VALIDATION REPORT

HUNAN SHATIAN HYDROELECTRIC PROJECT

REPORT NO. GHGCC(A)08-017

REVISION NO. 02.1

Korea GHG Certification Office

KOREA ENERGY MANAGEMENT CORPORATION

VALIDATION REPORT

Date of first issue: 2009-01-06	Project No.: GHGCC(A)-08-017
Approved by: Park, Sung Woo	Organisational unit: Korea GHG Certification Office, Korea Energy Management Corporation
Client: EcoSecurities Group Plc.	Client ref.: Mr. Peng Luo
Period for Comments	07 Oct 2008 – 05 Nov 2008
Category (Sectoral Scope)	Energy Industries (renewable-/non-renewable sources) (1)
First PDD (version and date)	Version 01, 09/21/2008
Final PDD (version and date)	Version 02, 30/07/2009

Summary:

The Korea Energy Management Corporation (KEMCO) has performed a validation of the "Hunan Shatian Hydroelectric Project" in China on the basis of all applicable CDM requirements, which include the CDM modalities and procedures and subsequent decisions by the CMP and documents released by the CDM Executive Board and available on the UNFCCC CDM website (together referred to as CDM requirements). This validation report summarizes the findings of the validation.

Hunan Shatian Hydroelectric Project is a modification of an existing hydro plant located in Haotou, Rucheng County, Chenzhou City, Hunan Province, P.R.China. This proposed project is expected to increase electricity supplied to the Central China Power Grid (CCPG) by 62,719 MWh per annum, and to displace part of electricity generated by coal-based power output. The emission reduction estimation will be 61,053 tonnes (CO_2) each year of the fixed crediting period.

The validation consisted of following three phases;
1) a desk review of the project design, baseline and monitoring plan
2) on-site assessment and follow-up interviews with project stakeholders, and
3) the resolution of outstanding issues and the issuance of the final validation report and opinion

In summary, it is KEMCO's opinion that the project, as described in the project design document as of 30 July 2009, meets all applicable UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0002(version 07). Hence, KEMCO requests the registration of the "Hunan Shatian Hydroelectric Project" as a CDM project activity.

Report No.: GHGCC(A)-08-017	Subject Group:	
Report title: Hunan Shatian Hydroelectric Project		
Work carried out by: Lee, Jae Hoon (Ph.D), Park, Kyung Soon		
Work verified by: Han, Seung Ho		
Date of this revision: 2009-08-03	Rev. No.: 02.1	Number of pages: 18

Indexing terms

UNFCCC/Kyoto Protocol/CDM

Validation / Verification

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Abbreviations

Explain any abbreviations that have been used in the report here.

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CCPG	Central China Power Grid
DNA	Designated National Authority
NDRC	National Development and Reform Commission
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KEMCO	Korea Energy Management Corporation
LOA	Letter of Approval
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
(CDM) VVM	Clean Development Mechanism (CDM) Validation and Verification Manual

Conversion Factors and Definitions

Insert and describe any conversion factors used in the report here. In addition, define any specific terminology used in the report.

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1 INTRODUCTION

The EcoSecurities Group Plc. has commissioned Korea Energy Management Corporation (KEMCO) to perform a validation of the "Hunan Shatian Hydroelectric Project" in China (hereafter called "the project"). This report summarises the findings of the validation of the project, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Role	Name	Organization	Scope of work
Team Leader, Validator	Lee, Jae Hoon	KEMCO GHG Certificaiton Office	Baseline and Monitoring methodology, Estimation of GHG emission reductions
Lead GHG Validator	Park, Kyung-Soon	KEMCO GHG Certification Office	Sustainable Development, Environmental impacts, Stakeholder comments

And as a local expert, Lee Han Woo, were involved in this project.

1.1 Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations including Clean Development Mechanism (CDM) Validation and Verification Manual (Version 01, EB44 Annex3). KEMCO has, based on the recommendations in the Validation and Verification Manual (IETA/PCF, version 3.3, March 2004) employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

Examples of Documents to review as part of scope shall include, but shall not be limited to ;

- Terms of Reference
- Project Design Document

- Baseline and Monitoring Methodology
- Environmental Impact Assessment
- Summary of Comments by Local Stakeholders

1.3 GHG Project Description

The project consists of a modification of an existing hydro plant (58MW) located at middle reach of Ou River, which is a branch of Lei River, in Haotou, Rucheng County, Chenzhou City, Hunan Province, P.R.China. The total installed capacity of the project is 50MW (2×25MW).

The purpose of the project is to modify an existing power plant by addition of new electricity generation units that will utilize the hydrological resource available in the existing reservoir at Ou River. This proposed project is expected to increase electricity generation supplied to the Central China Power Grid (CCPG) by 62,719 MWh per annum, and to displace part of electricity generated by relatively carbon intensive CCPG.

The project started on 13/05/2006, aiming 01/11/2009 or the registration date as the starting date of the fixed 10 years of crediting period. The emission reduction estimation of the project will be 61,053 tonnes (CO_2) each year of the fixed crediting period, with a Combined Margin emission factor of the CCPG - 0.9735 tCO_2/MWh.

According to the adopted list of sectoral scopes by CDM-AP, which is based on the list of sectors and sources contained in Annex A of the Kyoto Protocol, this project fits in sectoral scope 1 Energy Industries (renewable - / non-renewable sources).

2 METHODOLOGY

The validation may consist of the following three phases:

I a desk review of the project design, baseline and monitoring methodology
II on-site assessment and follow-up interviews with project stakeholders
III the resolution of outstanding issues and the issuance of the final validation report and opinion.

Validation Schedule	1. Desk Review : 1 October 2008 ~ 10 October 2008 2. On-site Assessment : 15 October 2008 ~ 16 October 2008 3. Review of Corrective Actions : 5 January 2009 ~ 16 July 2009

In order to ensure transparency, a validation protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes.

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

The validation protocol consists of three tables. The different columns in these tables are described in Figure1.
The completed validation protocol is enclosed in Appendix A to this report.

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

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

The validation team may also use the term Clarification, which would be where:

iv) additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

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

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

Figure 1 Validation protocol tables

2.1 Review of Documents

The Project Design Document (PDD) version 01 dated 21/09/2008 submitted initially and final version 02 /1/ dated 30/07/2008 along with additional background document /2/ - /20/ related to the project design and baseline were assessed as a part of validation.
The desk review focused mainly on the following aspects:

- Participation Requirement
- Project Design Document
- Project Additionality
- Sustainable Development and Approval by Parties involved
- Baseline Methodology and Project Baseline
- Monitoring Methodology and Plan – Coverage of Emission Sources
- Monitoring Practices and GHG Data Management

2.2 Follow-up Interviews

In the period of 15-16 October 2008, KEMCO performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Rucheng County Xiangneng Hydropower Development Co., Ltd, EcoSecurities Group Plc. (project consultant), local government officers and local consultant were interviewed. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
Rucheng County Xiangneng Hydropower Development Co., Ltd	➢ Project background information ➢ Project technology, operation, maintenance and monitoring capability ➢ Project additionality ➢ Project monitoring and management plan. ➢ Project approval status (incl. EIA approval, CDM project status) ➢ Stakeholder consultation process
EcoSecurities Group Plc.	o Application of selected baseline and monitoring methodology o Baseline determination o Emission reduction calculation o Emission reduction monitoring plan
Local government officers/consultants	o Environmental impact o Local stakeholder's comments

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for KEMCO's positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by KEMCO, presented to the project participant in KEMCO's NC report as of 20 October 2008 were resolved during communications between the client and KEMCO. To

guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modification to the project design were necessary to resolve KEMCO's concerns, the client decided to revise the PDD and resubmitted the PDD as version 02. After reviewing and assessing the revised PDD, KEMCO issued this final validation report and opinion.

