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Members of the CDM Executive Board
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Dear Members of the CDM Executive Board,

Request for review –Shunchang Yangkou Hydro Power Project, Fujian, China (Project No.: 2008)

Please find below our responses to the issues raised as part of the request for review for this project.

1. The DOE should clarify how it has validated the investment analysis, in particular: (a) the suitability of the input values as per the requirements of EB 38 guidance, paragraph 54; and (b) the net electricity exported to the grid (183,632 MWh) since the expected annual power generation is 204,700 MWh.

Response:

(a) Though FSR finalized in May of 2003, however it was validated in December of 2003 by an independent third party and approved in April of 2004 by Development and Reform Committee of Fujian Province. Then the Project Entity (PE) signed generator procurement agreement on 16-12-2004 and started construction on 01-01-2005. So it is unlikely that the input value from FSR would have materially changed during this period. On the other hand, since the proposed project is completed and have been put into commissioning since July of 2007. For key parameters (tariff, total investment, O&M cost and on-grid electricity), the true data from practice are compared with the input value for investment analysis and showed on table 1 below.

It is noted that tariff input value for IRR calculation was not from FSR, but from tariff investigation study conducted by PE in 2003. On 1st of July 2003, following Notification Regarding Reguating Electricity Tariff of NDRC (JJG【2001】No.701), Fujian Provincial Pricing Administration re-adjusted

and re-identified electricity tariff for all of power plants in Fujian[1]. It was found that new tariff of the hydropower plants upstream(Mowu) and downstream(Xiayang) was identified as 0.30CNY/KWh and 0.34CNY/KWh respectively. It was likely that the tariff of the proposed project would be between 0.30CNY/KWh-0.34CNY/KWh since it has similar installed capacity (48MW) with Mowu(30MW) and Xiayang(43.8MW) and is located at the same river(Futun River) and same area(Shunchang). Meanwhile, it was also noted that most of hydropower plants had tariff of 0.24CNY/KWh, 0.26CNY/KWh and 0.28CNY/KWh. Market investigation also found that the tariff of Xiayang was reduced from 0.3661CNY/KWh in 2002[2] to 0.34CNY/KWh in 2003. Hence 0.31CNY/KWh of tariff was identified for investment analysis.

In particular, for the total investment, by the end of 2008, it has come out 489,631,400, which is a little higher than input value for investment analysis. So far, the project is still under construction and the total investment is estimated to be 515,000,000. These data was also confirmed by Sinohydro Engineering Consulting (Middle-South Office) who is the supervision company of the proposed project.

The table showed that the total investment has increased, on-grid electricity remained almost the same with FSR, electricity tariff decreased by 9.7%, and O&M cost possibly decreased though the data for December hasn't come out yet. However, the sensitivity analysis below will indicate O&M cost is not sensitive to IRR. As a result, the input value for IRR calculation is conservative for additional analysis.

Table 1 The Comparison of input value for investment analysis with true data

Parameter	Value for investment analysis	Value from Practice	Results
Total investment (X104CNY)	45,901.86=45,997.9-96(current capital) FSR	48,963.14 by the end of 2008 Estimated to be 51,500 at the end	could be +12%
On-grid electricity (MWh)	183,632 FSR	181,544.56	-1.14%
Tariff with VAT (CNY/KWh)	0.31 Expected price	0.28 (Invoice issued by grid company during 03/2008-01/2009)	-9.7%
O&M cost(X10^{4}CNY)	956.92 on average 1,122.80 in the 5th year	693.37 for first 11 monthes of the 5th year.	For reference

[1] Fujian Provincial Pricing Administration(2003), Notification Regarding Re-adjust and Identify On-grid Tariff, MJ【2003】No.310, 01-07-2003

[2] http://www.fjjg.gov.cn/fjwjj/zwxxgk/zwgkznjml/jgsfgl/spjggl/webinfo/2002/02/1206687522915990.htm

	Total cost 2,937.13 and 4,920.80 in the 5th year	Total cost 5,288.61 for first 11 monthes of the 5th year	

Note 1: the true data is provided by the PE.

