Reduction Purchase Agreement was signed between China National Water Resources & Electric Power Materials &		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Equipment Co., Ltd. and Sumitomo Corporation on 26 February 2009; - The LoA from DNA of China was issued in April 2009; - The LoA from Annex I Party Japan was issued on 6 July 2009; - PDD was published for global stakeholder consultation from 03 August 2010. The starting date of the proposed project needs to be further clarified; The timeline of CDM key events in Section B.5 of PDD version 01 needs to be updated until the start of the validation.	~~CL~~4 ~~CL~~5	
B.5.8 When did the construction of the project activity start?	/1/ /16/	DR	The start of construction was permitted on 2 July 2008. However, DNV reviewed the publicly available source and found that the construction of the project activity happened before 2 July 2008. Therefore, further clarification is requested to justify the start and process of the construction of the project.	~~CL~~ 6	OK
B.5.9 When was the project commissioned?	/1/	DR	By interview with the project owner and physical on-site visit the project plant, DVN found that the project commissioned in August 2009 and has been in operation in March 2010. However, as stated in the PDD, the start of construction was permitted on 2 July 2008 which is only approximately 13 months prior to the project commissioning date (August 2009); while stated in the SFSR, 3 years construction period is	~~CL~~ 7	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			required for the project. Further clarification is sought to justify the appropriateness of the time gap between the construction, commissioning and operation for the project.		
B.5.10 Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	The timeline of CDM key events in Section B.5 of PDD version 01 need to be updated until the start of the validation.	~~CL5~~	OK
Investment analysis (VVM para 106-112) <i>The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.</i>					
B.5.11 Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	The proposed project generates financial and economic benefits through the sales of electricity other than CDM related income, which has been correctly described in the PDD.		OK
B.5.12 Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	The proposed baseline scenario of sourcing electricity from the grid does not involve a new investment, which has been correctly described in the PDD.		OK
B.5.13 Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	The benchmark analysis (option III) is justified for conducting the investment analysis.		OK
B.5.14 Is the benchmark/discount rate the latest available at the time of decision?	/1/ /69/	DR	Yes. According to <i>Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects</i> issued by former State Power Corporation of China in 2003, the IRR in China's power generation industry is 8%, which is regarded as the benchmark for investing in renewable energy generation projects in China, and which is the latest benchmark available at the time of the investment decision.		OK
B.5.15 What is the financial indicator? Is it on equity/project basis?	/1/	DR	The project IRR (after tax) is selected as the		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Before/after tax? Is the financial indicator in correspondence with the benchmark?	/2/ /4/ /69/		financial indicator. Yes, the financial indicator is in correspondence with the benchmark: a. This benchmark was determined by the national administration of this industry in China, and represents a government/official approved benchmark; b. This benchmark is for project and after tax and the investment analysis for this project is also for project and after tax also; c. This Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects is referred to the risk premiums of hydro power project. This Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects is still valid till now		
B.5.16 Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	It is not applicable.		OK
B.5.17 Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/ /2/ /4/	DR	The income tax calculation takes depreciation into account. The depreciation year is 25 years, which is in accordance with normal accounting practice in China.		OK
B.5.18 Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/ /2/ /4/ /84/	DR	The 28 years of investment analysis including 3 years of construction time and 25 years of operation time have been used by the project, which is normal practice and referenced in the SFSR. The residual value rate of the fixed assets uses the upper limited value as 5%, which is stipulated by		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the government and represents good practice in China. The residual value of the fixed assets has been recovered at the end year of the operational time in the IRR calculation. DNV can verify based on the relevant regulation and local sectoral expertise that 5% of the residual value rate is deemed to be conservative and reasonable. The working capital has been returned in the last year of operation time in the IRR spreadsheet.		
B.5.19 When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/ /4/	DR	The SFSR was completed by Kunming Survey and Design Institute of Water Conservancy and Hydropower on April 2008 and thus only more than 2 months prior to the decision to proceed with project activity (i.e. the start date of the project) which was on 30 June 2008 (stated in the PDD, version 01). Given this relative short period of time between finalization of the SFSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed. The SFSR was finally approved by Development & Reform Commission of Yunnan Province on 21 November 2008. It is thus reasonable to assume that the SFSR has been the basis of the decision to proceed with the investment in the project. However, according to the SFSR, annual operation hour of the proposed project is 4 051 hours. As a result, the calculated PLF is 0.462. The clarifications are sought on the following items: - The annual operation hour used in IRR calculation spreadsheet is 3 990 hours which	~~CL-8~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			is inconsistent with the value (4 051 hours) of SFSR; - As stated above, the PLF determined by SFSR is 0.462 which is inconsistent with the value 0.456 used in PDD; - In order to be transparent, annual electricity generation and self-consumption rate need to be stated clearly in the PDD.		
B.5.20 How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /4/ /64/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☒ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☐ Other approach. Annex 11 of CDM EB's 48th meeting report gives a guideline for validation of plant load factor for renewable energy. One option is to use plant load factor provided to the government while applying the project activity for implementation approval. The SFSR has this purpose and hence according to current CDM regulation, the SFSR can be considered sufficiently for validation of plant load factor. However, the clarifications are sought on the following items: - The annual operation hour used in IRR calculation spreadsheet is 3 990 hours which is inconsistent with the value (4 051 hours)	~~CL-8~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			of SFSR; - As stated above, the PLF determined by SFSR is 0.462 which is inconsistent with the value 0.456 used in PDD; - In order to be transparent, annual electricity generation and self-consumption rate need to be stated clearly in the PDD.		
B.5.21 How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /4/ /49/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants PP is requested to substantiate the tariff used in the financial analysis is the latest value available and valid at the time of investment decision on the project. The link for the “Notice on on-grid tariff of Dehong Prefecture by Dehong Prefecture government” (Dezhengfa [2003] No. 367) presented in page 14 of the PDD version 01 is not correct and needs to be updated. In addition, PP is requested to provide the financial information of other similar projects in Yunnan Province, such as total investment, O&M cost and tariff, to cross check the input value in the IRR calculation.	~~CL-9~~ ~~CL-10~~	OK
B.5.22 How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM	/1/ /2/ /4/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
paragraph 95.			announcements, contracts and annual financial reports related to the project and the project participants As per the SFSR, the proposed project being performed by present owner was transferred from other project developer. In addition, DNV reviewed the publicly available source and found that the construction of the project activity happened before the construction permission of 2 July 2008. Further clarification is sought on whether there were costs happened before the time of the CDM consideration on 21 June 2008. DNV has verified the IRR calculation spreadsheet and found the working capital was included in the total static investment, which led to double counting of working capital in the IRR calculation process. Therefore, further clarification is requested. PP is requested to provide the financial information of other similar projects in Yunnan Province such as total investment, O&M cost and tariff to cross check the input value in the IRR calculation.	~~CL-11~~ ~~CL-12~~ ~~CL-10~~	
B.5.23 How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /2/ /4/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants PP is requested to provide the financial	~~CL-10~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			information of other similar projects in Yunnan Province, such as total investment, O&M cost and tariff, to cross check the input value in the IRR calculation.		
B.5.24 Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /80/ /81/ /82/ /83/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants <i>Provide details on how other input parameters were validated:</i> DNV has verified other input parameters, such as income tax rate, value added tax, city construction tax rate, education surtax rate and other expenses, and found they are derived from the SFSR which are in line with the relevant national regulations. However, as the SFSR was completed in April 2008 and approved on 21 November 2008, PP is requested to clarify that the input values from the SFSR are valid and applicable at the time of the investment decision.	CL-8	OK
B.5.25 Was the financial calculation spreadsheet verified and found to be correct?	/1/ /2/	DR	In order to be transparent and re-produced, the IRR spreadsheet needs to be updated to make all formulas used in the calculation readable.	CL-13	OK
B.5.26 Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/ /2/ /4/	DR	A sensitivity analysis was carried out for parameters contributing more than 20% to revenues/costs in order to check the robustness of the financial analysis. Reasonable variations of the total investment, annual O&M cost, electricity output and on-grid tariff were checked by calculating the variation necessary to reach the		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				benchmark and then discussing the likelihood for that to happen. The evidences need to be provided to justify the increasing of the prices including equipments, commodities and also labour costs, consequently substantiate that the decreasing by 39.7% of total investment is impossible.	CL-14	
B.5.27	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/ /2/	DR	Yes. The key parameters (except O&M cost because it has ever not impact on the IRR value) were checked and the variations in sensitivity analysis made the project IRR value reached the benchmark of 8% which is deemed reasonable for the project activity.		OK
B.5.28	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	The evidences need to be provided to justify the increasing of the prices including equipments, commodities and also labour costs, consequently substantiate that the decreasing by 39.7% of total investment is impossible.	CL-14	OK
Barrier analysis (VVM para 113-116)						
B.5.29	Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	It is not applicable.		OK
B.5.30	How were the <u>investment barriers</u> assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR	It is not applicable.		OK
B.5.31	How does CDM alleviate the investment barriers?	/1/	DR	It is not applicable.		OK
B.5.32	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	It is not applicable.		OK
B.5.33	How were the <u>technological barriers</u> assessed to be real? Are	/1/	DR	It is not applicable.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
the technological barriers substantiated by a source independent of the project participants?					
B.5.34 How does CDM alleviate the technological barriers?	/1/	DR	It is not applicable.		OK
B.5.35 Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	It is not applicable.		OK
B.5.36 How were the <u>barriers due to prevailing practise</u> assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	It is not applicable.		OK
B.5.37 How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	It is not applicable.		OK
B.5.38 Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	It is not applicable.		OK
B.5.39 How were the <u>other barriers</u> assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	It is not applicable.		OK
B.5.40 How does CDM alleviate the other barriers?	/1/	DR	It is not applicable.		OK
B.5.41 Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	It is not applicable.		OK
Common practice analysis (VVM para 117-119)					
B.5.42 What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	In China, most policies are promulgated at provincial level by combining the national policy with the region's conditions. It is thus reasonable to select Yunnan Province as the scope for common practice analysis.		OK
B.5.43 What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has	/1/	DR	PP is requested to clarify the scope of period and size of the hydro power station selected for the	CL15	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
this been justified?				common practice analysis.		
B.5.44	What is the data source(s) used for the common practice analysis?	/1/	DR	The linkage for the “Wunihe Hydropower Plant” is not valid and needs to be corrected; The evidence for justifying the construction starting time of Nandinghe Hydropower Plant also needs to be provided.	~~CL-16~~	OK
B.5.45	How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	PP is requested to clarify the scope of period and size of the hydro power station selected for the common practice analysis.	~~CL-15~~	OK
B.5.46	How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	All the similar projects used for common practice analysis are necessary to be demonstrated that the existence of these similar activities does not contradict the claim that the proposed project activity is financially unattractive.	~~CL-17~~	OK
B.5.47	What is the conclusion of the common practice analysis?	/1/	DR	The conclusion of the common practice analysis will be made after CL 15 CL 16 CL 17 is closed.	~~CL-15~~ ~~CL-16~~ ~~CL-17~~	OK
Conclusion						
B.5.48	What is the conclusion with regard to the additionality of the project activity?	/1/	DR	The conclusion will be made after CL 4 to CL 17 addressed.	~~CL-4~~ ~~CL-5~~ ~~CL-6~~ ~~CL-7~~ ~~CL-8~~ ~~CL-9~~ ~~CL-10~~ ~~CL-11~~ ~~CL-13~~ ~~CL-14~~ ~~CL-15~~ ~~CL-16~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				GL-17	
B.6 Calculations of GHG emission reductions					
Data and parameters that are available at validation and that are not monitored (VVM para 198-200)					
B.6.1 How was the amount of fossil fuel type <i>i</i> consumed in the project electricity system in year <i>y</i> verified?	/1/ /72/	DR	The amount of fossil fuel type <i>i</i> consumed in the project electricity system in year <i>y</i> was referenced from <i>China Energy Statistical Yearbook (2006-2008)</i> .		OK
B.6.2 How was the net calorific value (energy content) of fossil fuel type <i>i</i> in year <i>y</i> verified?	/1/ /72/	DR	The net calorific value (energy content) of fossil fuel type <i>i</i> in year <i>y</i> was referenced from <i>China Energy Statistical Yearbook (2008)</i> .		OK
B.6.3 How was the CO ₂ emission Factor of fossil fuel type <i>i</i> in year <i>y</i> verified?	/1/ /66/	DR	The CO ₂ emission Factor of fossil fuel type <i>i</i> in year <i>y</i> was referenced from the <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i> .		OK
B.6.4 How was the electricity generation in CSPG in year <i>y</i> verified?	/1/ /73/	DR	The electricity generation in the CSPG in year <i>y</i> was referenced from <i>China Electric Power Yearbook (2006-2008)</i> .		OK
B.6.5 How was the internal use rate of power source <i>j</i> in CSPG verified?	/1/ /73/	DR	The internal use rate of power source <i>j</i> in the CSPG was referenced from <i>China Electric Power Yearbook (2006-2008)</i> .		OK
B.6.6 How was the electricity imported from CCPG in year <i>y</i> verified?	/1/ /73/	DR	The electricity imported from CCPG in year <i>y</i> was referenced from <i>China Electric Power Yearbook (2006-2008)</i> .		OK
B.6.7 How was installed capacity of power source <i>j</i> of CSPG in year <i>y</i> verified?	/1/ /73/	DR	The installed capacity of power source <i>j</i> of the CSPG in year <i>y</i> was referenced from <i>China Electric Power Yearbook (2006-2008)</i> .		OK
Baseline emissions (VVM para 88-92)					
B.6.8 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /59/	DR	The calculation process is documented according to the “Tool to calculate the emission factor for an electricity system” version 2.0 which is in line		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/61/ /66/ /72/ /73/ /75/		with the approved methodology ACM0002, version 12.1.0. The data used to calculate emission factor are derived from publicly published documents, such as China Energy Statistics Yearbooks (2006~2008) and China Electricity Power Yearbooks (2006-2008), 2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual and NDRC official website which were the latest data sources available when the validation was carried out.		
B.6.9 Have conservative assumptions been used when calculating the baseline emissions?	/1/ /61/ /62/	DR	All the used assumptions are in line with the “Tool to calculate the emission factor for an electricity system” version 2.0 and Guidance for request for deviation titled “Application of AM0005 and AMS-I.D in China” from EB.		OK
B.6.10 Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	No significant uncertainties can be addressed for the project.		OK
Project emissions (VVM para 88-92)					
B.6.11 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /59/	DR	According to ACM0002, version 12.1.0, the project emission is regarded as zero because the power density of the proposed project is greater than 10 W/m ² . However, the inconsistent values of power density stated in the PDD need to be clarified.	CL-2	OK
B.6.12 Have conservative assumptions been used when calculating the project emissions?	/1/	DR	It is not applicable.		OK
B.6.13 Are uncertainties in the project emission estimates properly addressed?	/1/	DR	It is not applicable.		OK
Leakage (VVM para 88-92)					
B.6.14 Are the leakage calculations documented according to the	/1/	DR	According to ACM0002, potential leakage		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
approved methodology and in a complete and transparent manner?		/59/		effects, such as emissions arising from power plant construction and upstream emissions from fossil fuel use do not have to be considered.		
B.6.15	Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	No leakages are expected to result from the project activity.		OK
B.6.16	Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	No leakages are expected to result from the project activity.		OK
Emission Reductions (VVM para 88-92)						
B.6.17	Algorithms and/or formulae used to determine emission reductions: - 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/ /59/ /61/ /62/ /66/ /72/ /73/ /75/	DR	- Yes. All assumptions and data used to calculate the emission reductions are listed in the PDD and all other documents used to determine emission reductions have been verified which can be deemed reasonable. The data are properly referenced. - Yes. All the documents used to determine emission reductions, such as China Energy Statistics Yearbooks (2006-2008), China Electricity Power Yearbooks (2006-2008), 2006 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual and NDRC official website, were correctly quoted and interpreted. - Yes. All values used can be deemed reasonable in the context of the project activity. - The approved baseline and monitoring methodology ACM0002 version 12.1.0 as well as “Tool to calculate the emission factor for an electricity system” version 2.0 and Guidance for request for deviation titled “Application of AM0005 and AMS-I.D in		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			China” from EB have been correctly applied to calculate the emission reductions. And the calculation of emission reductions can be replicated by using the data and parameter provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.		
B.7 Monitoring plan (VVM para 120-122)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ /59/	DR	Yes. The means of monitoring described in the plan is in compliance with the methodology ACM0002 version 12.1.0.		OK
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	Yes. All necessary parameters are contained and clearly described.		OK
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	(EG _{import,y}) and (EG _{export,y}) will be measured continuously and recorded monthly by the bidirectional metering equipment. However, how to ensure the monitoring in the failure of metering equipment needs to be described in the monitoring plan.	CL-18	OK
B.7.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR	According to the monitoring plan in PDD, the acceptable error does not exceed 0.5%, which is appropriate.		OK
B.7.5 In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	The frequency for the calibration of metering equipment needs to be specified in the monitoring plan.	CL-19	OK
B.7.6 Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	EG _{import,y} and EG _{export,y} will be measured continuously. This is in line with the methodology ACM0002 version 12.1.0 and adequate.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	EG _{import,y} and EG _{export,y} will be recorded on a monthly basis. This is in line with the methodology ACM0002 version 12.1.0 and adequate.		OK
Ability of project participants to implement monitoring plan						
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	Detailed responsibilities and authorities for project management and monitoring program have been presented in the PDD and were checked during site visit. The monitoring practices are considered appropriate and feasible within the project design.		OK
B.7.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?			Yes. The procedures for day-to-day data recording and handling have been presented in the monitoring plan of PDD.		OK
B.7.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR	Yes. The detailed procedures related to data management, quality assurance and quality control have been elaborated in the PDD. These will be maintained and implemented to enable subsequent verification of emission reductions.		OK
B.7.11	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. All parameters monitored will be archived in paper/electronic format and be kept for at least 2 years after the end of the last crediting period.		OK
Monitoring of sustainable development indicators/ environmental impacts						
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/ /7/ /8/ /59/	DR	Neither ACM0002 version 12.1.0 nor the Chinese NDRC requires collection and archiving of relevant data concerning environmental, social and economic impacts. The environmental impacts will be monitored by local environmental		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				authority.		
B.7.13	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /7/ /8/	DR	The indicators of environmental impacts will be stipulated by local environmental authority.		OK
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Yes. This will be on local authority decision.		OK
C Duration of the project activity / crediting period						
C.1.1 Start date of project activity (VVM para 96-97, 102)						
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/	DR	The starting date of the proposed project needs to be further clarified.	~~CL~~ 4	OK
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	Yes. The expected operational lifetime of the project activity is 25 years according to the SFSR which is reasonable		OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	A renewable crediting period 7 years was selected. And the crediting starting date is 1 July 2011 (or the date of registration, whichever is later). The crediting period and its starting date are clearly stated and reasonable.		OK
D Environmental Impacts (VVM para 129-131)						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /7/ /8/	DR	The EIA produced by Yunnan University has been approved by Yunnan Provincial Environmental Protection Bureau on 27 December 2005. There are no special conditions that need monitoring according to the approval of EIA for Yunnan Mangli Hydropower Project. However, the clarifications are requested as		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				follows: - The producer of EIA provided by PP is inconsistent with the one stated in the PDD version 01; - The date of EIA approval presented in PDD version 01 is not in line with the provided EIA approval.	CL-20	
D.1.2	Does the project comply with environmental legislation in the host country?	/1/ /7/ /8/ /9/	DR	Yes. The project complies with Chinese environmental legislation which can be confirmed by the approved EIA.		OK
D.1.3	Will the project create any adverse environmental effects?	/1/ /7/ /8/	DR	There are no significant adverse environmental effects for the project according to the EIA. However, the clarifications are requested as CL 20.	CL-20	OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/ /7/ /8/	DR	Every identified environmental impact has been addressed in the Section D.1 in PDD. However, the clarifications are requested as CL 20.	CL-20	OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Yes. The impacts are sufficiently described, including waste water and sewage, dust and air quality, noise and soil erosion impact.		OK
D.1.6	Are transboundary environmental impacts considered in the analysis?	/1/		There are no transboundary environmental impacts foreseen for the proposed project.		OK
E Stakeholder Comments (VVM para 126-128)						
E.1.1	Have relevant stakeholders been consulted?	/1/	DR	The environment assessment institution and project owner visited local stakeholders for getting the comments and suggestions. 100	CL-24	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				questionnaires on this project were distributed to the local residents and 100% returned of these questionnaires. However, by reviewed the questionnaires provided, the stakeholder consultation was performed in June 2009 which is inconsistent with the time (July 2009) stated in the PDD. Therefore, the clarification is requested.		
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	A survey was carried out by distributing questionnaires to the relevant stakeholders and collecting their responses.		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	Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/	DR	Yes. The summary of the stakeholder comments received is described in the PDD. There is no negative comment received which is confirmed by the original stakeholder questionnaires.		OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/	DR	As the conclusion in the PDD, 100% of the investigated people are supportive to the project activity. So there is no need to do adjustment on the project design.		OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 1 The relevant evidence needs to be provided to substantiate the LoA of Japan is authentic.	A.3.2	The LoA of Japan could be searched online with the link below: http://www.kyomecha.org/dbproject/List_of_JP.php	OK. DNV has verified the link which is the website of Minister of Economy, Trade and Industry (DNA of Japan) /57/, and can confirm the authenticity of the LoA from Japan. The CL 1 is closed.
CL 2 For power density of the power plant, two different values of 13.17 W/m ² and 35.72 W/m ² were indicated in the PDD. Clarification is requested to justify the correct one.	B.2.1 B.3.3	The installed capacity of the proposed project is 36 MW and the surface area of full reservoir 2.975 million m ² according to <i>The Supplementary Feasible Report</i> which was completed by the independent and certified “Kunming Survey and Design Institute of Water Resources and Hydropower” (It has obtained a “grade A” in electric power design industry issued by the Ministry of Construction of the People’s Republic of China). Thus the Power Density (PD) is equal to 12.1 W/m ² . The relevant parts have been revised in PDD.	OK. DNV has verified the SFSR /4/ and can confirm the data used for calculating the power density are correctly quoted. The power density is calculated to be 12.1 W/m ² . All relevant parts have been revised in the updated PDD /1/. The CL 2 is closed.
CL 3 As per the agreement of grid access of the proposed project, the project developer is inconsistent with the project owner stated in the PDD. Further clarification is requested for the difference.	B.2.4	The proposed project was owned by Deyuan Electric Power Development Co., Ltd. (the former project owner) in 2006. But the former project owner lost their confidence to continue investing and had no choice but to stop the construction on January 2007 due to fund shortage. In March 2007, the project owner (Datang Mangli Hydropower Development Company Limited) showed their interest of	OK. By verifying the <i>Assignment agreement on the shareholding of the project</i> signed between Deyuan Electric Power Development Co., Ltd. and Datang Mangli Hydropower Development Company Limited /13/, DNV can confirm that the proposed project was owned by the private investor, Mr. Chen Yongde before 7 August 2007. Therefore, on 16 May 2005 Mr. Chen Yongde, as the corporation

