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CDM Executive Board

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Date
16.12.2008

Request for Review

“Guangdong Shaoguan Yizhou Hydro Power Station” (1980)

Dear Sir/Madam,

Please find below the response of the project participants (Shaoguan Yizhou Hydro Power Station Co., Ltd; RWE Power AG) and the TÜV NORD JI/CDM Certification Program to the request for review for the above mentioned project no. 1980.

If you have any questions do not hesitate to contact us.

Yours sincerely,

TÜV NORD JI/CDM Certification Program



Rainer Winter

Request for Review (1)	
Issue raised by EB Members / DNA	<i>The DOE is requested to provide reliable evidence that continuing and real actions were taken to secure the CDM status for the project activity in parallel with its implementation (EB 41, Annex 46, paragraph 5b).</i>
Response of project participant	<i>Background:</i> <i>EB 41, Annex 46, Paragraph 5.b</i> <i>(b) The project participant must indicate, by means of reliable evidence, that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA or the UNFCCC secretariat;</i> The Preliminary Design Report (PDR) was completed by Hunan Hydro and Power Design Institute ("Institute") in June 2003 and approved by the Water Resources Bureau of Guangdong Province. Afterwards, the former project owner started the construction in 2005. However, due to the high investment risk, several months later the former project owner had to cease the project construction. At the beginning of 2006, the Shaoneng Group began to research the project. During research period, the Shaoneng Group assigned the same Institute to re-assess the estimated updated total investment. Later the Project Evaluation Report (PER) was completed by the Institute on March 28, 2006, which indicated that the total investment of the project has increased obviously. Therefore, the IRR of the project was low. Considering the high investment risk and low IRR, the Shaoneng Group had to decide to give up the project on March 30, 2006. However, the Shaoneng Group received a CDM support letter from the Development and Reform Bureau of Shaoguan City (local DRC) who recommended the Shaoneng Group to apply for CDM project to improve the financial index and reduce investment risk in April 3, 2006. And then the Shaoneng Group started to seek the consulting company for CDM application. After discussion and research, the Shaoneng Group decided to cooperate with the Beijing Tianqing Power International CDM Consulting Co., Ltd (Tianqing) for CDM application on April 4, 2006. Only after considering the CDM revenue seriously, the Shaoneng Group decided to purchase the project and apply for CDM support to improve the financial indexes on April 6, 2006. From the analysis above, it can be concluded that only after making the board decision to carry out the CDM application and signing the cooperation agreement with the consulting enterprise, namely, when the Shaoneng Group was confident on successful CDM application, the Shaoneng Group signed the project Transfer Agreement on April 10, 2006 (the earliest starting date of the project). Therefore, it can be concluded that the Shaoneng Group did consider

seriously the potential revenue of CDM when making the decision to purchase the project. CDM has played a critical role in the successful implementation of the project.

After signing the Transfer Agreement, the Shaoneng Group and Fangxia Group (another small stockholder) signed the Restructuring Agreement of Shaoguan Yizhou Hydropower Station Co., Ltd. (which is the project owner for the CDM project, hereafter referred to as "Yizhou Co., Ltd.") on June 10, 2006. After that, the project recommenced the construction on June 12, 2006. Soon the Yizhou Co., Ltd. signed the CDM Commission Letter with Tianqing on July 26, 2006.

And then, Tianqing started to collect relevant evidences, write PIN and seek a buyer. Only after several months, Tianqing began to contact with RWE Power AG for the project. In addition, Tianqing also began to prepare for the CDM application document to finish PDD compiling and the CDM stakeholder consulting meeting was also held on January 16, 2007.

After the serious due diligence, RWE Power AG signed LOI with Yizhou Co., Ltd. on May 27, 2007. Then the application letter of CDM and PDD has been submitted to China DNA for approval and the project was listed on China DNA official website as approved on July 13, 2007. The project received LOA of Chinese DNA on August 26, 2007. Later, Yizhou Co., Ltd. signed ERPA with RWE Power AG on September 5, 2007. Soon, the project started GSP of the CDM-PDD on October 9, 2007 and on October 26, 2007 TÜV NORD performed interviews on-site. Since then, the CDM application was going on smoothly. Please find the time line of key events of the project in the table below.