(b) The expected annual power generation (204,700 MWh) was a theorical data which calculated by design institute based on 60 years official hydrological statistics (April 1939-March 1999, April 1968-March 1978 day flow) (source: FSR P4-6) and the hydroelectricity development planning of Futun River. It is a definite data. The net electricity exported to the grid, i.e on-grid electricity (183,632 MWh), is equal to the expected annual power generation multiply by the Effective Electricity Factor (90%). The value 90% of EEF for the proposed project is an experience data which identified by design institute based on operation data from similar hydropower plants in Fujian. It relates to self use consumption, electricity loss, equipment or system function rate, generators efficiency, and Grid dispatch factor etc. (FSR: P14-4).

In order to check the rationality of 90% of EEF, the operation data (2008) of the proposed project and operation data during 2003-2008 from another similar installed capacity hydropower plant (30MW, upstream) are collected and showed on the table 2 below. So the value of 90% of EEF is reasonable.

In conclusion, it is appropriate to assume the expected annual power generation and the net electricity exported to the grid as 204,700MWh and 183,632 respectively.

Table 2 On-grid electricity and EEF for the proposed project and Mowu

	Expected annual power generation(MWh)	On-grid electricity(MWh)	EEF
The proposed project(01/2008-12/2008)	204,700	181,544.56	88.69%
Mowu Hydropower Plant up stream with capacity 30MW (2008)	132,000	112,184.10	85%
Mowu 2007	132,000	109185.10	82.72%
Mowu 2006	132,000	127627.70	96.69%
Mowu 2005	132,000	107951.50	81.78%
Mowu 2004	132,000	73488.80	55.67%
Mowu 2003	132,000	105199.20	82.72%

2. The DOE should explain how it has validated the sensitivity analysis, in particular: (a) why the PLF has not been included in the analysis; and (b) that the IRR is not likely to cross the benchmark.

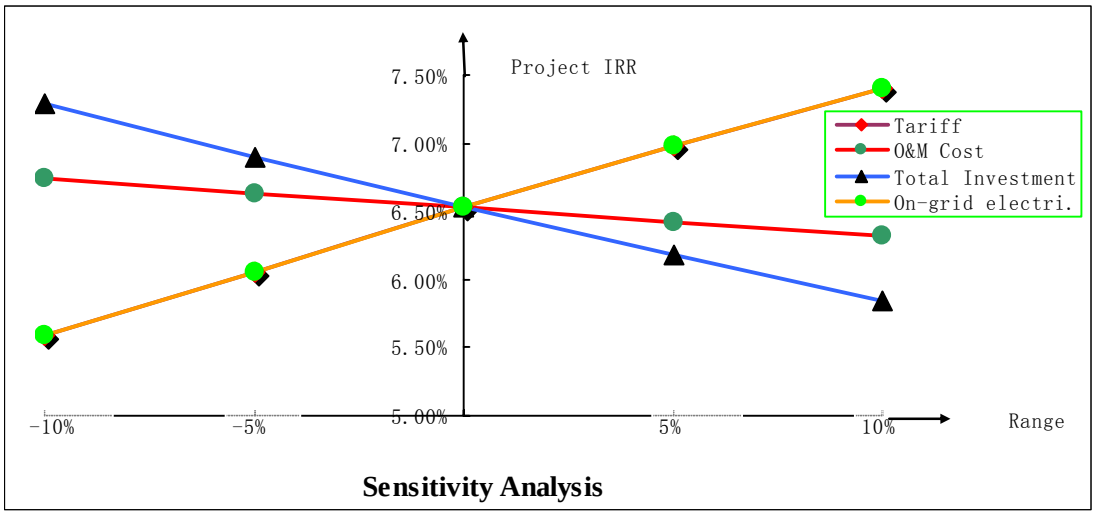
Response

(a) The PLF should be included in the sensitivity analysis by on-grid electricity. The new revision is as below and PDD has been revised accordingly.

