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Att: CDM Executive Board

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CDM Ref 2106	FRZ/DUDAG/BRINKS	23 February 2009

Response to requests for review of the project "Yunnan Lianghe Hulukou Hydropower Station" (CDM Reference No. 2106)

Dear Members of the CDM Executive Board,

We refer to the issues raised in the requests for review by three Board members concerning DNV's request for registration of the project activity 2106 "Yunnan Lianghe Hulukou Hydropower Station" and we would like to provide the following clarifications for your consideration and review.

***Question 1:** The DOE should clarify the changes between the PDD submitted for validation and the PDD submitted for registration, in particular, the removal of the description on the firewood being replaced by the electricity generated from the project activity.*

DNV's response:

The changes introduced in the PDD during the validation period, from the 4 June 2007 (when the PDD was submitted for validation) to the 28 July 2008 (when the PDD was submitted for registration), are indicated in the PDD revision history table reported in section A.1 and were due to Clarifications and Corrective Actions requested by DNV relative to the PDD document submitted for validation. In addition, the PDD was updated to clarify the following items:

- Imprecise or incorrect information relative to the project activity
- Lack of evidence supporting baseline determination
- Lack of indication of the sources used for the basic parameters of the Financial Analysis
- Lack of evidences supporting the common practice analysis
- Incorrect baseline calculations and insufficient description of the investment analysis
- Incompleteness of the Monitoring Plan

Regarding the removal of the description on the firewood being replaced by the electricity generated from the project activity, the firewood replacement argument was mentioned in three sections of the PDD submitted for validation. Two of them have remained unchanged during the validation process:

- In section A.2 of the PDD which indicated the main purpose of the project activity is to replace Firewood by Electricity
- In section D.1 of the PDD, where is reported that the project activity is beneficial to encourage the local residents to replace firewood by electricity…".

The only information relative to the firewood replacement argument that has been removed was the statement reported page 14 of the PDD submitted for validation which stated that 50% of the

electricity generated by the project participant is supplied to the local residents as a result of firewood being replaced by electricity. In fact, this information was found to be misleading as, according to the Power Connection Agreement[1] verified by DNV, all the electricity generated by the project activity is supplied to the Dehong Autonomous Prefecture Grid Company. The Grid Company then is responsible to supply part of the electricity generated by the project activity to the local residents, but this issue is beyond the scope of DNV validation.

Question 2: The DOE is requested to further clarify the assumed electricity tariff and to confirm whether or not all the electricity output will be supplied to the power grid.

DNV's response:

As indicated in the answer to the first question , DNV has verified the Power Connection Approval where it is contemplated that all the electricity generated by the project activity will be supplied to the Dehong Autonomous Prefecture Grid.

The tariff 0.1375 RMB/kWh (VAT included) was claimed by the project participant to be the tariff used in the decision to go ahead with the project and it was rationalized from the average of original and latest tariff, which was claimed to be requested revised. According to the project participants no power purchase agreement has been signed and the power plant is not yet commissioned. The starting date is 16 March 2005 based on the construction permit date.

The FSR was concluded in August 2004, based on the grid priced set by the Dehong Dai-Jingpo Autonomous Prefecture People's Government, as verified by DNV in the document No. 367/2003[2] from 17 December 2003. In this document 0.15 RMB/kWh was used during the rainy season and 0.20 RMB/kWh during the dry season, resulting in an annual average grid price of 0.175 RMB/kWh (VAT included) which was used in the FSR.

On 27 August 2004 the Dehong Dai-Jingpo Autonomous Prefecture People's Government issued the document No. 387/2004[3] - verified by DNV - in which the grid price for the project activity was fixed to 0.10 RMB/kWh (VAT included) for the project life time. Therefore the financial analysis needed to be updated with the new fixed price. As a result of this price variation, the project owner decided to request the local authorities to revise the proposed tariff 0.10 RMB/kWh (no evidence shown to DNV). However, the project owner did not expect its request to be fully accepted by the Local Government as the grid price setting in China is governed by rigid rules. With the intention to be conservative the project owner used the average tariff between the new and the old price. This is to say (0.1 + 0.175) / 2 = 0.1375 RMB/kWh. Therefore the grid price considered in the financial Analysis was 0.1375 RMB/kWh.
Despite the tariff estimate is relatively rough, it is still higher than the last tariff available and hence conservative. In addition the sensitivity analysis shows that a 28% increase is necessary for the project to become non-additional. This is 0.176 RMB/kWh and slightly above the original tariff in the FSR, which is no longer valid.

[1] Power Connection Agreement for Hulukou Hydro Station signed by the Dehong Autonomus Prefeture Grid Company and Lianghe Dayingjiang Hydropower Development Co. Ltd. (the project owner) on the 18th of January 2005

[2] document No. 367/2003 "Notice about the Grid Price of Dehong Dai-Jingpo Autonomous Prefecture" issued by the the Dehong Dai-Jingpo Autonomous Prefecture People's Government on the 17 December 2003

[3] document No. 287/2004 "*Implementation Opinion about the "Replacing Firewood by Hydropower Stations"* issued by the Dehong Dai-Jingpo Autonomous Prefecture People's Government on the 27 August 2004

Question 3: The DOE is requested to clarify how it has validated the input values used in the investment analysis in line with EB 38, para. 54, including: a) the update in the investment cost and it is not clear how CL4 was closed; and b) the suitability of the coefficient of effective electricity used.

