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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 "*Hubei Yuhuangtan 10MW Small-Scale Hydropower Project*" with the registration number 2077. In case you have any further inquiries please let us know as we kindly assist you.

Yours sincerely,

Javier Castro
Carbon Management Service

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Response to the CDM Executive Board

Issue 1

The DOE is requested to justify the suitability of the 10% benchmark, in particular, the appropriateness of a benchmark of year 1995 when assessing the additionality with investment decision made in 2006.

Response from the Project Participant

Although the applied IRR benchmark from the "*Economic evaluation code for small hydropower projects*" (Document No.SL16-95) was issued in 1995[1], which is still the most specific benchmark for this type of project. In 2002, the Ministry of Water Resources issued a *Bulletin on Effective Technical Standard in Hydro& Water Industry*[2] to confirm that the Document No.SL16-95 is still in effect. A publicly available resource[3] from the Chinese Hydraulic Engineering Society (CHES) confirms that this benchmark is still in effect in 2006. Therefore the 10% benchmark is representing the common Chinese practice for investment decision processes for small scale hydro projects[4], which is also suitable to the proposed Hubei Yuhuangtan 10MW small scale hydro projects.

In addition, the Executive Board has also taken note that the IRR benchmark of 10% to small scale hydro projects in China is suitable, e.g., at the thirty-second EB meeting[5], the Board agreed to register the "Zhoubai Hydroelectric project (Ref: 0996)", which had been requested for review for the same issue[6] on the suitability of benchmark as 10%.

Response by TÜV SÜD

The applied benchmark for the proposed project referred to the "*Economic evaluation code for small hydropower projects*" (Document No.SL16-95) issued in 1995, in which it mentions *"This evaluation code is applied for small hydropower projects with installed capacity no more than 25MW (all newly-built, expansion, modification or retrofit projects). Besides, projects with a capacity less than 50MW in rural area can refer to this code too."* (Article 1.2). In 2002, the Ministry of Water Resources issued a *Bulletin on Effective Technical Standard in Hydro & Water Industry*. The "*Economic evaluation code for small hydropower projects*" (Document No.SL16-

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[1] *Economic Evaluation Code for Small Hydropower Projects*, issued by Ministry of Water Resources in 1995 (Document No.SL16-95), http://apps.lib.whu.edu.cn/12/test/gfbz/2/j/xsdpj.html

[2] Bulletin on Effective Technical Standard in Hydro& Water Industry (Document No. GuokeZongbianzi [2002]07), 18 June 2002, http://www.cws.net.cn/guifan/bzdt/bzgg.asp

[3] The current effective technical standard until 9 September 2006, confirmed by Chinese Hydraulic Engineering Society (CHES), http://www.ches.org.cn/jishubiaozhun/001.asp

[4] Please note that the concept of small hydro project in China differs from the CDM definition. According to the *Economic Evaluation Code for Small Hydropower Projects*, projects with an installed capacity below 25MW are considered small scale projects for the project's approval process in China. Furthermore, even middle scale projects in some rural areas with capacity below 50MW could be referred to the *Economic Evaluation Code for Small Hydropower Projects*.

[5] Paragraph 63(g) of the meeting report of EB 32, http://cdm.unfccc.int/EB

[6] Please refer to the view history to request for review of project 0996, http://cdm.unfccc.int/Projects/DB/DNV-CUK1173700712.12/history

95) issued in 1995 is still in the validity list. The Code validity was confirmed again by an official organization, i.e. Chinese Hydraulic Engineering Society, which published all valid standards for hydraulic industry on 9 September 2006. Therefore DOE is quite confident the 10% benchmark is appropriately applied.

Issue 2

The DOE shall further clarify how the key input values for the investment analysis are validated and confirmed in line with the requirements of EB 38, para 54(c) guidance, in particular, the conservativeness and justification for the fixed tariff used given the actual tariff is already 8% higher than those assumed in the Feasibility Study Report.