Plant Load Factor(PLF) multiply by 8,760 hours is operation hours. And operation hours multiply by installed capacity is on-grid electricity. As installed capacity is a constant,so the variation of PLF will be indicated on on-grid electricity, vice-versa. The revision sensitivity analysis including parameter of on-grid electricity is showed on table 3 below.

Table 3 Variation of IRR to the parameters alteration

Parameters	-10%	-5%	0%	5%	10%
Total investment cost	7.29%	6.90%	6.54%	6.18%	5.85%
On-grid electricity	5.55%	6.05%	6.54%	6.98%	7.41%
Tariff	5.55%	6.05%	6.54%	6.98%	7.41%
O&M cost	6.74%	6.63%	6.54%	6.43%	6.32%



(b) In order to check the probability of IRR cross benchmark (8%), a calculation is conducted to show the parameter variation when IRR reach the benchmark and showed on table 4 below.

Table 4 Variation of parameters needed to reach the 8% benchmark

Parameters(benchmark)	8%
Total investment	-14.30%
O&M cost	-100% (7.4%)
Tariff	+19%
On-grid electricity	+19%

For total investment: the table shows that the IRR will reach the benchmark if the total investment is decreased by 14.3% . In reality, the total investment has

reached 48,963.14×10^4CNY by the end of 2008 which exceed the input value for IRR calculation. So the IRR wouldn't cross the benchmark.

For O&M cost: the table showed that even if the O&M cost is reduced to zero, the IRR still won't reach the benchmark.

For Tariff: On 1st of July 2003, following Notification Regarding Reguating Electricity Tariff of NDRC (JJG【2001】No.701), Fujian Provincial Pricing Administration re-adjusted and re-identified electricity tariff for all of power plants in Fujian[3]. It was found that new tariff of the hydropower plants upstream(Mowu) and downstream(Xiayang) was identified as 0.30CNY/KWh and 0.34CNY/KWh respectively. It was likely that the tariff of the proposed project would be between 0.30CNY/KWh-0.34CNY/KWh since it has similar installed capacity (48MW) with Mowu(30MW) and Xiayang(43.8MW) and is located at same river(Futun River) and same area(Shunchang). Meanwhile, it was also noted that most of hydropower plants have tariff of 0.24CNY/KWh, 0.26CNY/KWh and 0.28CNY/KWh. Market investigation also found that the tariff of Xiayang was reduced from 0.3661CNY/KWh in 2002[4] to 0.34CNY/KWh in 2003. Hence 0.31CNY/KWh of tariff was identified for investment analysis. This price is a little higher than the average tariff 0.278CNY/KWh of 2001-2003 in Fujian[5]. In reality, the current tariff is 0.28CNY/KWh which is 9.7% lower than the input value for IRR calculation. And such tariff is not likely to increase since the tariff tendency in Fujian is going down year by year[6] due to the fierce competition resulted from tariff reform. Thereby, it is highly unlikely that the average tariff will increase by 19% and thus the IRR also unlikely to reach the benchmark.

For on-grid electricity: As stated above, the input value of the on-grid electricity is equal to the expected annual power generation multiply by the Effective Efficiency Factor (EEF). And the expected annual power generation is calculated by design institute based on 60 years official hydrological statistics, the EEF is identified by design institute based on multi-year operation data from similar hydropower plants in Fujian. Actual data under normal circumstances may vary slightly. The reality data of on-grid electricity of 2008 (181,544.56MWh) remains almost the same with expectation (183,632MWh, -1.14% difference). Therefore, the average on-grid electricity is unlikely to increase by 19% and the IRR also

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[3] Fujian Provincial Pricing Administration(2003), Notification Regarding Re-adjust and Identify On-grid Tariff, MJ【2003】No.310, 01-07-2003

[4] http://www.fjjg.gov.cn/fjwjj/zwxxgk/zwgkznjml/jgsfgl/spjggl/webinfo/2002/02/1206687522915990.htm

[5] Wang, Xianglian 2006. The Analysis of on-grid electricity tariff of small hydropower plants in Fujian. *China Rural Hydropower & Electrification* (3)21-23.

