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	Javier Castro	Javier.Castro@tuev-sued.de			

Request for Review

Dear Sir or Madam,

Please find below the response to the review formulated for the CDM project with the title “Shunchang Yangkou Hydro Power Project, Fujian, China” with the registration number 2008. In case you have any further inquiries please let us know as we kindly assist you.

Best regards

Javier Castro
Carbon Management Service

Annex:

Annex 1: information reference list

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Request 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 from DOE:

All input data except the tariff in the investment analysis are taken from FSR (Feasibility Study Report), which was completed in May, 2003 and approved on April 21, 2004. The project owner got the confirmation regarding the power tariff in 2004 from market analysis in Fujian province on December, 2004 (IRL41). It is a lower tariff than that expected in FSR, which leads to a lower IRR. After considering the revenues of CDM, the project owner holds a board meeting to establish a CDM team for the proposed project(Nov.20, 2004 ,IRL21). The project owner made the investment decision of the proposed project along with the turbine purchase contract issued (i.e. Dec 16, 2004). In other words, the date when the turbine purchase contract has been issued by the project owner is considered by the PP as the date to make the investment decision. These periods are relatively short and it is unlikely that the input values from the FSR would have materially changed.

TÜV SÜD has experienced local experts too confirm that the input values from the FSR are valid and applicable at the time of the investment decision. The input values have also been validated by comparing the figures with statistical figures from 250 projects in China (validated by TÜV SÜD).

Total Static Investment

It is presumed to be 459.98 million RMB in the FSR. The investment per MW was calculated to be about 7.7 million RMB/MW, which are slightly lower than the average cost off 9.6 million RMB/MW, but the difference is still less than the average deviation. The turbine and generator purchasing contract and the finacial report were provided and compared with the investment cost listed in FSR. The respective actual investment cost for turbine and generator purchasing is 81.54 Million RMB. The proposed project is still under construction (nearly finished), the total investment had reached 489.63 Million RMB. It is higher than corresponding estimated investment as 459.98 Million RMB in the FSR. Evidence was available for the Audit team such as confirmation letter on investment cost issued by the project owner on 12/Jan/09 to the Audit team and attached to this response (IRL44),confirming the values described above. Based on the amount of the already realized investment it can be concluded that the assumptions are within a reasonable range. Therefore the far lower unit investment of the proposed project is conservative and reasonable.

As evidence, the contracts and confirmation letter on investment cost (IRL42, 44) were verified by the local audit team of the DOE.

Annual O&M costs

The annual operation costs of total investments are 6.93 Million RMB for the first 11 months. Equipment depreciation and employee number are specified in FSR respectively as 11.23 Million RMB. The results of the sensitivity analysis demonstrate that even if the project incurred zero operating costs - which is not feasible - the IRR of the project would remain below the benchmark 8%. The annual O&M costs used for calculations represent 1,4% of the total investment and are in line to the other hydro project validated by TÜV SÜD, the value can be considered as feasible.

Power supply of the plant

The plant is estimated to operate about 4264 hours per year. The annual operating hours in the FSR were calculated based on the water resource of the river in past 60 years (1939~1999). The

river-flow data evidence was provided to the DOE. TÜV SÜD checked the applied values thoroughly and based on local and sectoral expertise, TÜV SÜD confirms that these values are realistic and credible and appear to be valid at the time the investment decision was made.

Tariff

The electricity tariff used in the PDD was in accordance with the result of market analysis (IRL41) and in accordance with the tariff of another hydropower plant upstream of the same river, 0.31 Yuan RMB/ kWh implemented has been verified. The electricity tariff applied in the PDD can be taken as appropriate. Hence, the electricity tariff applied in the PDD can be taken as appropriate. Hence, TÜV SÜD deems that the applied tariff in the PDD is appropriate and valid.