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		the proposed project, and with the confidence of the increasing income from CDM revenue, the project owner signed the Assignment Agreements of 51% of the total shares with the former project owner on 07 August 2007. Therefore, the project owner in the PDD is Datang Mangli Hydropower Development Company Limited).	representative of Deyuan Electric Power Development Co., Ltd. signed the agreement of grid access /50/ with Yunnan Dehong Power Co., Ltd. which is reasonable. The CL 3 is closed.
CL 4 Other financial commitments for the project activity need to be provided to substantiate the starting date of the project is in accordance with the “Glossary of CDM terms”, i.e. by comparing the date of construction contract signed, the date of equipment contract signed, and the permission date of construction starting.	B.5.5 B.5.6 B.5.7 B.5.48 C.1.2	The contract of construction was signed on 30 June 2008, the equipment purchase contract (EPC) was signed on 18 August 2008 and the permission of restarting the construction was got on 02 July 2008. The date at which the contract of construction was signed had been chosen to be the starting date as the earliest of the date at which the real action of the project activity begins. The relevant evidences of the starting date of the project have been provided to DOE.	OK. Other financial commitment such as the purchase contract of the water-burbine generator equipments /17/ has been further provided and verified by DNV. According to the definition for the start date of a CDM project activity as the earliest date at which either the implementation or construction date or real action of a project activity begins in the terms of paragraph 67 of EB 41 st meeting report, the date of the construction contract signed of 30 June 2008 can be confirmed as the project activity starting date. The CL 4 is closed.
CL 5 The timeline of CDM key events in Section B.5 of PDD version 01 needs to be updated until the start of the validation.	B.5.7 B.5.10 B.5.48	This part has been updated in PDD.	OK. The timeline has been updated in the PDD and all the supporting documents have been provided. The CL 5 is closed.
CL 6 DNV reviewed the publicly available source and found that the construction of the project activity happened before 2 July 2008. Therefore, further clarification is requested to justify the start and process of the construction of the project.	B.5.8 B.5.48	The proposed project was owned by Deyuan Electric Power Development Co., Ltd. (the former project owner) in 2006 and the construction began on 28 October 2006 (<i>Notification from Kunming Construction Consulting Supervision Company</i>), but due to the bad geological conditions and the	By verifying the documents provided by PP, DNV found that early in 2006, the proposed project was owned by Deyuan Electric Power Development Co., Ltd. (invested by the private investor, Mr. Chen Yongde) and the initial construction was commenced on 28 October 2006 /9/ which