2.4 Internal Quality Control

The final validation report underwent technical review before requesting registration of the project activity. The technical review was performed by a committee member qualified in accordance with KEMCO's Committee Operation Procedure mainly in terms of validation procedures and results, and approved by Director of KEMCO's GHG Certification Office.

3 VALIDATION FINDINGS

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

1) The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in Appendix A.

2) Where KEMCO had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in four Corrective Action Requests and two Clarification Requests.

3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and KEMCO to resolve these Clarification or Corrective Action Requests are summarised.

4) The conclusions for validation subject are presented.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation version 02 dated 30 July 2009.

3.1 Participation Requirement

The project participants are Rucheng County Xiangneng Hydropower Development Co., Ltd of People's Republic of China (host) and EcoSecurities Plc. of United Kingdom of Great Britain and Northern Ireland.

The host Party China and the participating Annex I Party United Kingdom of Great Britain and Northern Ireland meet all relevant participation requirements.

The DNA of China has issued a Letter of Approval (LOA) /13/, authorizing Rucheng County Xiangneng Hydropower Development Co., Ltd as project participant and confirming that the project assists in achieving sustainable development. And KEMCO received this letter from the project participants.

The DNA of United Kingdom of Great Britain and Northern Ireland has issued a Letter of Approval (LOA) /13/, authorizing EcoSecurities Plc. as a project participant. KEMCO also received this letter from the project participants. Then, the final version of this report changed from v02 to v.02.1 taking into account the receipt of the Letter.

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.

3.2 Project Design

The project is a modification of the existing hydro power plant by addition of two new grid connected power generation units from hydro sources with a capacity of 50MW. The installation also includes a new intake structure, water conveyance system and power house.

Being a renewable electricity project, the project will reduce greenhouse gas emissions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants in CCPG.

Since hydro power plants technology is relatively well recognized to the project developer, the essential equipments such as water turbines and auxiliary units used in the project are produced by Nanyang Electric Equipment Manufacturing Corporation (domestic supplier).

The expected lifetime of the project is 25 years. A fixed crediting period of 10 years has been chosen for the project, starting from 01 November 2009. The emission reductions are estimated to be 61,053 tCO_2/year and 610,531 tCO_2 over the ten years of crediting period.

And the PDD is in accordance with the applicable CDM requirements for completing PDDs such as forms and guidance.

3.3 Baseline and Monitoring Methodology

The project applies the approved baseline and monitoring methodology for large-scale project because the total capacity exceeds the limit of small scale CDM project for renewable energy. As the project is the modification of a existing hydro power plant and generates electricity utilizing hydro power source (one type of renewable sources) with no change in the volume of reservoir and supply it to the grid, ACM0002 (ver 07), "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" is applied.

The spatial extent of the project boundary is clearly defined as the site of the project and all power plants connected physically to the CCPG (Central China Power Grid). This is in line with the delineation of grid boundaries as provided by the DNA of China (NDRC). The defined project boundary is in line with the applied methodology.

Given that the dispatch data for electricity system in the CCPG is not available and low-cost/must run resources constitute less than 50% of total grid generation in average of the 5 most recent years, simple OM (Operating Margin) and BM (Build Margin) are obtained to calculate the emission factor (CM) of the project by using the "Tool to calculate the emission factor for an electricity system (ver 01.1)". The weighting is set to be respectively W_{OM} = 50% and W_{BM} = 50% for the first crediting period under hydro type of power plant. The formulae for the emission factors are consistently used in the monitoring plan.

The starting date of the project was 13 May 2006 on which the contract /10/ was signed for two water turbines and auxiliary units by the project developer. It is in accordance with the "Glossary of CDM terms (ver03)", and the project is an existing project by the guidance from EB 41 Annex 46. As the starting date is before the date of the commencement of validation (Period for global stakeholder comments: 07 Oct 08 - 05 Nov 08, 2008), it has been assessed whether or not the incentive of the CDM was seriously considered in the decision to proceed with the project.

1) Prior consideration of the clean development mechanism

With regards to the prior consideration of the benefits from CDM, one Major NC (CAR1) was raised and closed out as follows;

- **CAR 1** : As the start date of the project activity is prior to the date of publication of the PDD, the PP must demonstrate that the incentive from the CDM was seriously considered in the decision to implement the project activity. So, the evidence to support such consideration must be adequately and transparently described in the PDD according to the guidance by EB41 Annex 46 C. (see Appendix B. Checklist B.5.2);

- **Corrective Actions** : One evidence which indicates the awareness of the CDM prior to the project activity start date is the Minutes related to the project by the Board of Directors in 1 February, 2005/4/ which states that the benefits of the CDM were a decisive factor in the decision to proceed with the project. And other evidences of continuing and real actions include Letter of Intention signed with Lvyuan CDM Development Corp. in 11 May 2005/5/, Broker service contract signed with Lvyuan CDM developmemt Corp. Ltd in 10 February 2006/8/, Letter of loan commitment from Rucheng branch of China Construction Bank in 2 March 2006/9/, and ERPA signed with EcoSecurities in 19 October 2007/12/. These documents consistently and properly indicate the prior consideration of the CDM for the project.
- **Conclusions** : The evidences for prior consideration of the CDM were submitted and accessed. Then, it is concluded that the prior consideration of the CDM for the project is adequately and transparently described in the PDD.

2) Additionality of a project activity

In order to demonstrate additionality, the PDD employed investment analysis and common practice analysis, then, showed that the project is not financially attractive under the baseline scenario by using the "Tool for the demonstration and assessment of additionality (ver5.2)".

By the applied methodology, identification of the baseline scenario of the project has been determined to be the modification/retrofit of an existing grid-connected renewable power plant. In the absence of the CDM, the existing facility (58MW) would continue to provide electricity to the grid at historical average levels. So, two possible scenarios - Implementation of the project without CDM revenues and Continuation of the current situation - were chosen at Step 1.

At Step 2, benchmark analysis (Option Ⅲ) was determined among three options since the project generate some financial or economic benefits other than CDM related income.