Table 1: Key Events of the Project

Date	Key Event
6-2003	The PDR was completed by Hunan Hydro and Power Design Institute.
26-9-2003	The PDR was approved by the Water Resources Bureau of Guangdong Province.
12-2003	The Environment impact assessment report was completed.
10-8-2004	The Environment impact assessment report was approved by the Environment Protection Bureau of Guangdong Province.
2005	The former project owner started the construction in 2005. However, due to the high investment risk, several months later the former project owner had to cease the project construction.
28-3-2006	The Shaoneng Group assigned the same Institute to re-assess the estimated updated total investment. Later the Project Evaluation Report (PER) was completed by the Institute, which indicated that the total investment of the project has increased obviously, therefore, the IRR of the project was low.
30-3-2006	Considering the high investment risk and low IRR, the Shaoneng Group had to decide to give up this project.
3-4-2006	The Shaoneng Group received a CDM support letter from local DRC who recommended the Shaoneng Group to apply for CDM project to improve the financial index and reduce investment risk.
4-4-2006	The Shaoneng Group consigned Tianqing to develop the CDM project.

	6-4-2006	After considering the CDM revenue seriously, the Shaoneng Group decided to purchase the project and apply for CDM support to improve the financial indexes.
	10-4-2006	The Shaoneng Group signed the project Transformer Agreement (the earliest starting date of the project).
	10-6-2006	The Shaoneng Group and Fangxia Group signed the Restructuring Agreement of Yizhou Co., Ltd.
	12-6-2006	The project was approved to recommence by the local DRC.
	26-7-2006	Yizhou Co., Ltd. signed Commission letter with Tianqing.
	16-1-2007	The CDM stakeholder consulting meeting was held.
	27-5-2007	The Yizhou Co., Ltd. signed LOI with RWE Power AG.
	13-7-2007	The project received LOA of Chinese DNA on Chinese DNA Website.
	26-8-2007	The project received LOA (paper pattern) of Chinese DNA.
	5-9-2007	The Yizhou Co., Ltd. signed ERPA with RWE Power AG.
	9-10-2007	Starting Date of GSP of the CDM-PDD.
	26-10-2007	TÜV NORD performed interviews on-site.
	From the analysis above, it can be concluded that the CDM played a crucial function on the decision of implement of the project. And real and concrete actions to secure registration as a CDM project activity have been continuously taken in parallel with its implementation. Therefore the project meets the requirement of EB 41, Annex 46, paragraph 5b.	
Response of DOE	According to EB 41, Annex 46, paragraph 5b, DOE carefully checked the evidences of continuing and real actions taken to secure the CDM status for the project activity in parallel with its implementation in respect to the key event time table. Detailed descriptions and evidences are listed in PP response thus won't be repeated here. The validator can confirm that the evidences provided by the project participants as indicated in the table above have been checked and fully meet the requirements as set out on EB41, Annex 46, paragraph 5. If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person: Mr. Li Yong Jun CDM project manager China Room 11C, East Ocean Centre II, No. 618 Yan An Rd. (E), Huangpu District, Shanghai China 200001 Tel: +86 (0)21 53855353-259 Fax: +86 (0)21 53855369	

