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Request for Review

Dear Sirs,

Please find below the response to the review formulated for the CDM project with the title "Xiaoxi Hydropower Project" with the registration number 1749. In case you have any further inquiries please let us know as we kindly assist you.

Yours sincerely,

Abhishek Goyal
Carbon Management Service

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Response to the CDM Executive Board

Issue 1

Further clarification is required on how the DOE has validated the suitability of:

- a) the input values to the investment analysis as per the guidance of EB 38 paragraph 54, and
- b) the fixed input values to the investment analysis.

AND

Issue 2

Further clarification is required on how the DOE has validated the existence of technological barrier.

AND

Issue 3

Further clarification is required on why the common practice analysis has been limited to projects:

- a) located in the Hunan Province,
- b) commissioned after 2000, and c) the capacity range of 50-300 MW.

AND

Issue 4

Further clarification is required on status of the GEF grant and its impact on the investment analysis.

Attachement:

- Enclosure 1 – Annex 1 Cover of the PDR
- Enclosure 2 – Annex 2 Review meeting about the PDR
- Enclosure 3 – Annex 3 Bus-bar tariff_XJZ[2006]97



Referring to Issue 1

Response from the Project Participant

We understand that this issue focuses on the data source of investment analysis. We would like to clarify:

a) The input values to the investment analysis of the Project were in accordance with the guidance of EB 38 paragraph 54.

As per the guidance of EB 38 paragraph 54, for the investment analysis PP relies on parameters and assumptions from the Preliminary Design Report (hereafter referred to as the PDR) that are approved by national authorities for the Project.

In China, besides the Feasibility Study Report (hereafter referred to as the FSR), the PDR is also used as the basis of decision whether to proceed with the investment of a hydropower project. As regulated in *Specification on Compiling Preliminary Design Report of Water Conservancy and Hydropower Projects* (Document No.DL5021-93, hereafter referred to as the *Specification*) issued by Ministry of Power Industry and Ministry of Water Resources, the PDR should be compiled based on the approved FSR and the objectives of the PDR for a hydropower project include:

- Check the objectives and requirements of a project in the FSR, and determine the exact scale of a project, choose the project characteristic values such as water level, flow, water head and etc and define the operation requirement of a project (Paragraph 1.0.4(1) of the *Specification*);
- Determine the installed capacity of a project, choose the type, the unit capacity, the unit flow and the sets of generator, determine the electric connection into the grid and the electricity transmission approaches, the lectotype and layout of main electromechanical equipment and choose the type of transformer (Paragraph 1.0.4(5) of the *Specification*);
- Compile the preliminary budgetary estimation (Paragraph 1.0.4(11) of the *Specification*);
- Review the investment analysis (Paragraph 1.0.4(12) of the *Specification*).

The objectives of PDR summarized above clearly show that the PDR is also functioned as the basis of investment decision. Therefore, using the input values from the PDR to the investment analysis of the Project was in accordance with the guidance of EB 38 paragraph 54.

The PDR of the Project was drafted by an authoritative and independent third party viz. Hunan Hydro & Power Design Institute (hereafter referred to as HHPDI) in September 2004 (1 month prior to the construction of the Project), submitted to government authorities in October 2005 and approved by government authorities in November 2005. HHPDI, a design institute with the top level of qualification, was established in 1956, capable of a series of work such as investigation and design of large scale power generation project, consulting and engineering procurement and construction (EPC). HHPDI designed more than 1,400 hydraulic and hydropower projects. Besides domestic business, HHPDI obtained business of design and technology consulting from 15 countries in Asia, Africa and America. For detailed introduction of HHPDI please referred to <http://www.hhpd.com/>. As per the guidance given by EB 38 paragraph 54, the PDR of the Project is a reliable data source for investment analysis of the Project. Being validated by the DOE, all the parameters and assumptions used in the PDD and associated annexes are fully consistent with the PDR of the Project. For particular source of each value adopted in the



investment analysis please refers to the IRR calculation table that had been submitted along with the PDD submitted for registration.

b) The appropriateness of applying fixed input values provided in the PDR throughout the period of assessment

All of the fixed input values to the investment analysis are obtained from the PDR of the Project which is in accordance with the guidance of EB 38 paragraph 54. The appropriateness of applying fixed input values throughout the period of assessment was demonstrated as follows:

First, to use fixed input values to an investment analysis is the requirement of China's relevant regulations/guidance. In the national/sectoral regulations/guidance on the investment analysis for Chinese projects, all the case studies use fixed input values. These regulations/guidance include Interim Rules on Economic Assessment of Electric Power Engineering for Retrofit Projects issued by the State Power Corporation and Financial Assessment Methods and Parameters for Construction (the third edition) issued by the National Development and Reform Commission and the Ministry of Construction. Both of these documents are widely applied in investment analysis of China's CDM projects.