Response from the Project Participant

The guidance of EB 38 paragraph 54(c) demonstrates that the input values from the FSR should be confirmed to be valid and applicable at the time of the investment decision by crosschecking or in other appropriate manners on the basis of its specific local and sectoral expertise. All input values used in the financial analysis of this project are taken from the feasibility study report (FSR)[7] that was approved by the Development and Reform Commission of Hubei Province on 5 October 2005[8]. A feasibility study report (FSR) in China is required to be developed by a third independent party and accredited by the government. Therefore, the values can be regarded accurate and trustworthy. Among all the values four are the key ones, including the tariff, which would be described as below:

1) Total Investment on Fixed Assets

The investment on the fixed assets of 81,847,200 RMB applied in PDD comes from FSR, which mainly include several main components like the cost on the construction engineering, the cost on metal structure engineering, the cost on purchasing and installation of the hydro turbines& generators, the cost of land purchasing & Migration Compensation and etc.,. Therefore, the value from FSR could be cross-checked by the actual cost on the main components for its validity and applicability. The cost contributes most of (nearly 80%) the investment on fixed assets is summarized below:

[7] The Feasibility Report of Hubei Yuhuangtan 10MW Small Scale Hydropower Project, dated in August 2005, Fished by Shiyan Water&Hydro Power Construction and Design Institute (the Institute has the Qualification Rate "B" for Engineering Design)

[8] Approval of Feasibility Report of Hubei Yuhuangtan 10MW Small Scale Hydropower Project, dated on Oct. 5th, 2005, Hubei Development and Reform Commission

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Table 1 the main components in total investment provided for cross-check

Term	The data estimated in FSR[9] (10thousand RMB)	The Percent of Total Investment in FSR	The data provided for cross-check[10] (10thousand RMB)	The Vary of the data (10thousand RMB)	Vary Percent
Symbol of the Term	A	B=A/8184.72	C	D=C-A	E=D/A
Construction Engineering	2786.09	32.84%	4930.2582	2144.1682	76.96%
Metal Structure Engineering	1378.59	16.25%	1344.8154	-33.7746	-2.45%
purchasing and installation of the hydro turbines& generators	1791.6	21.12%	1559.7813	-231.8187	-12.94%
land purchasing & Migration Compensation	607.89	7.16%	1406.2507	798.3607	131.33%
Total	6564.17	77.36%	9241.1056	2676.9356	40.78%

From the Table list above, it is demonstrated that the sum of four key components of, which is accounted for nearly 80% (77.36%) in the total investment and the real happened total cost on these four key components have already increased more than 40% (40.78%) percent until the end of May 2008.

2) Annual O&M cost

Although the values of the O&M Cost are insensitive factor, some of which from FSR have also be cross-checked by the Economic evaluation code or actual cost for its validity and applicability. The cost contributes most of (nearly 71%) the Annual O&M Cost has been summarized below:

[9] Chapter 12 “Investment Estimation” of the FSR

[10] The data provided for cross-checking have come from Supervising Report on the statistic real happened engineering cost until the end of May 2008, which was issued in June 2008 by the third supervised party named as Shiyan Dayu Hydro& Electric Engineering Supervising Ltd.

Table 2 the main components in Annual O&M Cost provided for cross-check

Term	The data estimated in FSR (10thousand RMB)			The Percent in Total Annual O& M Cost in FSR	The data provided for cross-check	Data Source of Cross-Check
Symbol of the Term	A		B	C=B/157.34	D	/
Fee Rate of Repair	1.0% (of Total Investment)		81.85	52.02%	1.0%	Please refer to B.4.3 of Document No.SL16-95[1]
Annual Personal Fee	Persons	20 (A1)	17.88[11]	11.36%	28.7868	Original accountant page in Oct 2008[12];
	Average Personal Pay	6000RMB/Year (A2)				
	Welfare Rate	49% (A3)				
Other Fee	12 RMB/kW		12.0	7.63%	12 RMB/kW	Please refer to B.4.5 of Document No.SL16-95[1]
Total	/		111.73	71.01%	/	/

3) Annual Net Electricity Delivered to the Grid

The annual power generation is 40,610MWh and the annual net electricity delivered to the grid is 39,718MWh from FSR, which means the annual operational hour of the proposed project is about 4061 hours. This expected output is derived from scientific analysis described in FSR, which is the average value based on 37 year's historical hydrological observation data. The computation result submitted by the Design Institute is scientific and well found. Thus, the annual power generation is very difficult to increase as 16.8% to make the IRR achieve the benchmark 10%. The relevant document has been delivered to DOE for the cross-checking, which can also prove that the operational hour applied for this project from FSR is reasonable.