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		increasing investment, the investment return was much lower than expected, Deyuan Electric Power Development Co., Ltd. (the former project owner) lost his confidence to continue investing and had no choice but to stop the construction on January 2007 due to fund shortage. The project owner (Datang Mangli Hydropower Development Company Limited) had been aware of CDM from the first hydro CDM project on in Yunnan Province in March 2007(Ref. 0791), with the confidence of the increasing income from CDM revenue; the project owner signed the Assignment Agreements of 51% of the total shares with Mr. Chen on 07 August 2007. The construction restarted on 02 July 2008.	is four months after the initial FSR got its approval on 27 June 2006 /5/. Whereas the un-predicted bad geological conditions /10/ resulted in the increasing investment, finally Mr. Chen gave up the construction due to the fund shortage /11/. DNV has also verified the publicly available information from the construction company website /86/ and can confirm it is the case. The relevant information has been presented in the updated PDD /1/. The CL 6 is closed.
CL 7 By interview with the project owner and physical on-site visit the project plant, DVN found that the project commissioned in August 2009 and has been in operation in March 2010. However, as stated in the PDD, the start of construction was permitted on 2 July 2008 which is only approximately 13 months prior to the project commissioning date (August 2009); while stated in the SFSR, 3 years construction period is required for the project. Further clarification is sought to justify the appropriateness of the time gap between the construction and operation for the project.	B.5.9 B.5.48	According to SFSR, the construction period was 24 months and another preparing period of 4 months. As the a part of construction had been finished before the equity transfer, and with the construction resumed on 02 July 2008, the project owner manage to make the construction of the project be finished on February 2010, the actual construction period was 19 months after the resume of the construction, considering a part of the construction had been finished before the equity transfer, the actual construction period is reasonable and accordance with the SFSR.	OK. In the SFSR /4/, also 24 months of construction period and 4 months for preparation before construction were mentioned. The construction start date of 2 July 2008 is the date for the resumption of the proposed project /16/. Considering part of the construction happened before the project transfer /13/, DNV considers the time gap of 19 months between the project resumption and operation is reasonable. The CL 7 is closed.
CL 8	B.5.19	In the SFSR, it has been clearly stated the	OK. The annual electricity generation of