PLF

The expected annual power generation (204,700 MWh) was a theory data which calculated by design institute based on 60 years official hydrological statistics (IFL8) and the hydroelectricity development planning of Futun River. The net electricity exported to the grid i.e on-grid electricity (183,632 MWh) equal to expected annual power generation multiply by plant load factor (PLF) (90%). The value 90% of PLF for the proposed project is an experience data which identified by design institute but based on operation data from similar hydropower plants in Fujian.

For small scale hydropower stations (with an installed capacity up to 50MW), the coefficient of effective electricity and effective power generation should be calculated according to the Economic Evaluation Regulation for Small Scale Hydropower Projects , which was substituted by "the Economic Evaluation Code for Small Hydropower Projects", whose in Table below provides an overview of applicable coefficients for energy efficiency as follows:

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/no regulating (run-of-river) 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	0.60-0.70

The installed capacity of the project is 48MW and the project is a run-of-river hydropower station. In accordance with the Table in "the Economic Evaluation Code for Small Hydropower Projects (SL16-95)" as listed above, the coefficient of effective electricity should choose 0.70-0.90. The Design Institute has chosen to employ the higher value of 0.90 as the coefficient of electricity. This is a comparatively *conservative* choice as a higher coefficient leads to higher power supply and therefore an overestimation of the IRR compared to employing a lower values as coefficient of electricity generation.

In addition, the coefficient of effective electricity is the result of the balance between the local grid absorption capability in the dry and rainy seasons, taking into consideration the demand for power in the two periods. In particular has been evidenced the coefficient of effective electricity reflects the conditions of insufficient water availability during

In summary, TÜV SÜD checked the applied values thoroughly and based on its local and sectoral expertise, TÜV SÜD confirms that the criteria of EB38, (54) is also ful-filled successfully.

Request 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 from DOE:

Plant load factor (PLF) is an experience data which identified by design institute based on multi-years operation data from similar hydropower plants in Fujian province. It relates to self use consumption, equipment or system function rate, generators efficiency, Grid dispatch factor etc. And expected annual power generation as a theory data is identical, so the variation of PLF will be indicated on on-grid electricity. Vice-versa, on-grid electricity will indicate the variation of PLF. So the revision sensitivity analysis which includes parameter of on-grid electricity is showed to DOE.

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 to auditing team of DOE.

The total investment is decreased by 14.3%, then the IRR will reach the benchmark.

The O&M cost is reduced to zero, the IRR still won't reach the benchmark.

The current tariff is 0.28Yuan RMB/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 province is going down year by year[1] due to fierce competition resulted by tariff reform. Thereby, it is high unlikely that the average tariff will increase by 19% and the IRR also unlikely to reach the benchmark.

The reality data of the electicity sell to the grid of 2008 (181,544.56MWh) remains almost same with expectation (183,632MWh). Thereby, the average on-grid electricity is unlikely to increase by 19% and the IRR also very unlikely to reach the benchmark.

As a result, TÜV SÜD considers the sensitivity analysis and IRR calculation in the PDD as well as in the PP's response as realistic and credible.

Request 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 from DOE:

According to China Hydropower Year Book 2005, Hydropower plants with installed capacity less than 50MW is defined as small hydropower project. Hence the similar hydropower plants with the proposed project installed capacity between 20MW to 50MW have been revised.

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). Then the electricity tariff is identified by the market and not set by government as was before. So only the hydropower plants started operation after 2002 are deemed as same circumstance as the proposed project. Hence, to investigate the hydropower plants with installed capacity range between 25MW to 75MW and started ope-

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

ration after 2002 or under construction in Fujian province are listed table below. It is noted that hydropower plants with installed capacity range between 25MW to 75MW in Fujian province that have been opened for GSP are excluded from the table.