4) Tariff

The tariff used for IRR analysis in PDD is 0.318RMB/kWh (including VAT) from FSR, which could be cross-checked with the approved tariff[13] from the Hubei Price Bureau on 22 November 2006. The price is slightly higher (8.2%) than that assumed in the Feasibility Study Report (0,344 RMB/kWh versa 0,318 RMB/kWh including VAT). The electricity tariff was approved on 22 November 2006, much later than the time of the decision making in November 2005 and the

[11] A1*A2*(1+A3)/10000

[12] The Total Personal Fee in October 2008 is 2.3989 (10,000RMB), which is evidenced by the original accountant page and delivered to DOE for Verifying. It could be concluded that the Annual Personal Fee is calculated as 2.3989*12=28.7868 (10,000RMB)

[13] The Approved tariff to the proposed project from Hubei Price Bureau is 0.344RMB/kWh (including VAT), E Price Num [2006]257

starting date of the project activity in April 2006. Hence it is reasonable to include the electricity tariff (0,318 RMB/kWh including VAT) from the FSR in the decision making. Furthermore, even if using the later approved electricity tariff of 0.344 RMB/kWh, the IRR would be 9.1%. This is still below the benchmark of 10%, which means the project still is not financial attractive.

In addition, in order to comprehend why the fixed tariff used in the investment analysis of power project is a common practice in China, the background of policy on feed-in-tariff would be provided as following:

In China, the feed-in-tariff is strictly controlled and will not be significantly changed without permission by the government. It is established based on strict regulation rather than on market mechanisms. It is therefore difficult to forecast tariff variations in the future. In this context it must also be noted that the common practice when performing investment analyses in China is to use fixed prices and tariffs over the analysis period. This is enforced by official documents, such as the above-mentioned *Economic Evaluation Code for Small Hydropower Projects*[1], and comes as a consequence of the market structure in China, where prices are subjects to strict regulation from the government.

As explained above, since the tariff for power project is strictly regulated by the government, the tariff will be fixed once it is approved by government, and the owner of the project would not be able to make assumption of tariff increase for decision making. Therefore, it is not feasible for the PP to assume that the tariff would increase and the fixed tariff is reasonable used in the investment analysis.

Response by TÜV SÜD

EB 38 paragraph 54(c) guidance:

"On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision."

The Feasibility Study Report (FSR) was developed in August 2005 by Shiyan Water & Hydro Power Construction and Design Institute, which is a qualified third party. And the FSR approval was released on 5 October 2005 by the local DRC. The investment decision was made at the board meeting on 29 November 2005, by considering the prerequisite of CDM application as the IRR value was lower than benchmark in FSR. Hence, TÜV SÜD is strongly convinced that applied input values (total static investment, net electricity to the Grid, tariffs and O&M costs) from FSR for IRR calculation is appropriate in the context of the project activity. And all the values have been cross-checked as follows:

1. Total static investment

The investment cost has been validated by comparing the figures with statistical figures from 240 CDM hydro projects registered and under validation. The value of the proposed project was 8.2 Mio. RMB/MW, which was higher than the average of 6.7 Mio. RMB/MW of the statistics, but still less than the average deviation. According to the FSR, the high cost per kilowatt for the proposed project is because the project site was located at a hard basement rock region. Additional tunnel and road were required for the project construction. These investigations in FSR were compared and confirmed by DOE with *the Assessment Opinions of FSR for Yuhua-*

ngtan Hydropower Project, which was organized by Hubei Engineering Consulting Corporation, an independent third party authorized by local DRC, in 12 September 2005 and issued on 28 September 2005.