Request for Review (2)	
Issue raised by EB Members / DNA	<i>The DOE is requested to clarify how it has validated the investment analysis, in particular the appropriateness of a benchmark issued in 1995 when assessing the additionality of a project with investment decision made in 2006.</i>
Response of project participant	The “Economic Evaluation Code for Small Hydropower Project (SL16-95)” belong to the Professional Standards of People’s Republic of China which was approved and published by the Ministry of Water Resources of the People’s Republic of China on June 2, 1995 and began to take effect on July 1, 1995^[1]. In this document, the small hydropower project is defined as: the station with installed capacity no more than 50MW. In 2002, the Ministry of Water Resources of the People’s Republic of China issued the “Bulletin of Valid Hydropower Technical Standard” (document No [2002]07). According to it, the “Economic Evaluation Code for Small Hydropower Project (SL16-95)” is still valid and enforceable^[2]. Additionally, this benchmark is still in effect in 2006.^[3] In addition, since 1995, institutes on hydropower aspect in China generally apply the document (SL-95) to make out Feasibility Study Reports (FSRs), Preliminary Design Reports (PDRs), and relevant reports. The installed capacity of the project is 20MW, therefore, the benchmark of 10% in the document SL16-95 as mentioned above is applicable to the project. Furthermore, in Preliminary Design Report (the PDR was completed by the Institute which is a certified and independent designed institute and also was approved by the Water Resources Bureau of Guangdong Province), the benchmark of 10% is used based on the document (SL-95) and therefore the document (SL-95) is still valid and appropriate on the date of investment decision. Therefore, the project is also appropriate to employ the benchmark of 10% listed in document (SL-95) in PDD requesting registration.

[1]<http://www.cws.net.cn/guifan/bz/SL16-95/>

[2] <http://www.ches.com.cn/jishubiao/hun/001.htm>

[3] <http://www.jxsly.com:6203/zy/syyw/qt/2007/slbz/1.htm>, confirmed by Water Resources and Hydropower Planning and Design General Institute of the Ministry of Water Resources of the People’s Republic of China

Response of DOE	“Economic Evaluation Code for Small Hydropower Projects” (SL16-95), published by the Ministry of Water Resources of People’s Republic of China in 02/06/1995, is commonly accepted as standard for financial analysis of small hydropower plants in China for the past few years and is still valid at the time of the validation. Evidence has been obtained and checked by the validators. Many registered small hydropower plants in China are all referring to SL16-95 for benchmark and financial analysis approach, etc. This project activity, located in Shaoguan City of Guangdong Province, with installed capacity 20MW, qualifies as “small hydropower plant”. Detailed evidences which were checked by the DOE and assessed to be correct, are listed in PP response thus won’t be repeated here again. In conclusion, it is quite appropriate to use SL16-95 for investment analysis of this project and in particular 10% for project IRR benchmark according to SL16-95. If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person: Mr. Li Yong Jun CDM project manager China Room 11C, East Ocean Centre II, No. 618 Yan An Rd. (E), Huangpu District, Shanghai China 200001 Tel: +86 (0)21 53855353-259 Fax: +86 (0)21 53855369
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Request for Review (3)	
Issue raised by EB Members / DNA	<i>The DOE is requested to further clarify the suitability of the input values to the investment analysis as per the requirements of EB 38 paragraph 54(c) guidance, in particular, suitability of annual electricity generation and annual power supplied to the grid.</i>
Response of project participant	According to paragraph 54 of the EB 38 report: <i>“54. The Board clarified that in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities, DOEs are required to ensure that:</i> <i>(c) 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.”</i> The input values are sourced from approved PDR and PER. The PDR and PER were completed by Hunan Hydro and Power Design Institute. This Institute is an independent organization which is qualified to compile design reports for hydropower projects (it has obtained class A the “Engineering Design Certificate” and “Engineering Investigation Certificate” issued by the Ministry of Construction of the People’s Republic of China).

Because the project has started to operate, in order to prove the conservativeness of the input values in the PDD for requesting registration, the important input values in PDD can be cross-checked by the actual values.