Then, the validation team has checked assumptions and input values of IRR calculation. On the IRR calculation for the benchmark analysis, it was not very clear how input values and assumptions are applied in the economic context of the project including electricity tariff and benchmark value. So, one Major NC (CAR2) was raised and closed out as follows;

- **CAR 2** : On the IRR calculations for the demonstration of additionality, it is not very clear how the input values and assumptions are applied in the economic context of the underlying project activity including electricity tariff and benchmark value. (see Appendix B. Checklist B.5.6);
- **Corrective Actions** : Feasibility Study Report/2/ of the project was asked to be submitted. In China, the Feasibility Study Report (FSR) must be prepared by an accredited third party, assumptions and data sources for the economic evaluation of a project in the Study are required to be based on relevant national standards and criteria. The FSR for the project was prepared by Hunan Hydroelectric & Power Exploration Research Institute and this report was approved by FSR Approval letter by Hunan Economy Committee in 20 January, 2005/3/. The period of time between the finalization of the FSR and the investment decision is almost one year. So, it is unlikely in the context of the underlying project that the input values would have materially changed. Especially the electricity tariff was approved by Hunan Price Bureau in 5 December 2007/14/ and it is cross-checked by current Electricity Sales receipts sample for

2008/15/. Based on the documents above, the estimated IRR without CERs 3.41% was lower than the 8% benchmark rate. The benchmark value properly refers to the Interim Rules on financial assessment of hydropower project by the Ministry of Power of P.R. China/16/.

- **Conclusions** : In summary, underlying assumptions and supporting documents above are appropriate and the financial calculations are correct.

A sensitivity analysis has been carried out for Operating Costs, Investment Costs, Electricity Tariff and Annual Operating Hours which the ranges of variations are reasonable in the project context by the "Guidance on the Assessment of Investment Analysis".

In a related matter, further clarification was required on why the common practice analysis has been limited to 4 projects in Hunan Province and one Minor NC (CL1) was raised and properly closed out as follows;

- **CL 1** : Further clarification is required on why the common practice analysis has been limited to 4 projects in Hunan Province. (see Appendix B. Checklist B.5.14);
- **Corrective Actions** : The geographical scope (the Hunan Province) of the common practice analysis is further explained in the revised PDD/1/. There are seven regional grids in China, and the project supplies electricity to the CCPG. Then, it is reasonable to limit the common practice analysis to the provincial level under the relevant CCPG, because the investment environment for each province differs and the grid planning in Hunan Province are regulated by the Hunan Electricity Power Corporation. As the project is an addition of new power generation units in an existing reservoir, it is also proper to select hydropower upgrade projects implemented or currently underway in Hunan Province. The common practice analysis shows that hydro projects that started operation after 2002 were considered similar to the project. Because the investment environment of power industry changed significantly in 2002.
- **Conclusions** : After geographical scope of the common practice analysis has been validated, 4 hydropower upgrade projects in Hunan Province has been identified as similar projects. Essential distinctions between the project and the other already existing hydropower projects in terms of water resources, funding and government support were assessed. To verify the information provided by PPs, the China Statistical Yearbook/30/, China Utilization of Water Yearbook/31/ and other relevant resources have been examined. As a result, it is verified that the project is not a common practice.

3.4 Monitoring Plan

The project applies the approved monitoring methodology, ACM0002 "Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources (ver 07)". The selected monitoring methodology is applicable for the project as it involves grid-connected renewable power generation using hydro energy source for the CCPG.

The combined margin emission factor (CM) is determined ex-ante based on the most recent information available. Hence, only electricity generated and also to the grid will be monitored.

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

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

Monitoring of sustainable development indicators is not required by the NDRC. It is confirmed by the interview with a relevant local government officer that the environmental impacts are considered minor and will be monitored by the local environmental authority during the project lifetime.

The monitoring manual /19/ including responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures, procedures for calibration of metering equipment and procedures for training and maintenance has been elaborated in the PDD. Detailed procedures will be implemented at the latest prior to the start of the crediting period to enable subsequent verification of emission reductions.

One Major NC (CAR3) regarding the volume of reservoir was raised and closed out as follows;

- **CAR 3** : This project activity is implemented in an existing reservoir. The fact that there was no change in the volume of reservoir should be supported by document evidences and cross checked with data of the grid company. (see Appendix B. Checklist B.7.1);
- **Corrective Actions** : In regards to the volume of reservoir, water level records by Hydrology Measuring Center of Zhongnan Hydroelectric & Power Institute/18/ was submitted. And to determine the volume of reservoir on the basis of the measurement of water levels of the reservoir, the monitoring plan includes the parameter A_{BL} (Area of reservoir measured in the surface of the water before the implementation of the project) and the parameter Apj (Area of the reservoir measured in the surface of the water after the implementation of the project) as area indicator.
- **Conclusions** : The fact that there was no change in the volume of reservoir was supported by proper document evidences and will be cross checked with the data of the grid company.

According to the ACM0002 (version 07), 5 years of historical data have to be available for those projects where modification/retrofit measures are implemented in the existing power plant. To make sure the historical data availability one Major NC (CAR4) regarding the data reliability was raised and closed out as follows;

- **CAR 4** : Details of hydro resource, 5 years of historical data for electricity generation and electricity capacity addition should be cross-checked with data of the grid company. (see Appendix B. Checklist B.7.1);
- **Corrective Actions** : In regards to reliability of the historical data, original data from the project participant was supported by the Cross-check record of electricity supply to the grid 2003-2007 by Hunan Electricity Power Company (grid company) in 20 October 2008/17/.
- **Conclusions** : In conclusion, 5 years of historical data for electricity generation was available and the credibility and transparency of the data has been verified by the third party record.

Regarding the monitoring plan it was not clear which relevant local standard on the data and parameters monitored was applied and one Minor NC (CL2) was raised and closed out as follows;

- **CL 2** : There is no appropriate description of the relevant local standard on the data and parameters monitored in the monitoring plan. And monitoring manual need to be updated according to the monitoring plan in the PDD. (see Appendix B. Checklist B.7.2);
- **Corrective Actions** : The name of standard was added instead of only indicating " relevant standard" in PDD and monitoring procedures for water levels added into monitoring manual for Shatian Project/19/.
- **Conclusions** : The monitoring plan properly described which standard data/parameters was referenced to in the monitoring plan and it is in consistence with the information in the PDD.

3.5 Calculation of GHG Emissions

The emission reduction ERy by the project during the crediting period is the difference between baseline emissions (BEy), project emissions (PEy) and emission due to leakage (Ly).

1) Baseline emissions : Baseline emissions (BEy in tCO_2) are the product of the baseline emission factor (EFy in tCO_2/MWh) times the electricity supplied by the project to the grid (EGy in MWh).

2) Project emissions : There are no emissions from the project given that the project is neither hydro power project activities that result in new reservoirs, nor hydro power project activities that result in the increase of existing reservoirs.

3) Leakage : There is no need to consider these emission sources as leakage in ACM0002.

4) Emission reduction : ERy = BEy – Pey – Ly = BEy – 0 – 0 = BEy

The baseline emission factor for the project is determined ex-ante as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM).

For the calculation of the OM, the simple OM emission factor calculation method is selected because low cost/must run resources constitute less than 50% of the total grid generation in average of the five most recent years and data is not available for applying the dispatch data analysis.

The aggregated generation and fuel consumption data are used due to the more disaggregated data are not available in the CCPG. Country specific data for net calorific value (NCVi) of each type of fossil fuel, the IPCC 2006 default value of oxidation factor of each type of fossil fuel and the total electricity delivered to the CCPG selected are deemed reasonable. Vintage data for the years 2004 to 2006 are used for operating margin calculation. The OM is calculated to be 1.2783 tCO_2/MWh as a generation-weighted average for the consecutive three years, and it is in accordance with the OM value from the NDRC.