[6] Wang, Xianglian 2006. The Analysis of on-grid electricity tariff of small hydropower plants in Fujian. *China Rural Hydropower & Electrification* (3)21-23.

very unlikely to reach the benchmark.

In conclude, the IRR of the proposed project is very unlikely to cross the benchmark.

3. The DOE should clarify how it has validated the common practice analysis including the capacity chosen (20~50 MW) as the installed capacity of the project activity is 48MW and a capacity range of "similar" projects between + and - 50%, i.c 25 - 75 MW would have been more appropriate.

Response:

Other activities similar to the proposed activity

According to the authority documents, similar scale projects between ±50% of the proposed project are more appropriate for common practice analysis. Moreover, in 2002, “Notification Regarding the Regulatory and Institutional Reformation Plan in China’s Power Sector” was released by the State Council of PRC. It initiated the power sector regulatory and institutional reformation in China (including tariff reform). Since then electricity tariff is identified by market force gradually instead of being set up by government as before. So only the hydropower plants started operation after 2002 are deemed as same circumstance as the proposed project. Hydropower plants with installed capacity range between 25MW-75MW and started operation after 2002 or those under construction in Fujian province are listed in table 5 below. It is noted that hydropower plants with installed capacity range between 25MW-75MW in Fujian province that have been opened for GSC are excluded from table 5.

Tab**le 5 List of Similar Installed Capacity Hydropower Plants in Fujian Province**

Name	Capacity (MW)	Commissioning	Total Investment (10^8CNY)	Unit Capacity Investment (CNY/W)
Dayang[7]	32	2004	2.1699	6.750
Wangkeng[8]	40	2004	2.4388	6.095
Shuangkoudu[9]	35	2005	2.100	6.000
Shangpei[10]	51	2005	2.4569	4.817
Zhaokou[11]	60	2006	4.9960	8.326
Baisha[12]	70	2006	5.4600	7.800

[7] http://www.86ne.com/Ocean/200601/Ocean_33118.html

[8] http://www.ndsl.gov.cn/upload/200592605056%E5%B1%8F%E5%8D%97%E5%8E%BF.mht

[9] http://www.ningde.gov.cn/jrnd/xsdt/23345.html

[10] http://www.ndsl.gov.cn/upload/200592605056%E5%B1%8F%E5%8D%97%E5%8E%BF.mht

[11] http://www.ningde.gov.cn/jrnd/xsdt/23345.html

The proposed project	48	2007	4.5998	9.583

Note: Longxiang(74MW) and Xindian(34MW) are still on preliminary stage[13]

Source: Consulting with experts from Shunchang County Water Resource Bureau Fujian Province Water Resource Bureau and broad literature review.

Discuss any similar options that are occurring

It is noted that the unit capacity investment of the proposed project is the highest amongst Table 5. Even for Zhaokou which unit installed capacity investment is the closest to the proposed project, it is still 13.11% lower than the proposed project. So under the circumstance of competitive on-grid tariff, the proposed project can't compete with other hydropower plants listed on Table 5. Hence, the proposed project is distinct differ from other similar capacity hydropower projects in the Fujian Province and not a common practice.

The common practice analysis of PDD has been revised accordingly.

4. The DOE is requested to clarify how the project start date complies with the CDM Glossary of terms and to confirm that continuing and real actions were taken to secure the CDM status for the project activity in parallel with its implementation, taking into consideration that validation started 1,5 year after the project start date.

Response:

Project starting date

According to the EB documentation of Glossary of CDM terms, the starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. Because the procurement agreement for the generators of the proposed project was signed on the date of 16-12-2004 which is earlier than the date of construction starting(01-01-2005). So the starting date of the proposed project is defined as 16-12-2004. The PDD has been revised accordingly.