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
The clarifications are sought on the following items: - The annual operation hour used in IRR calculation spreadsheet is 3 990 hours which is inconsistent with the value (4 051 hours) of SFSR; - As stated above, the PLF determined by SFSR is 0.462 which is inconsistent with the value 0.456 used in PDD; - In order to be transparent, annual electricity generation and self-consumption rate need to be stated clearly in the PDD.	B.5.20 B.5.48	annual electricity generation would be 145 840 MWh and the annual electric output would be 143 652 MWh, the integrated power consumption rate had been also pointed out to be 1.5%. It had been calculated wrong in the GSP PDD, the annual electricity generation should be used to calculate the annual operation hour and the PLF of the project. The relevant parts have been revised in PDD.	145 840 MWh and annual operation hour of 4 051 hours were correctly used to calculate the PLF in the updated PDD. Thus the PLF was calculated to be 0.462 which is in line with the SFSR. The annual electricity generation and self-consumption rate have been presented in the updated PDD. The CL 8 is closed.
CL 9 PP is requested to substantiate the tariff used in the financial analysis is the latest value available and valid at the time of investment decision on the project. The link for the “Notice on on-grid tariff of Dehong Prefecture by Dehong Prefecture government” (Dezhengfa [2003] No. 367) presented in page 14 of the PDD version 01 is not correct and needs to be updated.	B.5.21 B.5.48	The tariff used in the financial analysis in PDD is from SFSR. The project is located in Dehong Prefecture which is an autonomous state with the policy of the minority nationality. The tariff of Dehong Prefecture has been different from other parts of Yunnan Province. Since December 2003 to September 2008, the on-grid tariff of hydro power projects in Dehong Prefecture was regulated to be 0.20 RMB/kWh for dry period (January-May), 0.15 RMB/kWh for wet period (wet period) (<i>Price document of Dehong Prefecture [2003] No.367</i>). Therefore, the tariff used in the financial analysis in PDD is the latest value available and valid at the time of investment decision on the project (30 June 2008). The linkage for tariff has been revised in PDD.	OK. The link for the “Notice on on-grid tariff of Dehong Prefecture by Dehong Prefecture government” (Dezhengfa [2003] No. 367) has been updated to be a valid one /49/. By verifying this tariff regulation, DNV can confirm that the tariff in Dehong Prefecture was granted to be 0.20 RMB/kWh for dry period (January-May) and 0.15 RMB/kWh for wet period (June to December) which was the latest available tariff at the time of investment decision on the project (i.e. the project starting date of 30 June 2008). The CL 9 is closed.
CL 10	B.5.21	The financial information of other similar	As so many hydropower projects have been

