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Dear Members of the CDM Executive Board,

Request for review – 2192 Tianquan Xiacun Hydro Power Project

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

> ***Request 1 How the DOE has validated the source of benchmark as the DOE has previously validated the benchmark from the same source as 10%.***

Response:

There seems to have been a misunderstanding. The reference for the benchmark as stated in the PDD and in the Validation Report is the Feasibility Study Report (FSR) not SL16-95. The application of a 10% benchmark as specified by SL16-95 is common practice in China, however for this particular project a benchmark of 8% was used in the FSR. Therefore to be both consistent and conservative this benchmark was applied in the PDD.

> ***Request 2 The PP/DOE is requested to clarify how the reported values of annual electricity generation and power supply to grid are appropriate in the context of the underlying project activity.***
> ***AND***
> ***The PP/DOE is requested to clarify how the reported values of annual electricity generation and power supply to grid are appropriate in the context of the underlying project activity, taking into account the 14% difference between expected electricity generated and supplied to the grid.***

Response:
The **annual electricity generation** is the average power generation obtained according to hydrological conditions and technical performance of the turbine and generator units of certain installed capacity[1].
The appropriateness of **power supply to grid** used in the financial analysis is specified as below:

1. Calculation Process for power supply to grid in the FSR:

[1] See Feasibility Study Report p.4-31 of the detailed calculation process.

Power supply to grid = Effective electricity supply* (1-internal power use) * (1-transmission losses)

2. **Effective electricity supply** was defined by Economic Evaluation Code for Small Hydropower Project (SL16-95) as electricity that can be used by the system or end users. It explains that because of variations of the river flow, of grid load restraints, of equipment maintenance and of plant shut down periods, most of the small hydropower plants cannot achieve the designed electricity generation, which significantly affects the economic analysis of a power plant. I.e., a coefficient for effective supply applies because theoretically available power cannot always be delivered to the grid when plants are not allowed to run in baseload by the grid operator. The grid operator does not want plants to run in baseload if their power output is not predictable. The power output is not predictable for hydro projects if there is limited or no water storage. If there is limited/no water storage, water fluctuations translate directly into power output fluctuations, and hence an effective electricity supply factor needs to be applied. The effective electricity supply takes into account the above factors. The application of a coefficient for effective electricity supply in these circumstances is a normal, accepted approach which is also embedded in Chinese national policies and feasibility studies.
   SL16-95 also specifies the range for coefficient for effective supply to the grid to be used depending on the particular project circumstances. For Grid connected projects with monthly/weekly/daily/no regulating stations the range for coefficient shall be 0.7-0.9. The project qualifies as project type with Grid connected daily regulating capacity[2]. The factor estimated in the FSR: 0.88, which is at the high (ie most conservative) end of the suggested range, and therefore can be considered to be reasonable. Note that even if the effective electricity supply was 1.0 (i.e. all theoretically available power could be dispatched to the grid) the project IRR remains below the benchmark. An effective electricity supply of 1.0 would equate to a 12% increase in operating hours. As shown in response to request 3 below, an increase in operating hours of 43% would be required for the project IRR to reach the benchmark.

3. **Internal power use:** 1% in the FSR. This can be cross-checked by Hydroenergy Design Code for Small Hydro Power Document No.SL 76-94 (a technical regulation and standard applicable to hydropower projects below 25 MW published by the Ministry of Water Resources of the People's Republic of China, still valid as published by the Ministry of Water Resources of the People's Republic of China[3])

4. **Transmission loss:** 1% in the FSR. This can be also cross-checked by Document No.SL 76-94.

These have been clarified in the "Clarification on the Calculation Process of Tianquan Xiacun Hydro Power Project" by the Sichuan Provincial Water Conservation and Hydro Electric Power Survey and Design Institute. Therefore, it can be concluded that the annual electricity generation and power supply to grid and the 14% difference in between are appropriate.

Request 3 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.

Response:

[2] See FSR p.4-9, the Project is categorized to be daily regulating Project.
[3] http://www.mwr.gov.cn/tzgg/qt/20060926000000479251.aspx

EB 38 paragraph 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:
(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."

The input values used in the investment analysis are sourced from the Feasibility Study Report (FSR). The FSR was carried out in July 2004 by Sichuan Provincial Water Conservation and Hydro Electric Power Survey and Design Institute, which is an independent 3rd party entity accredited by the Ministry of Construction of People's Republic of China (PRC) with an A grade certificate of Survey and Design in the hydro power and water conservancy industries. The FSR was audited and approved by the local government - Development and Reform Committee of Sichuan Province - in May 2005.