In addition, DOE has cross-checked *the Supervision Report for the Investment of Yuhuangtan Hydropower Project*, issued in June 2008. The actual investment for the project was 11.6 Mio. RMB/MW. The main reason for higher investment cost is due to increasing expenses of construction materials, salary payment, bank interest, land use compensation etc. Detailed investment statement was also listed in the Report. DOE has verified the data sources in the report and the qualification of Shiyan Dayu Hydraulic Engineering Supervision Ltd. In brief, the total static investment applied in FSR was credible and conservative.

2. Annual O&M cost

The estimation of annual O&M cost was appropriate and conservative in FSR. The assessment opinion was based on data sources from National Bureau of Statistics of China.

Furthermore, DOE compared annual O&M cost in FSR with all other available project documents during the validation process. The additional maintenance expenses were 0.83 Mio. RMB annually for the transformer substation of the project, which was not considered in FSR but confirmed by *the Maintenance Agreement for Transformer Substation of Yuhuangtan Hydropower Project* signed between Shiyan Juneng Power Goup Co., Ltd. and Yunxi Yuhuangtan Hydropower Co., Ltd. on 13 February 2008. Employee wages & welfare were increased into 0.29 Mio. RMB in 2008 (0.14 Mio. RMB/yr in FSR), evidenced in *Accounting Credential of Yunxi Yuhuangtan Hydropower Co., Ltd.*

3. Annual Net Electricity Delivered to the Grid

The electricity generation value in FSR is the product of installed capacity and the designed operational hours for the proposed project. The installed capacity has been verified by cross-checking the *Purchasing Contract of Hydroelectric Generating Sets*. The designed operational hours of the proposed project in FSR was based on the records of annual average flow from 1956 to 1993, together with a controlling model. This FSR was approved by the local DRC on 6 October 2005. Moreover, 4061 operational hours was confirmed again in *the Agreement of Grid Connection* signed on 17 May 2008 between Shiyan Power Company and Yunxi Yuhuangtan Hydropower Co., Ltd. In addition, all electricity self-consuming and losses were assessed and correctly deducted from annual electricity generation. Thus DOE confirmed the net electricity generation value used in the IRR calculations was accurate.

4. Tariff

The on-grid tariff estimated in FSR was 0.30 RMB/kWh (excluding VAT). The investment decision was made at the board meeting on 29 November 2005, by considering the prerequisite of CDM application as the IRR value was lower than benchmark in FSR. The fixed tariff from Hubei Price Bureau for the proposed project was 0.344 RMB/kWh (including VAT), issued on 22 November 2006, much later than the time of the decision making. And the approved tariff was 8.2% higher than the value estimated in FSR, which was within the 10% range of sensitivity analysis. Based on this assessment, TÜV SÜD deemed the estimated tariff for IRR calculations was applicable as per EB 38 paragraph 54(c) guidance - DOE should assess whether *the input*

values from the FSR are valid and applicable at the time of the investment decision. Furthermore, even the tariff of 0.344 RMB/kWh (including VAT) is applied in IRR calculations for the proposed project, the IRR value would be 9.1%, still lower than 10% benchmark. In China, the electricity tariff is strictly controlled by the government and will not change significantly during the project operational lifetime.

Issue 3

The PP/DOE shall further clarify whether a reservoir is present for the project activity and hence whether project emission should be considered.

Response from the Project Participant

The project is a small scale hydro power station with a very low dam, the designed surface area of the reservoir is 256,000 m^2 according to the FSR[14], and thus the power density could be calculated as 39 W/m^2 (10,000,000W/256,000m^2) which is greater than 10 W/m^2, therefore the project emission can be neglected according to EB meeting 23, Annex 5.

Response by TÜV SÜD

This issue has been assessed by DOE and the statement by PP was confirmed.

Issue 4

The DOE shall submit a correct information reference list for the project activity.

Response by TÜV SÜD

The corrected information reference list is attached.

[14] Please refer to the first page of Chapter 2 of the FSR.