Second, it is common practice to use fixed input values to the investment analysis for Chinese projects. According to P85 in Financial Assessment Methods and Parameters for Construction (the third edition) which was issued by the National Development and Reform Commission and the Ministry of Construction, "it is hard either to predict the future price level in the preliminary study phase or to ensure the reliability of the predicted result due to the long-term operation period. So usually, the price level of the project input and project output in the first year of operation period should be predicted and this price level should be fixed in the investment analysis during the operation period". Furthermore, basic parameters and assumptions for different industries/regions are quantified by the government. Relevant parameters to the O&M expenses of the Project just come from Interim Rules on Economic Assessment for Hydropower Projects (Document No.SGG[1994]0026) issued by Ministry of Electric Power and Ministry of Water Conservancy, and keep constant for years throughout the economic assessment part of the PDR.

Third, it has to use fixed input values to carry out investment analysis for Chinese projects. The electricity tariff is controlled by the government in China. The electricity tariff is adjusted along with the judgment on the macro economy by the government. Adjustment of electricity tariff should be co-decided/approved by several government departments or even the central government. So certain power generation companies are not able to predict or control the electricity tariff. Under this circumstance, project owners cannot pre-consider the adjustment of electricity tariff and have to use fixed input values to the investment analysis.

As described above, the input values to the investment analysis are all obtained from the document compiled by a qualified third party and approved by government authorities. It is in accordance with the guidance of EB 38 paragraph 54. At the same time, the fixed input values adopted in the investment analysis of the Project is in accordance with

- 1) the national/sectoral regulations/guidance regarding investment analysis issued by China's authorities;
- 2) the PDR of the Project and the common practice of investment analysis in China; and
- 3) China's particular situation.

Therefore, to use fixed input values to the investment analysis of the Project is appropriate.

Response by TÜV SÜD

a) The investment decision of the PP was based on the PDR compiled according to the *Specification* (Document No.DL5021-93). Therefore, the clarification according to EB 38 § 54 refers to the PDR in this case.

The PDR was released in September 2004 by Hunan Hydro & Power Design Institute. On September 24th, 2004 a meeting was held to discuss the investment of the project by the Chairman of the Board of Hunan Xinshao Xiaoxi Hydropower Development Co., Ltd. and other shareholders and stakeholders. The chairman decided to start construction even with poor IRR because of the CDM-revenues. The meeting report was provided to TÜV SÜD (see enclosures).

The period of time between the PDR and the start of construction was 1 month, so that with high certainty the input values were still valid at the time of the investment decision. The PDR was approved in November 2005. This means during this period of time the input values didn't materially change.

Furthermore TÜV SÜD can confirm that the values used in the PDD are fully consistent with the approved PDR.

The project is still under construction so that TÜV SÜD cannot verify the input values of investment by invoices. However, each part of the total project cost is determined as per relevant standards as:

-Construction cost: *Cost Estimate Quota for Hydraulic Engineering* issued by the Ministry of Water Conservancy in 2002 (Document No.SZ[2002]116);

-Installation cost: *Cost Estimate Quota for Installation of Hydroengineering Equipment* issued by the Ministry of Water Conservancy (Document No.SJG[1999]523);

-Construction equipment cost: *Unit Cost of Construction Equipment for Hydraulic Engineering* issued by the Ministry of Water Conservancy in 2002 (Document No.SZ[2002]116).

TÜV SÜD can confirm that the project costs are reasonable given our local and sectoral expertise.

Additionally two critical input values from the PDR were cross-checked by TÜV SÜD:

1. According to *Circular on Relevant Issues of Adjustment of the Electricity Tariff in Hunan Power Grid* (Document No.XJZ[2006]97) issued by the Bureau of Pricing of Hunan Province, "the benchmark tariff (including VAT) of hydropower projects in Hunan Province is 0.301 RMB/kWh..., and for all the newly commercially commissioned units the bus-bar tariff is determined in line with the above mentioned benchmark tariff". Therefore the provincial bus-bar tariff is lower than the expected value of 0.315 RMB/kWh (including VAT) in the PDR.

2.The estimated electricity generation is based on 3472 operational hours per year calculated from hydrographical data from 1959-2004.

The average operational hours of 19 hydro power projects in Hunan province are appr. 3700 hours per year. Hence, the scale of the operational hours of hydro power plants in Hunan province is met. The area of Hunan province was chosen because the rainfall is the same in this province.

Thus TÜV SÜD can confirm that these input values are appropriate.



b) TÜV SÜD is strongly convinced that applying fixed input values in the IRR calculation is appropriate in the context of the project activity. There are a number of reasons which lead to this conclusion, demonstrated here for case 1749.