The FSR was approved in May 2005, only 10 months before the project start date (March 2006, construction permission). This period is relatively short and it is unlikely that the input values from the FSR would have materially changed in between. To address the request for review, the Sichuan Provincial Water Conservation and Hydro Electric Power Survey and Design Institute issued a confirmation[4] that the input values used in the FSR were in accordance with relevant regulations and guidelines, and were still valid and applicable at the time of the start of the project activity in March 2006.

The suitability of each input value used for the financial analysis is discussed in detail below.

Investment costs
The investment costs for the Project as per the FSR were RMB 185,055,500. This figure was used in the financial analysis in the PDD. The main contracts have been submitted to the DOE during validation, the contracted fee was higher than expected in the FSR. The investment costs actually incurred for the construction of the Project as of 30/11/2008 were RMB194 million[5] according to the financial balance sheet of the Project, which is already 5% higher than the total investment costs expected in the FSR. The Project is still under construction and the total investment is estimated to be 202million, the construction and investment status was also confirmed by the Hubei Zhongge Project Management Co.ltd which is the Supervision company of the Project[6.] In order to better address this request, we have done an additional sensitivity analysis for the Project. It shows that the investment costs has to be decreased by 38% to reach the benchmark, which is highly unrealistic since construction materials and fuel prices have been increasing in China for the past years[7].
The approach followed in the PDD using the estimated investment costs from the FSR (valid at the time of decision making) is thus conservative.

Operating costs
The operating costs are calculated according to the parameters from the approved FSR. The operating costs are calculated predominantly based on maintenance fees, insurance fees, staff salaries and welfare, materials, others, Support for reservoir inundation, and electricity transmission operating costs, and amount to a total of RMB 4,927,301 per year, which represents 2.66% of the value of the total estimated investment costs and was validated by TUV-SUD to be lower than other

[4] See Clarification of input values used in the Feasibility Study Report of Tianquan Xiacun Hydro Power Project.

5 See Finanical balance sheet of Tianquan Xiacun Hydro Power Project

[6] See Clarification of the investment on the Tianquan Xiacun Hydro Power Project

[7] See *Statistical Communiqué of the People's Republic of China*. National Bureau of Statistics of China: (http://www.stats.gov.cn/english/StatisticalCommuniques/)

similar projects. 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.

Electricity tariff

The electricity tariff used in the PDD was in accordance with the tariff policy of local grid company-Tianquan Power Company in August 2005 [8] which can be crossed-checked with the Reform Regulation on Power Grid Management of Tianquan County issued by the Tianquan County Government in November 2004[9]. After the finalisation of the FSR in May 2005, the Project developer consulted the local grid company about tariff and was replied with the above letter. As soon as this information, the Project developer held a Board meeting, evaluating potential possibilities on how to overcome this issue and finally decided to apply for and register this project as a CDM project.

In 2002, the Chinese State Council issued the Notification on the Power System Reform – GuoFa [2002] No.5 by which power plants are encouraged to lower the cost of electricity generation, and thus lower feed-in tariffs. In May 2005, the National Development and Reform Commission, which regulates power production, also issued "Provisional Measures for the Administration of the Electricity On-Grid Tariffs"– NDRC [2005] NO.514, which aims at regulating the determination of the electricity tariff offered to power producers in order to stabilise tariffs and increase competitiveness in the electricity market.

43% of increase in electricity tariff is needed for the benchmark to be reached which was extremely unrealistic for the Project developer to consider at the time of the investment decision given the electricity pricing structure in China. The tariff used in the investment analysis was thus considered to be valid and applicable at the time of decision making.

Power Output

The power output of the proposed Project indicated in the FSR were calculated based on 46 years (from year 1956-2001) of historical hydrological data and technical performance of the turbine and generator units of certain installed capacity. The annual operating hours to determine the power output is higher than average as validated by DOE. Besides, three other alternatives were discussed in the FSR, 24MW was decided to be the most appropriate capacity given technical and economic factors. As a result, the power output or the expected operating hours is only likely to fluctuate within a small range. 43% of increase to reach the benchmark as indicated in the revised sensitivity analysis is highly unrealistic.

This demonstrates that the input values in the investment analysis are reasonable and conservative at the time of decision making.We hope that the information provided adequately addresses the concerns raised.

Yours Sincerely,

Belinda Kinkead
Associate Director - Head of Implementation

[8] See Reply letter on the tariff issued by Tianquan Power Company, dated 07/08/2005.
[9] See Regulation on Power Grid Management of Tianquan County – Tianquan County Government - TianWeiBan[2004]158 - 29/11/2004

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