List of Similar Installed Capacity Hydropower Plants in Fujian Province

Name	Capacity (MW)	Commissioning	Total Investment (108CNY)	Unit Capacity Investment (CNY/W)
Dayang[2]	32	2004	2.1699	6.750
Wangkeng[3]	40	2004	2.4388	6.095
Shuangkoudu[4]	35	2005	2.100	6.000
Shangpei[5]	51	2005	2.4569	4.817
Zhaokou[6]	60	2006	4.9960	8.326
Baisha[7]	70	2006	5.4600	7.800
The proposed project	48	2007	4.59979	9.583

Note: Longxiang(74MW) and Xindian(34MW) are still on preliminary stage[8]

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

It is distinction that the unit capacity investment of the proposed project is the highest from the table. Even for Zhaokou which unit installed capacity investment is the most close 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. Hence, the proposed project is distinct differ from other similar capacity hydropower project in Fujian Province and not a common practice.

All projects were listed with reference from official sources and local industry expertise. The proposed Shunchang Yangkou hydropower project is additional and not common practice project activity.

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

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

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

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

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

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

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

As a result, TÜV SÜD considers the common practice analysis in the PDD as well as in the PP's response as realistic and credible.

Request 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 from DOE:

The PP indicated awareness of the CDM consideration (CDM resolution board meeting in 20 November 2004, IRL22) prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence has been delivered to DOE as a CDM project activity.

The PP indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation with reliable evidence, including contracts with consultants (IFL53) for CDM/PDD/methodology services, Emission Reduction Purchase Agreements (IFL54), agreement (IFL55) with a DOE for validation services to DOE.

In summary, TÜV SÜD confirms that the serious prior consideration of the CDM as indicated above is available the DOE shall determine that the CDM was seriously considered in the decision to implement the project activity. Furthermore, real action was done in Order to maintain the CDM status of the project activity.

Request 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 from DOE:

According to the methodology the data to be used should be the latest available data at the time of PDD submission. The present project has been submitted for registration in August 2008 and the data used is the latest available at that time.

Nevertheless to follow the request, the data public by China DNA (NDRC) on 15 Dec. 2006 that was available before validation starting date in July 2007 is adopted for the grid emission factor calculation. The grid emission factor and the estimation emission reduction calculation of the proposed project are revised in PDD. The more details data please refer to the revised PDD.

In summary, TÜV SÜD confirms that available version of grid emission factor before the commencement of validation. The PDD has been revised accordingly.

As a result, TÜV SÜD considers available version of grid emission factor before the commencement of validation has been used.

Annex 1: information reference list;
It lists the major documents which were used for the response. All documents have been validated by TUV-SUD.

Ref. No.	Issuance and/or submission date (dd/mm/yy)	Title/Type of Document	Author/Editor/Issuer	Additional Information (Relevance in CDM Context)
1	05/2003	FSR	Fujian Hydrological and Hydraulic Investigation and Design Institute	
2	21/04/2004	FSR Approval	Fujian DPC	

3	20/11/2004	CDM resolution board meeting minutes	Fujian Shunchang Yangkou hydropower Development Co., Ltd	
4	16/12/2004	Turbines purchase contract (YK/H-101)	Tianjin Tianfa Hydro-power Equipment Co., Ltd	
5	12/2004	Tariff analysis report in Fujian province	Fujian Shunchang Yangkou hydropower Development Co., Ltd	
6	12/01/2009	PDD with available grid emission factor	HSE	Available grid emis-sion factor was used for calcu-lation
7	11/2008	Financial report of Shunchang Yangkou hydropower	Fujian Shunchang Yangkou hydropower Development Co., Ltd	
8	01/2009	Invoice of export electricity of Shunchang Yangkou hydropower	Fujian Shunchang Yangkou hydropower Development Co., Ltd	
9	01/2009	Investment cost list of Shunchang Yangkou hydropower	Fujian Shunchang Yangkou hydropower Development Co., Ltd	
10	06/11/2006	Consultant contract	HSE	
11		Emission Reduction Purchase Agreements	KfW	
12	12/07/2007	Validation contract	TUV-SUD	