Table 2: The Designed Data in PDD and Actual Values

	Value in PDD	Actual Value	Comment
Annual utilization hour	3,702h	2,378h ^[4]	The annual utilization hour used in investment analysis in PDD is more conservative than the data of actual operation.
Annual electricity generation	74,030MWh	47,555.02MWh ^[5]	The annual electricity generation used in investment analysis in PDD is more conservative than the data of actual operation.
Annual power supplied to the grid	68,580MWh	45,587.542MWh ^[6]	The annual power supplied to the grid used in investment analysis in PDD is more conservative than the data of actual operation.
Tariff	0.42Yuan RMB/kWh with VAT	0.432 Yuan RMB/kWh with VAT (power sale invoice and circularize of tariff from Shaoguan City Price Bureau)	The actual tariff is slightly higher than tariff investment analysis in PDD. However, even if use the actual tariff, the IRR is still lower than the benchmark of 10%.
Total investment	229,700,000 Yuan RMB	286,719,600.19 Yuan RMB (Finance Audit Report)	The lower total investment of 229,700,000Yuan RMB used investment analysis in PDD is more conservative.
Annual operational cost	4,005,600 Yuan RMB	4,269,900 Yuan RMB (See detail in the following context)	The annual operational cost used in investment analysis in PDD is more conservative.

Annual Operational Cost

The annual operational cost is calculated according to the data from the approved PDR. Based on the PDR, hydropower No [1995]186 documents and Interim Regulations of Hydropower Construction Project Financial Evaluation, the annual operational cost mainly includes salary, overhaul cost, welfare fund, water charges, other cost, the property Insurance and the maintenance expenses of reservoir. The parameters used to calculate the annual operational cost of the project have been analyzed respectively:

[4] The actual annual electricity generation is 47,555.02MWh from June 2007 to May 2008. Therefore the actual annual utilization hour is 2,378h.

[5] The actual annual electricity generation is 47,555.02MWh from June 2007 to May 2008.

[6] Based on the settlement bills, the actual annual power supplied to the grid is 45,587.542MWh from June 2007 to May 2008.

	● Based on the document SL16-95, and considering the hydropower project with an installed capacity greater than 6MW, the minimum employees should be 48 persons. In addition, there are 42 persons for operation of the project based on the Payroll Record of employees. While based on the PDR, the IRR calculation of the PDD uses 32 persons, which is conservative. ● Based on the document SL16-95, the average rate of overhaul cost is 1%, which is fixed and consistent with the values (1%) in IRR calculation of the PDD; ● Based on the document SL16-95, the average value of other cost is 12 Yuan/kW , which is fixed and consistent with the IRR calculation of the PDD; ● Based on the document SL16-95, the welfare fund for employees should be 14% of the total salary, which is fixed and consistent with the IRR calculation of the PDD. Based on the relevant regulations published by China government, the employee's insurance is within 26% of the total wage, which the value of 20% in the IRR calculation of the PDD is in compliance with; the average value of the housing provident fund is about 5%-12% of the total wage, which the value of 6% in the IRR calculation of the PDD is in compliance with. ● According to Information of Collection of Water Charge (Doc: Shaofufa[1996]68) in Shaoguan City published by Shaoguan City Government, the water charge of hydropower station should be 0.003Yuan RMB/kWh, which is fixed and consistent with the value in IRR calculation of the PDD. ● Based on Interim Regulations of Hydropower Construction Project Financial Evaluation, the maintenance expenses of reservoir should be 0.001yuan/kWh, which is fixed and consistent with the value in IRR calculation of the PDD. ● In addition, based on the PDR, the property Insurance is 0.25% of fixed assets. In IRR calculation of the PDD, the property Insurance is 574,300yuan RMB annually. According to the Contract of Property Insurance of the project, the property Insurance is 256,414.18yuan RMB annually, which is slightly lower than the one in IRR calculation of the PDD. ● Based on the PDR, the IRR calculation uses 12,000Yuan RMB/person as the annual employee salary. While according to the Payroll Record of employees of the project, the actual annual employee salary of the employees is 19,044Yuan RMB/person, which is higher than the payroll in IRR calculation of the PDD. Most data of annual operational costs are fixed and comparatively stable, but the salary of the employees has been increased from 12,000Yuan RMB/person annually to 19,044Yuan RMB/person annually, and the employees also increased from 32 persons to 42 persons. Only the property Insurance decreased from 574,300yuan RMB annually to 256,414.18yuan RMB. Thus the actual annual operational cost will be increased to 4,269,900Yuan RMB. Therefore, the actual annual operational cost is higher than the values in investment analysis in PDD.
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[7] The coefficient of effective electricity is the ratio of actual annual power generation and designed annual power generation.