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
PP is requested to provide the financial information of other similar projects in Yunnan Province, such as total investment, O&M cost and tariff, to cross check the input value in the IRR calculation.	B.5.22 B.5.23 B.5.28 B.5.48	projects in Yunnan Province has been provided to DOE.	performed in Yunnan Province, the financial information of total 35 registered similar projects within the capacity from 18 MW to 54 MW (50% to 150% of the capacity of the proposed project) has been provided for cross-checking. DNV considers acceptable. By cross-checking the input values including the total investment, O&M cost and tariff with the corresponding values of the similar projects, it is confirmed that all these input values for the proposed project are within the range of corresponding values of other similar projects. In addition, the IRR resulted by introducing the highest tariff (0.215 RMB/kWh, incl. VAT) in Yunnan Province described in the EB note /68/ into the financial analysis of the proposed project also has been verified, which is 7.63% still lower than the benchmark of 8%. Therefore, all these input values are deemed reasonable. The CL 10 is closed.
CL 11 As per the SFSR, the project being performed by present owner was transferred from other project developer. In addition, DNV reviewed the publicly available source and found that the construction of the project activity happened before the construction permission of 2 July 2008. Further clarification is sought on whether there were some costs happened before the time of the CDM consideration on 21 June 2008.	B.5.22 B.5.48	There were sunk cost happened before the time of the CDM consideration on 21 June 2008. According to the Assignment Agreements signed between the project owner and Deyuan Electric Power Development Co., Ltd. (the former project owner), there were 31.1 Million RMB had happen which was assessed by Yunnan Huayijingcheng Asset Evaluation Limited Company.	As per the <i>assignment agreement on the shareholding of the project</i> signed between Datang Mangli Hydropower Development Company Limited and Deyuan Electric Power Development Co., Ltd. on 7 August 2007 /13/, the costs of 31.1 million RMB had happened before the shareholding transfer, which was assessed by the assets evaluation company. The project developer taking over the project held the board