The main reason is:

The project applies the benchmark “Interim Rules on Economic Assessment of Electric Power Engineering for Retrofit Projects” issued by the State Power Corporation. According to this document, it can be clearly seen that the parameters used in the calculation should be constant throughout the assessment period. In CDM assessment, TÜV SÜD has reviewed dozens of feasibility study reports of renewable energy projects in China. It can be confirmed that the above guideline is consistently applied as common practice in China; all feasibility studies make use of fixed input parameters.

Further reasons are:

The fixed values provided in the PDR followed mainly the guidance “Interim Rules on Economic Assessment for Hydropower Projects” (Document No. SGG[1994]26).

The fixed input values derived from this rules are listed below:

item	value	remark	original sources
operation period	30	year	Paragraph 1.0.4 of Section I and Paragraph 1.0.2 of Section II of <i>SGG[1994]26</i>
VAT	17%		Paragraph 2.3.1 of Section I of <i>SGG[1994]26</i>
income tax	33%		Paragraph 2.3.2 of Section I of <i>SGG[1994]26</i>
urban maintenance and construction tax	5%		Paragraph 2.3.1 of Section I of <i>SGG[1994]26</i>
surtax for education	3%		Paragraph 2.3.1 of Section I of <i>SGG[1994]26</i>
maintenance	1%		Paragraph 2.2.1 (2) of Section I of <i>SGG[1994]26</i>
employee welfare	14%		Paragraph 2.2.1 (3) of Section I of <i>SGG[1994]26</i>
reservoir maintenance fee	0.001	RMB/kWh	Paragraph 2.2.1 (4) of Section I of <i>SGG[1994]26</i>
materials cost	5	RMB/kW	Paragraph 2.0.2 of Section II of <i>SGG[1994]26</i>
other cost	24	RMB/kW	Paragraph 2.0.2 of Section II of <i>SGG[1994]26</i>

The financial analysis applies a sensitivity analysis, varying among other parameters the tariff and O&M costs +-10%. The result reveals a maximum IRR of 6.32%, assuming a 10% increase in grid price throughout the entire 30 years period of consideration.

Considering the O&M costs, the impact of sensitivity is much lower; assuming a 10% decrease of the O&M costs, IRR reaches 5.67%.



To conclude, the applied benchmark assessing the projects financial viability clearly suggests applying fixed values for the calculation. Further, as current trends show, the revenues, depending on the tariff, are likely to stay constant, while at the same time the O&M costs are likely to increase significantly – a trend which leads to the conclusion that currently applied calculation methods applying fixed parameters can be considered a conservative approach in the CDM context.

This conclusion is valid for all other TÜV SÜD positively validated Chinese hydropower projects applying the investment analysis to proof additionality and referring to one of the following benchmark documents:

- a. Interim Rules on Economic Assessment of Electric Power Engineering for Retrofit Projects
- b. Economic Assessment method and Parameters for Construction Project, the third edition (2006) (*“A fixed price should be used in the operation period”*)
- c. The Economical Assessment Temporary Regulation on Electrical Technology Improvement Project, published by China Electric Power Press. September 10, 2002 (*“The price should be based on the current price system in the financial evaluation”*)

Referring to issue 2

Response from the Project Participant

The additionality of the Project was demonstrated via investment analysis. As described on Page 12 of the Validation Report of the Project - “the additionality has been evidenced by investment analysis”. As per *Tool for the Demonstration and Assessment of Additionality*, prohibitive barriers faced by the Project can be demonstrated either applying Step 2 (Investment analysis) or Step 3 (Barrier analysis). For avoiding confusion, PP has deleted the barriers analysis in the revised PDD of the Project.

Response by TÜV SÜD

The technology barrier as one alternative to demonstrate additionality was deleted in the revised PDD. The investment analysis provided sufficient evidences to proof the additionality of the proposed project.

Referring to Issue 3

Response from the Project Participant

The common practice analysis of the Project was limited to projects: a) located in the Hunan Province, b) commissioned after 2000, and c) the capacity range of 50-300 MW in accordance with the requirement of *Tool for the Demonstration and Assessment of Additionality*.

As per *Tool for the Demonstration and Assessment of Additionality*, projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Therefore, for the Project,

a) The common practice analysis is limited to the provincial level as the investment environment and policies are similar within certain province but different among provinces in China. For example, the bus-bar tariff for different province is much different under the control of National Development and Reform Commission¹. The Project is located within Hunan Province, therefore the common practice analysis of the Project was limited to Hunan Province to ensure a comparable environment with respect to regulatory framework. With 211,875 km² of area and 98,596.4 MW of total installed capacity, Hunan Province is large enough to be considered as the boundary for the common practice analysis of the Project.

b) 01/01/2000 is the date for the prompt start of CDM, so projects commissioned after 2000 were analyzed for common practice considering of taking place in a comparable environment with respect to access to financing.