[8] In Section 3.2.1, 3.2.2, and 3.4 of the SL 16-95 regulation it is stated that the power supply to the grid by a project is calculated as the annual designed electricity generation $\times$ coefficient of effective electricity $\times$ (1 – auxiliary power consumption) $\times$ (1 – the line losses). The annual designed electricity generation $\times$ coefficient of effective electricity is the effective electricity generation (which is based on amongst others the load factor, the electricity balance of the local grid, and the frequency of equipments overhaul and damages. Section 3.4 of SL 16-95 further specifically states that for simplification purpose, the coefficient of effective electricity can be chosen from the table 3.4 in the SL 16-95 document.

[9] Please see: http://www.chinawater.net.cn/guifan/bz_pdf/SL76-94/05.pdf

[10] Published by the Ministry of Water Resources of the People's Republic of China

Annual electricity generation and annual power supplied to the grid

According to above description, it is concluded that annual electricity generation and annual power supplied to the grid in PDR are lower than the actual values. Therefore, the values used in investment analysis in PDD are more conservative and appropriate.

According to PDR, the average annual designed electricity generation is 74,030MWh, the coefficient of effective electricity^[7] is 0.93 and auxiliary power consumption is 0.5%. The annual power supplied to the grid of 68,580MWh is calculated based on coefficient of effective electricity (0.93) and auxiliary power consumption (0.5%):
According to below calculation formula: ^[8]

The annual power supplied to the grid = the annual designed electricity generation × coefficient of effective electricity × (1 – auxiliary power consumption) × (1 – the line losses)

The calculation values comes from PDR which was completed by the Institute based on the “the Economic Evaluation Code for Small Hydropower Projects (SL16-95)”. Therefore, the annual power supplied to the grid employed in the IRR calculation is reasonable and conservative.

- The coefficient of effective electricity of 0.93 is sourced from approved PDR and is further confirmed by the Hydroenergy Design Code for Hydro Power Projects (SL76-94) approved by the Ministry of Water Resources of the People’s Republic of China: ^[9]
 - ✧ For small scale hydropower stations (with an installed capacity below 50MW), the coefficient of effective electricity and effective power generation should be calculated according to the Economic Evaluation Regulation for Small Scale Hydropower Projects (SL16-92), which was substituted by “the Economic Evaluation Code for Small Hydropower Projects (SL16-95)”. As per this guidance different coefficients for energy efficiency are applicable:

Table 3: The coefficient of effective electricity for different type of hydropower stations:

Type of hydropower stations	The coefficient of effective electricity
1.Grid connected, annual/ multi-year regulating hydropower stations	0.95-1.00
2.Grid connected, seasonal regulating hydropower stations	0.90-0.95
3. Grid connected, monthly/weekly/daily regulating hydropower stations	
The grid will take all electricity generated in rainy season and night	0.80-0.90
The grid will only take part of the electricity generated in rainy season and night	0.70-0.80
4. Not connected to the grid, Daily/No regulating capacity	0.80-0.90