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		The sunk cost had been deducted from the total investment in IRR calculation. The relevant evidence has been provided to DOE and the PDD has been revised.	meeting on the decision for determining CDM development of the project on 21 June 2008. Subsequently the construction contract was signed on 30 June 2008 which was selected as the project starting date. So the costs occurred before this date shall be considered as the sunk costs. By verifying the updated IRR spreadsheet /2/, it can be confirmed that the sunk costs of 31.1 million RMB has been deducted from total static investment. The IRR value was updated simultaneity. The CL 11 is closed.
CL 12 DNV has verified the IRR calculation spreadsheet and found the working capital was included in the total static investment, which led to double counting of working capital in the IRR calculation process. Therefore, further clarification is requested.	B.5.22 B.5.48	The IRR calculation has been corrected.	OK. In the updated IRR spreadsheet /2/, the working capital has been excluded from the total static investment. The project IRR was correctly calculated. The CL 12 is closed.
CL 13 The IRR spreadsheet needs to be updated to make all formulas used in the calculation readable.	B.5.25 B.5.48	The IRR spreadsheet has been revised.	OK. All the formulas used in the IRR calculation have been updated to be readable /2/. The CL 13 is closed.
CL 14 In order to be transparent and re-produced, the evidences need to be provided to justify the increasing of the prices including equipments, commodities and also labour costs, consequently substantiate that the decreasing by 39.7% of total investment is impossible.	B.5.26 B.5.28 B.5.48	At present, the actual price of the main equipments had increased 1.5702 million RMB and the construction and installation costs had increased 10.687 million RMB compared to the expected price in SFSR. According to the official statistic bulletins, the price of industrial products has increased by 5.8% from 2007 to 2008 in	OK. After the sunk cost was taken into account and the working capital was excluded from the total static investment, the sensitivity analysis was re-performed /2/. It can be observed that if the total static investment decreases by 28%, the project IRR will equal the benchmark. DNV can confirm that the value in the signed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		Yunnan Province and the labour cost has increased by 15.5% from 2007 to 2008. So the total static investment is not likely to decrease by 28%. The relative evidence has been provided to DOE.	contracts provided by PP /15/ /17/ /18/ has been nearly equal to the estimated value in the SFSR. According to the official statistics, the price of industrial products and labour cost has increased from 2007 to 2008 in Yunnan Province /55/. So the total investment is not likely to decrease by 28%. The convictive link has been referenced in the updated PDD. The CL 14 is closed.
CL 15 PP is requested to clarify the scope of period and size of the hydro power station selected for the common practice analysis.	B.5.43 B.5.45 B.5.47 B.5.48	The relevant statement of how to select the scope of period and size of the hydro power station chosen for common practice have been added in PDD. The projects started before 10th February 2002 should be obviously differentiated from those afterwards and, accordingly, were excluded from the issues to be discussed. Zhangwo Hydropower Plant developed by Sichuan Yibin Yili Group is located on Hengjiang River which is the boundary river of Sichuan province and Yunnan province, the electricity generated by this project was delivered to Sichuan Grid, so it wouldn't be included in the common practice.	OK. The scope of the projects used for comment practice analysis has been clarified in the updated PDD /1/. The installed capacity for other similar projects in Yunnan Province is selected from 50% to 150% of the rated capacity of the project activity, that is, 18 MW to 54 MW. The common practice analysis starts from 2002 when China implemented power sector reform to establish a more commercialized power market /78/. It is deemed justified according to the definitions of other activities similar to the proposed project activity in “<i>Tool for the Demonstration and Assessment of Additionality</i>” (version 5.2) /60/. DNV has checked the publically available links /48/ /89/ and can confirm that Zhangwo Hydropower Plant was developed by Sichuan Yibin Yili Group and supplied the electricity to Sichuan Power Grid. Therefore, Zhangwo Hydro is excluded