Because plant specific fuel consumption and electricity generation data is not publicly available in China, the CDM EB took notice of the request for deviation in use of AM0005 as follows:

1) Use of average efficiency of existing power plants in the grid as proxy for estimating fuel consumption

2) Use of capacity additions during last 1 – 3 years for estimating the build margin emission factor for grid electricity

3) Use of weights estimated using installed capacity in place of annual electricity generation.

Since AM0005 has been replaced by ACM0002, the application of the above confirmation from EB to this project is acceptable. The BM is calculated as 0.6687 tCO_2/MWh, and it is also in accordance with the BM value from the NDRC.

The weighting w_{OM} and w_{BM} are selected as 0.5 and 0.5, respectively, as stipulated for hydro power project by ACM0002 (ver 07). The combined margin of 0.9735 tCO_2/MWh is fixed ex-ante for the crediting period.

The consecutive data used to calculate OM is derived from China Electric Power Yearbooks 2003 – 2007; to calculate to BM is derived from China Statistics Yearbooks 2005 – 2007.

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

3.6 Environmental Impacts

As for its environmental impacts on the local area, in accordance with the Environmental Evaluation Law of the P.R. China, the environmental impact assessment (EIA) /6/ has been conducted by Chenzhou Municipal Environmental Protection Research Institute. The potential environmental impacts have been sufficiently identified. No significant environmental impacts are expected from the project. The Chenzhou Municipal Environmental Protection Bereau has approved the project on Jan 16, 2006 /7/.

3.7 Comments by Local Stakeholders

In addition, the project participant conducted a public consultation to invite stakeholders' comments and discuss social and environmental issues of the project. The staff of the project developer carried out a survey on the local villagers and residents in February 2006 /20/. The survey shows that the proposed CDM project activity will have positive impacts on the local community. The local stakeholders agree with the development of the project and the proposed project receives support from residents and government. A summary of comments was provided and reviewed by KEMCO.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

In accordance with Paragraph 40(c) of the CDM Modalities and Procedures, the project design document of the Hunan Shatian Hydroelectric Project had been posted on the UNFCCC CDM website for public comments and Parties, stakeholders and NGOs were through CDM website

invited to provide comments during 30 days period from 07 Oct 08 to 05 Nov 08, 2008. As a result, no comments were received during this period.

5 VALIDATION OPINION

KEMCO has undertaken the validation of Hunan Shatian Hydroelectric Project which claimed approximately 61,053 CO_2eq ton annually by generation of electricity from hydro resource in Hunan Province in People' Republic of China. To ensure the transparency and integrity of the validation, the Validation Team first had established the validation checklist taking into account UNFCCC, Kyoto Protocol, Marrakesh Accords, Decision 3, 4/CMP.1 and relevant decisions of the CDM executive board. Based on the checklist the validation of the project activity was undertaken in three stages, i.e. desk review (1 October 2008 ~ 10 October 2008), on-site assessment (15 October 2008 ~ 16 October 2008) and review of corrective actions (5 January 2009 ~ 16 June 2009).

As a result of the desk review and on-site assessment, the validation team identified four Major non-conformities (CARs) and two Minor non-conformities (CLs) and then requested the project proponents to take corrective actions against them. In response to the request, the project proponents submitted the revised project documentation to the Validation Team, of which the Validation Team made a full review. Then the team has fully agreed that all the significant CARS and CLs issued had been cleared.

In conclusion, KEMCO is of the opinion that [Hunan Shatian Hydroelectric Project] is in full compliance with all applicable requirements for the CDM by leading to emission reductions additional to what would have otherwise occurred, providing for reliable and measurable emission reductions with the well-established monitoring plan and contributing to sustainable development in China through improvement of environmental condition, resource exploration and conservation, and socio-economic benefits.

6 REFERENCES

Category 1 : Documents and electronic files submitted by the Project Participants

List documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority). These should have been used as direct sources of evidence for the validation conclusions, and are usually further checked through interviews with key personnel.

/1/ Project Design Document, Updated in 30 July, 2009 (version 02)

/2/ Feasibility Study Report (FSR) of Shatian Project by Hunan Hydroelectric & Power Exploration Research Institute in January 2005

/3/ FSR Approval letter by Hunan Economy Committee in 20 January, 2005

/4/ Minutes related to the project by the Board of Directors in 1 February, 2005

/5/ Letter of Intention signed with Lvyuan CDM Development Corp. in 11 May, 2005

/6/ The EIA of Shatian Project – Chenzhou Municipal Environmental Protection Research Institute in December 2005

/7/ Approval letter of EIA by Chenzhou Municipal Environmental Protection Bureau in 16 January, 2006

/8/ Broker service contract signed with Lvyuan CDM development Corp. Ltd in 10 February, 2006

/9/ Letter of loan commitment from Rucheng branch of China Construction Bank in 2 March, 2006

/10/ Water turbine contract signed with Nanning Electricity Equipment Manufacture Corp. in 13 May, 2006

/11/ Life time assessment by Rucheng County Technology Quality Supervisory Bureau in 26 September, 2007

/12/ ERPA signed with EcoSecurities in 19 October, 2007

/13/ LoA from NDRC (Chinese DNA) in 22 April, 2008

LoA from United Kingdom of Great Britain and Northern Ireland as of 3 August 2009

/14/ Electricity Tariff Approval by Hunan Price Bureau in 5 December, 2007

/15/ Electricity Sales receipts sample for 2008

/16/ Interim Rules on financial assessment of hydropower project by the Ministry of Power of P.R. China – General Water Resources and Hydro Power Planning and Design Institute in 14 June, 1994

/17/ Cross-check record of electricity supply to the grid 2003-2007 by Hunan Electricity Power Company (grid company) in 26 October, 2008

/18/ Water level records by Hydrology Measuring Center of Zhongnan Hydroelectric & Power Institute

/19/ Monitoring Manual for Shatian Project

/20/ Stakeholder consultation questionnaires in Feb, 2006

Category 2 : Documents and websites referred to by KEMCO

List background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents should have been used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews.

/21/ Clean Development Mechanism Validation and Verification Manual (Version01)

/22/ International Emission Trading Association (IETA) & World Bank's Prototype Carbon Fund (PCF) : Validation and Verification Manual (http://www.vvmanual.info)

/23/ ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources" version 07

/24/ http://cdm.unfccc.int/DNA/index.html

/25/ http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf

/26/ CDM Country Guide for China by IGES (Institute for Global Environmental Strategies, http://www.iges.or.jp)

/27/ http://cdm.ccchina.gov.cn/Website/CDM/UpFile/File1888.pdf for the EF_{OM}

/28/ http://cdm.ccchina.gov.cn/Website/CDM/UpFile/File1875.pdf for the EF_{BM}

/29/ http://cdm.ccchina.gov.cn/Website/CDM/UpFile/2008/200887164119674.pdf

/30/ China Electric Power Yearbooks 2003-2007

/31/ China Utilization of Water Yearbook 2006

Persons interviewed:

List persons interviewed during the validation, or persons contributed with other information that are not included in the documents listed above.

Rucheng County Xiangneng Hydropower Development Co., Ltd

Mr. Yang Xuan, Mr. Huang Xiau Zeng

EcoSecurities Group Plc.