- ✧ The installed capacity of the project is 20MW and the project is a daily regulating hydropower station. In accordance with the Table 3 above from “the Economic Evaluation Code for Small Hydropower Projects (SL16-95)”. The coefficient of effective electricity should choose 0.70-0.90. However, the Institute has employed 0.93 as coefficient of electricity generation. This is a conservative choice as a higher coefficient leads to higher power supply and therefore an overestimation of the IRR will occur compared with employing a lower value as coefficient of electricity generation. Furthermore, the actual annual electricity generation of the project from June 2007 to May 2008 is 47,555.02MWh, while the designed annual power generation in PDR is 74,030MWh. Therefore, the actual coefficient of effective electricity is 64.24%, much lower than expected in PDR. Therefore, the coefficient of effective electricity of 0.93 used in PDD for requesting registration is credible and conservative.
- ✧ Besides, Local Grid Company (which the project connected) issued an explanation (attached as evidence to the response on the review) and the reasons to prove the validity of the coefficient of effective electricity of 0.93. The main reasons are as following:
 Since the connecting way for the project is the single line connection, the capacity for anti-accident is quite weak. Shaoguan City is located in the area that thunder happened frequently, the power generation in abundant water reason will be influenced to some extent.
 The project is the run of river hydropower station with low water head. In the abundant water season, when the water is becoming much more, large amount of water will be abandoned for the purpose of flood preventing;
 The project takes the responsibility of peak regulation under the dispatching of local Grid and it is has to operate under the low water level, the water resources utilization efficiency is quite low.
- ✧ Furthermore, the actual annual electricity generation of the project from June 2007 to May 2008 is 47,555.02MWh, while the designed annual power generation in PDR is 74,030MWh. Therefore, the actual coefficient of effective electricity is 64.24%, much lower than expected in PDR. Therefore, the coefficient of effective electricity of 0.93 used in PDD for requesting registration is credible and conservative.

- In PDR the line losses is zero. In fact, the power generated is connected to the substation of Grid Company and the line losses from the project to substation were covered by the project owner. Therefore, the calculation method in PDR and PDD for requesting registration is more conservative to be used for calculation of power supplied to the grid.

The 0.5% for auxiliary power consumption is based on the “Economic Evaluation Code for Small Hydropower Projects (SL16-95)”. According to this guidance, auxiliary power consumption is to be determined based on the actual situation or referred to from other similar projects. Based on “the regulation of development programming of electrical power in the region mainly supplied by rural hydropower (SL22-92)”^[10], auxiliary power consumption has been determined as 0.5% by the independent institute preparing the PDR. In addition, the actual annual auxiliary power consumption is 3.36% from June 2007 to May 2008, which is higher than 0.5% in PDR. Therefore, the 0.5% of auxiliary power consumption used in investment analysis in PDD for requesting registration is more conservative. It can be concluded that the net annual power supply to the grid used in the IRR calculation is reasonable and conservative at the time of investment decision.

In conclusion, based on the cross-check above, the important input values used in the

	financial analysis is reasonable and more conservative than the actual values. Therefore, the input values employed in the investment analysis are appropriate and valid which is consistent with the EB 38 guidance, paragraph 54(c).
Response of DOE	Detailed assessment of input values used in investment analysis can be found in Table 4 of FVR. Background research and cross-check is done for the input values In particular for electricity generation and supply: Annual electricity generation (74,030MWh) = project capacity (20MW) * annual operation time (3701.5 hours). Annual power supplied to the grid = "annual electricity generation (74,030MWh)" * "effective electricity rate (0.93)" * (1- plant use rate (0.5%)). The project capacity 20MW and the operation time 3701.5 hours are from PDR, estimated by the design institute according to hydraulic condition and design. The effective electricity rate 0.93 is also from PDR. It is higher than recommended highest effective electricity rate (0.90) in SL16-95 thus is conservative. The plant use rate 0.5% is also from PDR. The actual electricity generation during the period of June 2007 to May 2008 is 47555.02 MWh, lower than the value used in IRR calculation. Calculated from that, the actual average operation time during the period of June 2007 to May 2008 is 2378 hr, much lower than the value used in IRR calculation. The actual electricity supplied to the grid during the period of June 2007 to May 2008 is 45587.542 MWh, much lower than the value used in IRR calculation. All evidences have been carefully checked by the validators. Thus the values used in IRR calculation are reasonable and conservative. The validator can confirm that the values were checked and assessed in conformance with the guidance in EB38, paragraph 54 (c). All information provided by the project participant has been checked and can be confirmed. Thus in conclusion TÜV NORD confirms that the values, the IRR calculation is based on, are valid and applicable at the time of the investment decision. If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person: Mr. Li Yong Jun CDM project manager China Room 11C, East Ocean Centre II, No. 618 Yan An Rd. (E), Huangpu District, Shanghai China 200001 Tel: +86 (0)21 53855353-259 Fax: +86 (0)21 53855369