Then, reform of the power sector in China took place. As a result, the investment environment of hydropower plants in China before and after 2001 is very different. Before 2001, according to *Note on Implement methods of Various Electricity Tariff* (Document No.101SDCZ[1987]), "the electricity tariff of each power plant should be determined according to the principle of full-cost recovery and reasonable benefit"². With such favorable policies provided by the government, the developer of hydropower plants didn't face any investment risk. In 2001, the favorable policies for electricity tariff were cancelled due to the issuance of Notice on Standardizing Electricity Tariff Management (Document No.701JJG[2001])³ where the electricity tariff level was required to decrease and the mechanism of supplying electricity to the power grid through competing price was implemented. Since the starting date of the Project is later than 2001, project activities similar to the Project should be those which are put into operation later than 2001.

To summarize, it is conservative to limit the common practice analysis of the Project to those projects commissioned after 2000.

c) Limitation of installed capacity was applied in the common practice analysis to reflect similar technology and similar scale required by *Tool for the Demonstration and Assessment of Addi-*

¹ <http://www.sdpc.gov.cn/zfdj/default.htm>

² Ministry of Water Resources and Electric Power, State Economic Commission and State Price Bureau, Note on Implement methods of Various Electricity Tariff (Document No.101SDCZ[1987]).

³ State Planning Commission, Notice on Standardizing Electricity Tariff Management (Document No.701JJG[2001]).



tionality. In *Standard for Classification and Flood Control of Water Resources and Hydropower Project* (Document No.SL252-2000) issued by Ministry of Water Resources in 2000, hydropower plants are divided into five categories according to the project scale and its importance to economy. The same categorization method is also adopted in *Classification & Design Safety Standard of Hydropower Projects* (Document No.DL5180-2003). The installed capacity of the Project is 135 MW and it belongs to Category III. Category III covers hydropower plants with an installed capacity between 50~300 MW, so the installed capacity of activities similar to the Project should be between 50~300 MW.

As described above, the common practice analysis of the Project was limited to projects: a) located in the Hunan Province and b) commissioned after 2000 to reflect comparable environment with respect of regulation framework, investment climate and financing as required by *Tool for the Demonstration and Assessment of Additionality*. The common practice analysis of the Project was limited to projects c) the capacity range of 50-300 MW to reflect similar technology and similar scale as required by *Tool for the Demonstration and Assessment of Additionality*.

Response by TÜV SÜD

- a) The boundary of the common practice analysis was limited to the Hunan Province because important regulations are determined on provincial level, for example the electricity tariff.
- b) The rules for electricity tariffs were changed in 2001. Therefore, hydro power projects commissioned before 2001 cannot be compared with the proposed project.
- c) The capacity range follows Chinese classification as determined in standards.

The detailed explanation of the PP can be confirmed as plausible by TÜV SÜD. Generally, the criteria of similarity for the common practice analysis are applicable only within a province in China.

Referring to Issue 4

Response from the Project Participant

Being confident of the environment benefits generated by the Project, PP decided to apply international financial supports to overcome the investment barrier faced by the Project in February 2004. At that time, GEF grant and CDM assistance were both considered by the Project Owner. The decision was made in *Meeting Minutes of the General Management of Hunan Xishao Xiaoxi Hydropower Development Co., Ltd.* and the document had been submitted along with the PDD submitted for registration.

Then, PP studied GEF grant and CDM assistance carefully.

For GEF grant: After weeks of web searching, PP realized that the GEF grant is too little to help the Project to overcome the investment barriers being faced. According to the introduction of GEF grant on World Bank's website⁴, the amount of GEF grant keeps no more than 2 million US dollar. For the Project, the total project cost is about 139 million US dollar (converted from 1112.32 million RMB using the exchange rate of 8 RMB/US dollar at that time). The highest 2 million US dollar of GEF grant only accounts 1% of the total project cost of the Project. Referring to the result of sensitivity analysis provided in Step 2d of Section B.5 of the PDD, GEF grant could not increase the project IRR of the Project to reach the benchmark. Moreover, GEF grant is in favor of small scale hydropower projects and energy saving projects⁵, which further increases the difficulty for the Project to apply.

For CDM assistance: With more than 400,000 tCO₂e per year, the IRR calculation shows that the CDM revenues will significantly improve the financial attractiveness of the Project. Therefore in June 2004, CDM assistance became the loan payback guarantee when applying loan for the Project from China Construction Bank.

When the CDM assistance was further confirmed by the ERPA and the LOA, application of GEF grant was finally given up.

Response by TÜV SÜD

Although the explanation of the PP is plausible, to further clarify the status of any GEF grant the proposed project was searched in the GEF database without any result.

⁴ <http://www.gefonline.org/>

⁵ http://www.worldbank.org.cn/Chinese/overview/overview_brief_gef.htm.