楊泫(Rex Yang), 李姍蔓(Fiona Lee), Mr. Peng Luo

Local government officers/consultants

Mr. Hu Meng Long, Mr. He Yu Ming, Mr. Zhong Ya Ping, Mr. Yi Xing, Mrs. Deng Xiao yum

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Appendix A

Validation Protocol

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

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	Checked	The LoA from United Kingdom of Great Britain and Northern Ireland has been received.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Marrakesh Accords, CDM Modalities §40a	Checked	Table 2, Section A.3 LoA by DNA of China has been received.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	Checked	Table 2, Section B.6.1
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Marrakesh Accords, CDM Modalities §40a	Checked	The LoAs from China and United Kingdom of Great Britain and Northern Ireland have been received.
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	Checked	Table 2, Section B.6
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, Marrakesh Accords, CDM Modalities §43	Checked	Table 2, Section B.5

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords	Checked	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards China.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	Checked	The DNA of China is the National Development and Reform Commission (NDRC).
9. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	Checked	China ratified the KP on 30 August, 2002.
10. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	Marrakech Accords, CDM Modalities §37b	Checked	Table 2, Section E
11. 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.	Marrakech Accords, CDM Modalities §37c	Checked	Table 2, Section D
12. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel	Marrakech Accords, CDM Modalities §37e	Checked	Table 2, Section B.1.1 and B.7.1
13. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech	Marrakech Accords, CDM	Checked	Table 2, Section B.7

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
Accords and relevant decisions of the COP/MOP	Modalities §37f		
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	Marrakech Accords, CDM Modalities, §40	Checked	The PDD of the project had been posted on the UNFCCC CDM website for public comments and Parties, stakeholders and NGOs were through CDM website invited to provide comments from 07 Oct 08 to 05 Nov 08, 2008 (30days).
15. 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	Marrakech Accords, CDM Modalities, §45c,d	Checked	Table 2, Section B.4
16. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, CDM Modalities, §47	Checked	Table 2, Section B.4
17. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	Checked	The PDD is in line with UNFCCC CDM-PDD format. Table2, Section A.1.1

