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UNFCCC Secretariat Martin-Luther-King-Strasse 8 D-53153 Bonn Germany

Att: CDM Executive Board

Your ref.: CDM Ref 2142

Our ref.: Li Wei/BRINKS/DUDAG Date: 19 January 2009

Response to request for review of the project "Longyou 18 MW Hydropower Project in Zhejiang Province" (2142)

Dear Members of the CDM Executive Board,

We refer to the issue raised by the requests for review by Board members regarding project activity "Longyou 18 MW Hydropower Project in Zhejiang Province" (UNFCCC reference number 2142) and would like to provide following initial responses to the issue raised.

Comment 1: The PP/DOE are requested to provide an investment analysis spreadsheet in line with EB 41, Annex 45, parag. 8. The sensitivity analysis spreadsheet is also required.

DNV Response:

In response to the request for review, the project participant has provided the spreadsheet for the investment analysis and the sensitivity analysis¹. DNV has verified that these are in line with EB 41, Annex 45 paragraph 8.

Comment 2: The DOE should clarify how it has validated the appropriateness of the input values to the investment analysis in line with EB 38, para. 54, including the calculation of costs assumed.

DNV Response:

DNV has validated the consistency and appropriateness of the input values available at the project investment decision making stage as per paragraph 54(c) of EB 38 report.

All input values for the investment analysis are based on the Preliminary Design Report (PDR) dated November 2003. The PDR was developed by the Power Industry Reconnaissance & Design Institute of Zhejiang Province and further approved by Zhejiang Development and Reform Commission on 12 December 2003. The input parameters used in the financial analysis are thus considered as information provided by an independent and recognized source.

The PDR was approved (12 December 2003) eleven months prior to the project starting date (30 November 2004). Given this relatively short period of time, it is unlikely in the context of the

¹ IRR and sensitivity calculation spreadsheet.

project that the input values would have materially changed. It is thus reasonable to assume that the PDR have been the basis of the decision to proceed with the investment in the project.

DNV has verified the project Preliminary Design Report of November 2003 and its approval from Zhejiang Development and reform Committee dated of 12 December 2003.

DNV has also compared the proposed project investment analysis input values with other hydropower projects developed in China. DNV has used the following parameter as part of projects comparison: electricity tariff and percentage of O&M costs relative to total investment costs. DNV was able to confirm that the input parameters used in the investment analysis are reasonable and adequately represent the economic situation of the project at the time of decision. (The parameter of investment costs per kW is discussed in the response for the comment 3).

All parameters in the financial analysis are assumed to be fixed, which is common practice for investment analyses in FSRs or PDRs in China. This is enforced by official documents, as the *Economic Evaluation Code for Small Hydropower Projects*, and comes as a consequence of the market structure in China, where prices are subjects to strict regulation from the government. Lastly, when including an incremental tariff, one should also include incremental O&M costs, which may show a much steeper increasing trend than electricity tariffs.

It must also be noted that approvals by the government as well as decisions by project developers are to our understanding based on FSRs and when assessing additionality DNV assesses the information that can be regarded as the basis for making investment decisions. Moreover, also the applied benchmark is related to IRR analysis with fixed input values, and an IRR without escalation of the tariff and O&M costs is thus in our opinion more suitable to be compared against the selected benchmark.

In addition, as part of a sensitivity analysis, DNV has also verified the following actual cost provided by the project participant:

- The total investment from the final accounting of expenditures by Hangzhou Jianghe Engineer Costs Consultant Co., Ltd.². The actual total investment on fixed assets is 247.9352 million RMB, which is 8.8% below the estimated total investment on fixes assets (271.91 million RMB) as indicated in the PDR and PDD. This variation does not exceed the range of sensitivity analysis, the proposed project remains financially unattractive without CDM revenues given the decrease of total investment on fixed assets by 8.8% which correspond to an IRR of 6.37%.
- An actual average tariff was approved by the Price Bureau of Quzhou City³ on 22 October 2008. The actual average electricity tariff is 0.45 RMB/kWh, (including VAT, equal to 0.425 RMB/kWh excluding VAT) which was approved by the Price Bureau of Quzhou City. This tariff is consistent with the value in the PDR and PDD.