The Backgound of the implementation of the proposed project

FSR indicates that if the IRR of the proposed project need to reach the benchmark (8%), then the tariff must to be set at 0.364CNY/KWh. In 2002, the Chinese State Council issued the Notification on the Power System Reform (GF【2002】No.5 which initiated tariff competition to encourage lower electricity cost. Following the reform policy, on 01-07-2003, Fujian Provincial Pricing Administration re-adjusted and

[12] http://www.ningde.gov.cn/jrnd/xsdt/23345.html

[13] http://www.yongtai.gov.cn/typenews.asp?id=5757

re-identified electricity tariff for all of power plants in Fujian[14]. It was found that the average on-grid tariff only 0.274CNY/KWh, So the PE considered that the tariff of 0.364CNY/KWh would not have advantage in tariff competition then the proposed project was therefore being delayed. It was only at the end of 2004, CDM conception was introduced in the 2nd board meeting. The PE learned that potential CDM revenue could help the proposed project to improve competitiveness on tariff. This encouraged the PE to resume their investment in the proposed project. The PE signed generators procurement agreement and started project construction at the begining of 2005.

The PE started to work on CDM development at that time. However, the inquiry to Shunchang County Development & Reform Committee couldn't get much help. At the beginning of 2005, the CDM in China just sprouted up, so it was really hard to precede CDM development. The process went very slowly due to the lack of CDM knowledge, language skills and relevant instruments in Fujian. It is only in the middle of 2006, after attending a capacity building meeting hold by the NDRC in Haerbin, PE had clearer idea on how to develop CDM and realized that it was better to commit a professional consultation company to do such work.

Up to present the PDD work has started, the PDD was submitted to DOE for GSC on 7th of July 2007 and Chinese LOA was obtained in 30th of September 2007. The details of the implementation of the proposed project are showed on the table 7.

Table 7 the Implementation Timeline of the proposed CDM project

Stage	Date	Source
Feasibility Study Report Finalization	05-2003	
EIA	07-2003	
EIA approve	04-08-2003	MHBJ【2003】No.56
FSR Approve	21-04-2004	MJJC【2004】No.460
Consideration of CDM	20-11-2004	
Procurement Agreement（Turbine Hydroelectric Generator）	16-12-2004	
Construction start date	01-01-2005	
Commission for CDM Development	06-11-2006	
Open for Global Stakeholder Consultation	12-07-2007	
LoA (China)	30-09-2007	FGQH 【 2007 】 No.2580
First generator start date	28-07-2007	
Second generator start date	08-08-2007	
Third generator start date	28-08-2007	

[14] Fujian Provincial Pricing Administration(2003), Notification Regarding Re-adjust and Identify On-grid Tariff, MJ【2003】No.310, 01-07-2003

More details of the implementation of the proposed CDM project have been included in the revised PDD.

5. The data used to calculate the grid emission factor in the PDD submitted for registration was not available at the commencement of validation (July 2007). The PP and DOE are therefore requested to amend the grid emission factor using data which was available at this date.

Response:
Following up to the request by EB, the data published by DNA (China) on 15 Dec. 2006 is adopted for the grid emission factor calculation. The grid emission factor and the estimation emission reduction calculation of the proposed project are revised as below. The more details data please refer to revised PDD. PDD has been revised accordingly.

Grid emission factor

EF_{OM}	0.9411 tCO2/MWh
EF_{BM}	0.7869 tCO2/MWh
EF_{CM}	0.864 tCO2/MWh

Calculation of estimated emission reduction
(a) The calculation of baseline emission,
BEy= EGnet,y • EFy = 183,632×0.8640=158,658 tCO2e.

(b) The calculation of project emission, because the power density of proposed project equal to 7.78W/m^2, which is greater than 4W/m^2 and less than 10W/m^2, according to feasibility study, the value of EGy is 204,700MWh, then:

$$PE_y = \frac{EF_{Res} \cdot EG_y}{1000}$$ =(90×204,700)/1000=18,423 tCO2e.

(c) The calculation of emission reduction:
ERy = BEy – PEy – Ly = 158,658– 18,423 – 0=140,235 tCO2e