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Design Document (PDD) / Project Title					
A.1.1. Is the PDD in accordance with latest template and guidance from the CDM EB?	/1/	DR	Checked: The PDD is in accordance with (CDM-PDD) Form Version 03 - in effect as of: 28 July 2006		OK
A.1.2. Is the project title in accordance with other documents issued by project participants?	/1/, /13/	DR	Checked: A letter on the MOC signed by the project participants has been assessed at the time of request for registration.		OK
A.2. Description of the project activity *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.2.1. Does the description of the project provide a clear understanding of the nature of the project?	/1//2/	DR	Checked :.The description of the project clearly provide the nature of the project as a type of renewable energy project.		OK
A.2.2. Is the project in line with sustainable development policies of the host country?	/1/, /7/	DR I	Checked : The project in line with sustainable development policies in China.		OK
A.2.3. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR I	Checked: The project will create social benefits by upgrading existing hydro-power plant and improving power generation efficiency.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.3. Project Participants *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/, /13/	DR	Checked: The project has been approved by Chinese DNA(NDRC) and Chenzhou Municipal Environmental Protection Bureau.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/, /13/, /26/	DR I	Checked: The project is in line with host-country specific CDM requirement. The LoA from NDRC confirmed it.		OK
A.3.3. Are the project participants listed in tabular form in section A.3 of the PDD consistent with the contact details provided in annex 1 of the PDD?	/1/	DR	Checked: The project participants are consistent with the contact details.		OK
A.4. Technical description of the project activity *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.4.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/, /2/	DR	Checked : The project is located at middle reach of Ou River, which is a branch of Lei River, in Haotou, Rucheng County, Chenzhou City, Hunan Province, P.R.China.		OK
A.4.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR, I	Checked : The Central China Power Grid (CCPG) is defined as the project boundary.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.3. Does the project design engineering reflect current good practices?	/1/	DR	Checked: The project design engineering reflects current good practices in China.		OK
A.4.4. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1//2/	DR	Checked: The technology employed state-of-the-art technology, whose technology is different from existing hydro power units.		OK
A.4.5. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1//2/	DR I	Checked: The project technology is unlikely to be substituted by other or more efficient technologies within the lifetime.		OK
A.4.6. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	Checked: Internal training is required for the project.		OK
A.4.7. Does the project make provisions for meeting training and maintenance needs?	/1/ /19/	DR I	Checked: Relevant training has been provided by the manufacturer.		OK
B. Baseline and Monitoring Methodology *The validation of the project baseline establishes whether the selected baseline and monitoring methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Title and reference of the approved baseline methodology applied to the project activity *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	/1/, /23/	DR	Checked: The project applies ACM0002 (version 07).		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/, /23/	DR	Checked: The project is an addition of two hydro electric power units with no change in the volume of existing reservoir. The methodology is applicable under this condition.		OK
B.2. Justification of the choice of the methodology and why it is applicable to the project activity *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/, /23/	DR	Checked: The discussion and determination of the chosen baseline is done in a transparent manner.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/, /17/	DR, I	Checked: The baseline has been determined using 5 years of historical electricity generation data.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/, /11/	DR, I	Checked: The baseline is established on a project specific basis. The assumed lifetime of the existing hydro power plant exceeds the expected crediting period of the project.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/, /26/	DR, I	Checked: Chinese government is in favour of renewable energy projects. And the project is a hydroelectric power generation project.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Checked: The available data for emission factor has been taken from NDRC. And relevant IPCC default values are applied.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/, /23/	DR	Checked: In the absence of the CDM project activity, the existing facility would continue to provide electricity to the grid at historical average levels. This represents the most likely baseline scenario.		OK
B.2.7. Is there any GHG emissions which are expected to contribute more than 1% of the overall estimated average annual emission reductions occurring within the project activity boundary as a result of the implementation of the project?	/1/, /23/	DR, I	Checked: According to ACM0002, there is no need to consider project emission for most renewable energy projects (*PEy* = 0).		OK
B.3. Description of the sources and gases included in the project boundary					
B.3.1. Is the project boundary correctly described and meet the requirements of the selected baseline methodology?	/1/, /23/	DR	Checked: Emission sources described in the PDD are in accordance with ACM0002.		OK
B.3.2. Have all sources and GHGs required by the methodology been included within the project boundary?	/1/, /23/	DR	Checked: All sources and GHGs required by ACM0002 have been included.		OK
B.3.3. If the methodology allows project participants to choose whether a source or gas is to be included within the project boundary, have the project participants justified that choice?	/1/, /23/	DR	Checked: There is no source or gas to be included within the project boundary except sources and gases in ACM0002.		OK
B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario					
B.4.1. Are all scenarios that are considered by the project participants and supplementary to those required by the methodology, reasonable in the	/1/, /23/	DR	Checked: All scenarios considered in the PDD are in accordance with ACM0002.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
context of the proposed CDM project activity?					
B.4.2. Is the baseline scenario identified reasonable in terms of the assumptions, calculations and rationales used, as described in the PDD?	/1/, /23/	DR	Checked: The baseline scenario identified is deemed to be reasonable.		OK
B.4.3. Does the PDD provide verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	/1/, /23/	DR	Checked: The PDD provides reasonable description of the identified baseline scenario.		OK
B.4.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans and the economic situation in the project sector?	/1/, /23/	DR	Checked: The baseline scenario sufficiently take into account Chinese and local policies and circumstances.		OK
B.4.5. Are all documentations used in relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD?	/1/, /23/	DR	Checked: All documentations used are correctly quoted and interpreted in the PDD.		OK
B.4.6. Has the approved baseline methodology been correctly applied to identify the most reasonable baseline scenario and does the identified baseline scenario reasonably represent what would occur in the absence of the proposed CDM project activity?	/1/, /23/	DR	Checked: The identified baseline scenario reasonably represent that in the absence of CDM project activity, the existing facility would continue to provide electricity to the grid at historical average levels.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality)					
B.5.1. For a new project activity with a start date on or after 2 August 2008, for which PDD has not been published for global stakeholder consultation or a new methodology proposed to the Executive Board before the project activity start date, had the Project Participants informed the Host Party DNA and/or the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status?	/1/, /10/	DR, I	Checked: This project is an existing project, since the starting date of the project is before 2 August 2008.		OK
B.5.2. For an existing project activity with a start date before 2 August 2008, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, has the Project Participant's prior consideration of the CDM been sufficiently evidenced?	/1/, /4/, /5/, /12/	DR, I	Checked: As the start date of the project activity is prior to the date of publication of the PDD, the PP must demonstrate that the incentive from the CDM was seriously considered in the decision to implement the project activity. So, the evidence to support such consideration must be adequately and transparently described in the PDD according to the guidance by EB41 Annex 46 C.	~~CAR1~~	OK
B.5.3. Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	/1/	DR	Checked: The list of alternatives include that the project activity is undertaken without CDM.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.5.4. Does the list of alternatives contain all plausible alternatives considered to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?	/1/	DR	Checked: The list of alternatives was properly assessed by the tool.		OK
B.5.5. Do the alternatives comply with all applicable and enforced legislation?	/1/	DR	Checked: Any alternative that doesn't comply with all applicable and enforced legislation is excluded.		OK
B.5.6. (Investment Analysis) Are all parameters and assumptions used in calculating the relevant financial indicator accurate and suitable in light of relevant accounting practices?	/1/, /2/, /3/, /14/, /15/, /16/	DR, I	Checked: On the IRR calculations for the demonstration of additionality, it is not very clear how the input values and assumptions are applied in the economic context of the underlying project activity including electricity tariff and benchmark value.	~~CAR2~~	OK
B.5.7. (Investment Analysis) Are computations in the investment analysis correctly carried out and sufficiently documented?	/1/	DR, I	Checked: Computations in the investment analysis excel file were verified.		OK
B.5.8. (Investment Analysis) Are the sensitivity analysis properly carried considering under what conditions variations in the result of investment analysis would occur, and the likelihood of these conditions?	/1/	DR, I	Checked: The sensitivity analysis was properly carried considering the guidance by CDM EB.		OK
B.5.9. (Investment Analysis) Is the type of benchmark applied suitable for the type of financial indicator presented?	/1/, /16/	DR, I	Checked: The benchmark value is properly referenced to the relevant local rule by the Ministry of Power of P.R. China.		OK
B.5.10. (Investment Analysis) Has the Feasibility Study Report (FSR) been the basis of the decision to proceed with the investment in the project? i.e. is the period of time between the finalization of the FSR and the investment decision is	/1/, /2/, /3/	DR, I	Checked: The FSR has been the basis of the decision to proceed with the investment in the project. The period of time between the finalization of the FSR and the investment decision is almost one year.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
sufficiently short and is it unlikely in the context of the underlying project activity that the input values would have materially changed?					
B.5.11. (Barrier Analysis) Is existence of barriers substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	/1/	DR	N/A		OK
B.5.12. (Barrier Analysis) Is a barrier or set of barriers likely to prevent the implementation of the proposed CDM project activity and unlikely to equally prevent implementation of at least one of the possible alternatives, in particular the identified baseline scenario?	/1/	DR	N/A		OK
B.5.13. (Common Practice Analysis) Is the geographical scope of the common practice analysis appropriate for the assessment of common practice related to the project activity's technology or industry type?	/1/	DR, I	Checked: The geographical scope of the common practice analysis is limited to Hunan Province, as the investment environment for each province differs in China (e.g. with regards to taxes, loan policy and electricity tariffs).		OK
B.5.14. (Common Practice Analysis) Is existence of similar projects substantiated by official sources and local and industry expertise?	/1/	DR, I	Checked: Further clarification was required on why the common practice analysis has been limited to 4 projects in Hunan Province. It is verified by examining relevant reosources.	~~CL1~~	OK
B.5.15. (Common Practice Analysis) Are essential distinctions sufficiently provided between the proposed CDM project activity and any similar projects that are widely observed and commonly	/1/	DR, I	To be checked: Essential distinctions are sufficiently provided. This has been checked with CL1.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
carried out?					
B.6. Emission reductions *It is established whether the emission reductions provide for reliable and complete baseline and project emission data.*					
B.6.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/, /23/	DR, I	Checked: The emission reductions are determined in accordance with ACM0002 version 07 and relevant tools.		OK
B.6.2. Are all documentations used by project participants as the basis for assumptions and source of data correctly quoted and interpreted in the PDD?	/1/	DR	Checked: All documentation used by project participants are correctly quoted and interpreted in the PDD.		OK
B.6.3. Are all values used in the PDD considered reasonable in the context of the proposed CDM project activity?	/1/	DR	Checked: Country specific data for net calorific value (NCVi) of each type of fossil fuel, the IPCC 2006 default value of oxidation factor of each type of fossil fuel and the total electricity delivered to the CCPG selected are deemed reasonable.		OK
B.6.4. Has the baseline methodology been correctly applied to calculate project emissions, baseline emissions, leakage and emission reductions?	/1/	DR	Checked: The relevant tool to calculate GHG emissions is properly applied.		OK
B.6.5. Can all estimates of the baseline emissions be replicated using the data and parameter values provided in the PDD?	/1/	DR	Checked: The GHG calculations are complete and transparent, and their accuracy has been verified.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.7. Application of the monitoring methodology and description of the monitoring plan *Note:*					
B.7.1. Does the monitoring plan contain all necessary parameters and the means of monitoring described in the plan comply with the requirements of the methodology?	/1/, /19/	DR, I	Checked: The monitoring plan was deemed to be incomplete. The project is implemented in an existing reservoir. The fact that there was no change in the volume of reservoir should be supported by document evidences and cross checked with data of the grid company. Details of hydro resource, 5 years of historical data for electricity generation and electricity capacity addition should be cross-checked with data of the grid company.	~~CAR3~~ ~~CAR4~~	OK
B.7.2. Are monitoring arrangements described in the monitoring plan feasible within the project design?	/1/, /19/	DR, I	Checked: There is no appropriate description of the relevant local standard on the data and parameters monitored in the monitoring plan. And monitoring manual need to be updated according to the monitoring plan in the PDD.	~~CL2~~	OK
B.7.3. Are procedures for monitoring, taking measurements and reporting sufficient to ensure the accuracy and completeness of emission reductions achieved by the proposed CDM project activity?	/1/, /19/	DR, I	Checked: Procedures for monitoring, taking measurement and reporting are sufficient.		OK
B.7.4. Are procedures for emergency preparedness appropriately established?	/1/, /19/	DR, I	Checked: Procedures for emergency are appropriately established.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.7.5. Are procedures for calibration of equipment appropriately established?	/1/, /19/	DR, I	Checked: Procedures for calibration of equipment are properly established.		OK
B.7.6. Are procedures for review or checks of reported results/data appropriately established?	/1/, /19/	DR, I	Checked: In the monitoring manual, procedures for review or checks of reported data are appropriately described.		OK
B.7.7. Is the authority and responsibility for monitoring, measurement and reporting project emission, baseline emission and leakage data over time clearly described?	/1/, /19/	DR, I	Checked: The authority and responsibility for monitoring, measurement and reporting over time is clearly described.		OK
B.8. Details of baseline information, including the date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline *Note:*					
B.8.1. Is the detailed baseline information sufficiently provided in Annex 3 to the PDD?	/1/, /19/	DR, I	Checked: Detailed baseline information is properly attached in Annex 3.		OK
B.8.2. Are the date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline clearly stated?	/1/, /19/	DR, I	Checked: The application of the baseline study and monitoring methodology was completed on 27/06/2008. And the name of the person and entity determining the baseline clearly stated.		OK
B.8.3. Is the contact information clearly provided and is it indicated that the person/entity is a project participant listed in Annex I?	/1/, /19/	DR, I	Checked: The contact information is clearly provided and is in accordance with Annex I.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
C. Duration of the project / Crediting Period *Note:*					
C.1. Duration of the project activity *Note:*					
C.1.1. Is the start date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms" and sufficiently evidenced?	/1/, /10/	DR, I	Checked: The earliest date at which real action of the project activity begins was provided.		OK
C.1.2. Is the operational lifetime of the project activity clearly defined and reasonable?	/1/, /11/	DR, I	Checked: 25 years of expected operational lifetime of the project activity is reasonable with proper maintenance.		OK
C.2. Choice of the crediting period and related information *Note:*					
C.2.1. Is the assumed crediting period clearly defined and reasonable (renewable crediting period of max. two times 7 years or fixed crediting period of max. 10 years)?	/1/	DR	Checked: 10 years of fixed crediting period is defined in the PDD.		OK
C.2.2. Is the assumed crediting period chosen as below the operational lifetime of the project activity?	/1/	DR	Checked: The assumed crediting is chosen below the operational lifetime.		OK
C.2.3. Are the starting date and length of the crediting period clearly and properly stated?	/1/	DR	Checked: The crediting period will start on 01/11/2009. But this period needs to be later than the date of registration.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
D.1. Documentation on the analysis of the environmental impacts, including trans-boundary impacts *Note:*					
D.1.1. Is the project activity likely to create any adverse environmental effects?	/1/, /6/	DR, I	Checked: The project is a hydroelectric power generation project with an existing reservoir. There are no outstanding adverse environmental effects.		OK
D.1.2. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Checked: EIA summary was described in the PDD.		OK
D.1.3. Are trans-boundary environmental impacts considered in the analysis?	/1/	DR	Checked:		OK
D.2. Provision of conclusions and all references to support documentation of an EIA undertaken in accordance with the procedures as required by the Host Party (if any environmental impacts are considered significant by the project participants or the Host Party) *Note:*					
D.2.1. Does the project comply with environmental legislation in the host country including requirements for an Environmental Impact Assessment?	/1/, /6/	DR, I	Checked: As for its environmental impacts on the local area, in accordance with the Environmental Evaluation Law of the P.R. China, the environmental impact		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			assessment (EIA) /6/ has been conducted by Chenzhou Municipal Environmental Protection Research Institute		
D.2.2. Have identified environmental impacts been addressed in the project design?	/1/	DR	Checked: The potential environmental impacts have been sufficiently identified.		OK
D.2.3. Does the project comply with environmental legislation in the host country?	/1/, /7/	DR, I	Checked: The Chenzhou Municipal Environmental Protection Bereau has approved the project.		OK
E. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
E.1. Brief description how comments by local stakeholders have been invited and compiled *Note:*					
E.1.1. Is the process clearly described by which comments by local stakeholders have been invited and compiled?	/1/	DR	Checked: The process clearly described in the PDD.		OK
E.1.2. Has an invitation for comments by local stakeholders made in an open transparent manner, in a way that facilitates comments to be received from local stakeholders and allow for a reasonable time for comments to be submitted?	/1/, /20/	DR, I	Checked: The local stakeholder comments process was verified during interviews with relevant local government officers.		OK
E.1.3. Has detailed description of the project activity been provided in a manner which allows the local stakeholders to understand project activity?	/1/, /20/	DR, I	Checked: The questionnaires are submitted during the site-visit and verified during interviews with relevant local government officers.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.2. Summary of the comments received *Note:*					
E.2.1. Have relevant stakeholders been consulted?	/1/, /20/		Checked: A stakeholder consultation questionnaires were used.		OK
E.2.2. Is a summary of the stakeholder comments received provided?	/1/, /20/		Checked: 30 questionnaires were distributed and 22 of them returned. This is confirmed by on-site assessment and sample interview with local stakeholders.		OK
E.3. Summary of the comments received *Note:*					
E.3.1. Has due account been taken of any stakeholder comments received?	/1/, /20/		Checked: There are no negative comments received during the local stakeholder consultation process.		OK