Comment 3: The DOE should clarify how it has validated the common practice analysis, including the selection criteria and the high unit investment cost per kW for the project activity.

DNV Response:

The reason for selecting Zhejiang province as the analysis range is that the tariff of Zhejiang province is different from other provinces in China. DNV confirms that this as a correct approach.

² Investment Inspection Table, the attachment of final accounting of expenditures by Hangzhou Jianghe Engineer Costs Consultant Co., Ltd.

³ Approval letter for tariff by the Price Bureau of Quzhou City on 22 October 2008

For the proposed 18 MW hydro power plant project, the common practice analysis was conducted for hydro power plants in the data source China Hydro Resources Yearbook 2006, 16 projects were selected. However, this data source only covers hydro power plants above 25 MW. Hence, the common practice analysis was from 25-45 MW. Even though the larger scale of the power plants generally indicate more financially attractive condition. DNV acknowledge that there can be some power plants below 25 MW that might be financially attractive. DNV therefore request the project participants to also use local data sources to consider power plants in the range 15-25 MW. For power plants realised from 2002 without CDM, possible reasons related to funding, investment per kWh need to be considered in order to establish whether hydro power projects in this range is common practice under similar conditions.

The proposed project activity has the investment per capacity of 15 106 RMB/kW which is much higher than the other 16 selected projects in Zhejiang Province.

The main reason for the high unit investment of the proposed project, with low hydraulic head and big discharge flow, is that the technology used requires rubber dams with a length of 775 m and huge bulb tubular type turbines, which are addressed in the PDR. Two similar projects applying for CDM registration with low hydraulic head and big discharge flow were demonstrated by project participant, the unit investments of the two projects are 12284 RMB/kW and 14666 RMB/kW, close to the unit investment of the proposed project⁴. Another reason for the high unit investment is the additional costs for resettlement and land occupation, and project's navigation function. The project participant also provided the IRR excluding the cost of resettlement, land occupation and navigation related facilities. The IRR is then 6.60%, which is still below the benchmark.

Comment 4: The data used to calculate the grid emission factor in the PDD submitted for registration was not available at the commencement of validation (March 2007). The PP and DOE are therefore requested to amend the grid emission factor using data which was available at this date.

The initial project PDD was submitted for validation on March 2007 and the PDD version 05 dated 30 June 2008 was submitted for registration in August 2008. In the PDD submitted for registration the project participant used the following data from the China Electric Power Yearbook and China Energy Statistical Yearbook to calculate the grid emission factor (0.9046 tCO_2e):

- China Electric Power Yearbook from 2000 to 2006
- China Energy Statistical Yearbook from 2004 to 2006

The China Electric Power 2006 Yearbook was published in November 2006, whereas the China Energy Statistical 2006 Yearbook was published on March 2007. The latter may not have been available at the date of the commencement of the validation (March 2007). Therefore, DNV confirms that the grid emission factor must be updated to data available in March 2007. Data from the China Energy Statistical 2005 Yearbook published in June 2006, which were the most recent data available at this time, should be used instead.

As part of the request for review, the project participant as provided a revised emission factor based on the following data:

⁴ <u>http://www.lr.org/NR/rdonlyres/B9F6899D-D16A-4C31-B597-</u> 8386779418FF/74919/16MWHydropowerprojectinChinaPDD.pd

http://www.netinform.net/KE/files/pdf/Dong_River_Dongyuan_20MW_Hydropower_Project_gs20080313.pdf

- Electricity generation and auxiliary electricity consumption data from the *China Electric Power Yearbook* from 1998 to 2005 (published annually).
- Data on different fuel consumptions for power generation and the net caloric values of the fuels are obtained from the *China Energy Statistical Yearbook* from 2000 to 2005 (published annually after 2003).
- IPCC 2006 guidelines

The revised grid emission factor is 0.8808 tCO₂e/MWh. The PDD will be revised correspondingly to be consistent with the original version of PDD for GSP.

We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully for Det Norske Veritas Certification AS

H.W. Brinks

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