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			from the similar projects used for common practice analysis and deleted in the updated PDD. The CL 15 is closed.
CL 16 The linkage for the “Wunihe Hydropower Plant” is not valid and needs to be corrected; The evidence for justifying the construction starting time of Nandinghe Hydropower Plant also needs to be provided.	B.5.44 B.5.47 B.5.48	The common practice part has been revised in PDD.	OK. The valid linkages have been quoted in the updated PDD /1/. The CL 16 is closed.
CL 17 All the similar projects used for common practice analysis are necessary to be demonstrated that the existence of these similar activities does not contradict the claim that the proposed project activity is financially unattractive.	B.5.46 B.5.47 B.5.48	The common practice part has been revised in PDD.	OK. After the scope of the projects used for common practice was confirmed, there are also some other similar projects indentified and assessed in the updated PDD /1/. By verifying the described analysis and also referenced evidences, DNV is able to confirm that the existence of all these similar project activities does not contradict the claim that the proposed project is financially unattractive. The CL 17 is closed.
CL 18 How to ensure the monitoring in the failure of metering equipment needs to be described in the monitoring plan.	B.7.3	Bidirectional metering equipment has been installed at the substation of Grid Company and project site. If the metering equipment of the Grid Company failed to monitor the electricity, the metering equipment at the project site will be used to report the data and the QA/QC unit manager will initiate and supervise the implementation of corrective actions.	OK. The meter installed at the substation of grid company is used to monitor the electricity exported to and imported from the grid. The meter at the project site will be used to report the data at the time of the failure of the meter at the grid company side. The implementation of the monitoring system has been strictly in line with the Power Purchase Agreement to be signed between the project company and the grid company. The information above has been