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

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.1 As the start date of the project activity is prior to the date of publication of the PDD, the PP must demonstrate that the incentive from the CDM was seriously considered in the decision to implement the project activity. So, the evidence to support such consideration must be adequately and transparently described in the PDD according to the guidance by EB41 Annex 46 C.	B.5	One evidence which indicates the awareness of the CDM prior to the project activity start date is the Minutes related to the project by the Board of Directors in 1 February, 2005/4/ which states that the benefits of the CDM were a decisive factor in the decision to proceed with the project. And other evidences of continuing and real actions include Letter of Intention signed with Lvyuan CDM Development Corp. in 11 May 2005/5/, Broker service contract signed with Lvyuan CDM developmemt Corp. Ltd in 10 February 2006/8/, Letter of loan commitment from Rucheng branch of China Construction Bank in 2 March 2006/9/, and ERPA signed with EcoSecurities in 19 October 2007/12/. These documents consistently and properly indicate the prior consideration of the CDM for the project.	The evidences for prior consideration of the CDM were submitted and accessed. Then, it is concluded that the prior consideration of the CDM for the project is adequately and transparently described in the PDD.
CAR.2 On the IRR calculations for the demonstration	B.5	Feasibility Study Report/2/ of the project was asked to be submitted. In China, the Feasibility Study Report	In summary, underlying assumptions and supporting documents above are appropriate and the financial

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
of additionality, it is not very clear how the input values and assumptions are applied in the economic context of the underlying project activities including electricity tariff and benchmark value.		(FSR) must be prepared by an accredited third party, assumptions and data sources for the economic evaluation of a project in the Study are required to be based on relevant national standards and criteria. The FSR for the project was prepared by Hunan Hydroelectric & Power Exploration Research Institute and this report was approved by FSR Approval letter by Hunan Economy Committee in 20 January, 2005/3/. The period of time between the finalization of the FSR and the investment decision is almost one year. So, it is unlikely in the context of the underlying project that the input values would have materially changed. Especially the electricity tariff was approved by Hunan Price Bureau in 5 December 2007/14/ and it is cross-checked by current Electricity Sales receipts sample for 2008/15/. Based on the documents above, the estimated IRR without CERs 3.41% was lower than the 8% benchmark rate. The benchmark value properly refers to the Interim Rules on financial assessment of hydropower project by the Ministry of Power of P.R. China/16/.	calculations are correct.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.3 This project activity is implemented in an existing reservoir. The fact that there was no change in the volume of reservoir should be supported by document evidences and cross checked with data of the grid company.	B.6	In regards to the volume of reservoir, water level records by Hydrology Measuring Center of Zhongnan Hydroelectric & Power Institute/18/ was submitted. And to determine the volume of reservoir on the basis of the measurement of water levels of the reservoir, the monitoring plan includes the parameter ABL (Area of reservoir measured in the surface of the water before the implementation of the project) and the parameter Apj (Area of the reservoir measured in the surface of the water after the implementation of the project) as area indicator.	The fact that there was no change in the volume of reservoir was supported by proper document evidences and will be cross checked with the data of the grid company.
CAR.4 Details of hydro resource, 5 years of historical data for electricity generation and electricity capacity addition should be cross-checked with data of the grid company.	B.6	In regards to reliability of the historical data, original data from the project participant was supported by the Cross-check record of electricity supply to the grid 2003-2007 by Hunan Electricity Power Company (grid company) in 20 October 2008/17/.	In conclusion, 5 years of historical data for electricity generation was available and the credibility and transparency of the data has been verified by the third party record.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 1. Further clarification is required on why the common practice analysis has been limited to 4 projects in Hunan Province.	B.5	The geographical scope (the Hunan Province) of the common practice analysis is further explained in the revised PDD/1/. There are seven regional grids in China, and the project supplies electricity to the CCPG. Then, it is reasonable to limit the common practice analysis to the provincial level under the relevant CCPG, because the investment environment for each province differs and the grid planning in Hunan Province are regulated by the Hunan Electricity Power Corporation. As the project is an addition of new power generation units in an existing reservoir, it is also proper to select hydropower upgrade projects implemented or currently underway in Hunan Province. The common practice analysis shows that hydro projects that started operation after 2002 were considered similar to the project. Because the investment environment of power industry changed significantly in 2002.	After geographical scope of the common practice analysis has been validated, 4 hydropower upgrade projects in Hunan Province has been identified as similar projects. Essential distinctions between the project and the other already existing hydropower projects in terms of water resources, funding and government support were assessed. To verify the information provided by PPs, the China Statistical Yearbook/30/, China Utilization of Water Yearbook/31/ and other relevant resources have been examined. As a result, it is verified that the project is not a common practice.
CL 2. There is no appropriate description of the relevant local standard on the data and	B.7	The name of standard was added instead of only indicating " relevant standard" in PDD and monitoring	The monitoring plan properly described which standard data/parameters was referenced to in the monitoring plan and

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
parameters monitored in the monitoring plan. And monitoring manual need to be updated according to the monitoring plan in the PDD.		procedures for water levels added into monitoring manual for Shatian Project/19/.	it is in consistence with the information in the PDD.

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Appendix B

CVs of Validators

KEMCO

Personal History

Family name	LEE	Date of Birth	Aug. 09, 1959
Given name	JAE HOON	Sex	Male
Organization	Korea Energy Management Corporation	Phone No.	+82-31-260-4880
Position	Director	Fax No.	+82-31-260-4886
Address	1157, Pungdukchun 2, Suji, Yongin, Gyeonggi, 448-994, Republic of Korea	E-mail	jhlee@kemco.or.kr

	Title	Qualification
Proposed Title	☐ Full-time Validator/verifier	☐
	☐ Part-time Validator/verifier	☐
	☑ Full-time Lead Validator/verifier ☐ KEMC-B-1100, Paragraph 6.2(1) ☑ KEMC-B-1100, Paragraph 6.2(2) * Please tick off (☑) for qualification as a lead auditor	☑
	☐ Part-time Lead Validator/verifier	☐
	☐ Committee Member( )	☐
	☐ Technical Expert	☐
	☐ Others ( )	☐
	* Please tick off (☑) the title which you wish to apply for	*Qualification shall be determined by the authorized person

	Sectoral Scope	Qualification
Proposed Sectoral Scope	☑ 1. Energy industries (renewable-/non-renewable sources)	☑
	☐ 2. Energy distribution	☐
	☑ 3. Energy demand	☑
	☐ 4. Manufacturing industries	☐
	☑ 5. Chemical industries	☑
	☐ 6. Construction	☐
	☑ 7. Transport	☑
	☐ 8. Mining/mineral production	☐
	☐ 9. Metal production	☐
	☐ 10. Fugitive emissions from fuels (solid, oil and gas)	☐
	☐ 11. Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	☐
	☐ 12. Solvent use	☐
	☐ 13. Waste handling and disposal	☐
	☐ 14. Afforestation and reforestation	☐
	☐ 15. Agriculture	☐
	* Please tick off (☑) the sectoral scope which you wish to apply for	*Qualification shall be determined by the authorized person

KEMCO

Personal History

Family name	Park	Date of Birth	27/01/1968
Given name	Kyung-Soon	Sex	Male
Organization	KEMCO	Phone No.	+82-31-260-4885
Position	Associate Manager	Fax No.	+82-31-260-4886
Address	1157, Pungdukchun-2-dong, Yongin, Gyeonggi, 448-994, Republic of Korea	E-mail	kspark@kemco.or.kr

	Title	Qualification
Proposed Title	☐ Full-time Validator/verifier	☑
	☐ Part-time Validator/verifier	☐
	☑ Full-time Lead Validator/verifier ☑ KEMC-B-1100, Paragraph 6.2(1) ☐ KEMC-B-1100, Paragraph 6.2(2) * Please tick off (☑) for qualification as a lead auditor	☐
	☐ Part-time Lead Validator/verifier	☐
	☐ Committee Member( )	☐
	☐ Technical Expert	☐
	☐ Others ( )	☐
	* Please tick off (☑) the title which you wish to apply for	*Qualification shall be determined by the authorized person

	Sectoral Scope	Qualification
Proposed Sectoral Scope	☑ 1. Energy industries (renewable-/non-renewable sources)	☑
	☐ 2. Energy distribution	☐
	☑ 3. Energy demand	☑
	☑ 4. Manufacturing industries	☑
	☑ 5. Chemical industries	☑
	☐ 6. Construction	☐
	☐ 7. Transport	☐
	☐ 8. Mining/mineral production	☐
	☐ 9. Metal production	☐
	☐ 10. Fugitive emissions from fuels (solid, oil and gas)	☐
	☐ 11. Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	☐
	☐ 12. Solvent use	☐
	☐ 13. Waste handling and disposal	☐
	☐ 14. Afforestation and reforestation	☐
	☐ 15. Agriculture	☐
	* Please tick off (☑) the sectoral scope which you wish to apply for	*Qualification shall be determined by the authorized person