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			provided in the updated PDD /1/. QA/QC procedure is also described in the PDD /1/. The CL 18 is closed.
CL 19 The frequency for the calibration of metering equipment needs to be specified in the monitoring plan of PDD.	B.7.5	The frequency for the calibration of metering equipment has been specified in the monitoring plan of PDD.	OK. Metering equipment will be calibrated annually according to the sectoral requirement which can be identified in the updated PDD /1/. The CL 19 is closed.
CL 20 The clarifications are requested as follows: - The producer of EIA provided by PP is inconsistent with the one stated in the PDD version 01; - The date of EIA approval presented in PDD version 01 is not in line with the provided EIA approval.	D.1.1 D.1.3 D.1.4	The project owner entrusted a third party, Yunnan University, to conduct the environmental impact assessment (EIA) on the proposed project, which was completed in July, 2005 and offered the approval (Yunhuanxuzhun [2005] 182) from Yunnan Provincial Environmental Protection Bureau (YNEPB) on 27/10/2005. The relative evidence has been provided to DOE and the Section D.1 in PDD has been revised.	OK. The information on the producer of EIA and EIA approval date has been revised to be consistent with the information collected from the documents provided by PP /7/ /8/. The CL 20 is closed.
CL 21 By reviewed the questionnaires provided by PP, the stakeholder consultation was performed in June 2009 which is inconsistent with the time (July 2009) stated in the PDD. Therefore, the clarification is requested.	E.1.1	Actually, the stakeholder consultation was performed in June 2009. The time (July 2009) stated in the GSP PDD was not correct. The relative evidence has been provided to DOE and the Section E.1 in PDD has been revised.	OK. The date of stakeholder consultation has been revised in the updated PDD /1/. The CL 21 is closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
N/A	N/A	N/A

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Mr. Lin Wu holds a Master Degree in Chemical Engineering & Process and a Bachelor Degree in Computer Science & Technology. Having an overall experience of around seven years. Prior to joining DNV, he has around four years experience in chemical industry covering design of chemical process and system, piping design, commissioning and project management on site. His experience also covers the fields of desulfurization of flue gas in power plant industry.

He has experience of around 3 years in validation and verification of numerous CDM, VCS and Gold Standard projects in DNV.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources” and “Chemical Processes Industries”.

Ms. Wang Guo Lian, Jessie holds a Bachelor Degree and a Master Degree in Chemical Engineering. Having an overall experience of around six years. Prior to joining DNV, having around five years in the field of chemical engineering, of which, three years in product line maintenance and technology innovation as a chemical technician working in chemical fertilizer enterprise and two years in design of chemical process & piping and research of the material and energy balance for chemical engineering units in petrochemical design institute.

She has experience of around one year in validation and verification of several CDM projects in DNV, both in China and abroad.

Her qualification, industrial experience and experience in CDM demonstrate her sufficient sectoral competence in “Chemical Processes Industries”.

Agnes Dudek holds a PhD Degree in applied physics. Having an overall experience of around 10 years. Prior to joining DNV having 7 years experience in scientific research covering satellite remote sensing, mesoscale weather forecast modeling and air pollution dispersion modeling and monitoring.

She has experience of around 3 years in validation and verification of numerous CDM projects.

Her qualification, research experience and experience in CDM demonstrate her sufficient sectoral competence in energy generation from renewable energy sources.