DNV's response:
DNV has validated all the input values in accordance with *"Guidance of EB38 paragraph 54(c)"* resulting in the financial analysis at the moment of the investment decision a project-IRR of 6.84% which is lower than the benchmark of 10%.

Step 1: Assessment of the sources of the used input parameters:
All the input parameters, except for the grid price for the reasons explained in the answer to question 2, used in the financial analysis at the moment of the investment decision are taken from the project Feasibility Study Report (FSR) developed in August 2004 by the "Hangzhou Water Resource and Hydropower Reconnaissance Institute", which is an independent officially accredited entity. The FSR input parameters were verified and approved by Yunnan Provincial Development and Reform Committee in December 2004 and can thus be considered information provided by independent and recognized source.

Step 2: Confirmation that the values used in the PDD and investment analysis are fully consistent with the FSR:
DNV compared the input parameters for the financial analysis included in the PDD with the parameters stated in the FSR, and was able to confirm that the values applied are consistent with the value stated in the FSR except for the electricity tariff for the reasons explained in the answer to question 2.

Step 3: Assessment of the period of time between the finalization of the FSR and the investment decision:
The FSR was approved in December 2004, thus only three months prior to the project owner decision to proceed with the project activity (i.e. the project start date) on the 16 March 2005. Given the short period of time between the approval of the FSR and decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed. Thus it is reasonable to assume that the FSR has been the basis of the decision to proceed with the investment in the project.

Step 4: Cross check of the main input parameters used in the financial analysis with the parameters used by other similar projects:
The input parameters used in the financial analysis were compared with the data reported for other similar proposed CDM projects in the same province in China. The investment cost per MW, the electricity generation, the percentage of operation and maintenance costs relative to total project investment costs and the electricity tariff are in the same range as the other analyzed projects. Consequently, DNV confirms that the input parameters used in the financial analysis are reasonable.

Coefficient of effective electricity
The net power supplied to the grid of 95 830MWh is based on the coefficient of effective electricity (90%), the auxiliary power consumption (0.5%) and the line losses (3%)

$$95\,830\text{MWh} = 110\,320\text{MWh} \times 90\% \times (100\text{-}0.5)\,\% \times (100\text{-}3)\,\%$$

The coefficient of effective electricity and effective power generation for small scale hydropower

stations (with an installed capacity up to 50 MW) is according to the "Economic Evaluation Regulation for Small Scale Hydropower Projects (SL16-92)", regulation which has been successively modified by "the Economic Evaluation Code for Small Hydropower Projects (SL16-95) [4]", from the values of Table 3.4 of the Code:

Table 3.4 - 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 project is a run-of-river hydropower station with 20 MW installed capacity. In accordance with the Table listed above, the coefficient of effective electricity should be chosen from a range from 0.70 to 0.90. The Hangzhou Water Resource and Hydropower Reconnaissance Institute used the highest possible value (0.90). This is a conservative approach as higher coefficients lead to a larger IRR.
The choice of coefficient of effective electricity is regulated by the code SL16-95, which is the same source as the benchmark. Hence, the use of this benchmark is linked to the use of these coefficients and it would be inconsistent to use higher coefficients.

Closure of CL4
Clarification request 4 concerned two items of the financial analysis: the grid price and eventual inclusion of the unexpected geological problems in the investment costs. DNV confirms that both issues have been verified and the clarification request has been closed.

Regarding the grid price, there is a small inaccuracy in the conclusion column of table 3. The text says "…the price value chosen in the Financial Analysis is 0.1375 RMB/kWh which is conservative respect the one reported in the Feasibility Study Report of 0.10". The text should instead say: "…the price value chosen in the Financial Analysis is 0.1375 RMB/kWh which is conservative with respect to the one reported in Dehong Dai-Jingpo Autonomous Prefecture document dated 27 August 2004 of 0.10 RMB/kWh", cf. answer to question 2.
Regarding the extra costs for geological problems, DNV has verified that they have not been included in the Financial Analysis. In addition, it may be added, even though it does not influence the investment decision that already has been taken, that the project investments in January 2009 already have passed the estimate of 94.89 million RMB in the FSR. The investments costs in January 2009, before the project is finalized, is 160 million RMB[5].

[4] http://www.cws.net.cn/guifan/bz/SL16-95/. In 2002, the Ministry of Water Resources of the People's Republic of China issued the "Bulletin of Valid Hydropower Technical Standard" currently. According to this hydropower document No [2002]07 the "Revision of Economic Evaluation Code for Small Hydropower Project (SL16-95)", is still effective and enforceable, reference website: http://www.ches.com.cn/jishubiaozhun/001.htm, and the Water Resources and Hydropower Planning and Design General Institute of the Ministry of Water Resources of the People's Republic of China confirm that it is still in effect in 2008, reference website: http://www.giwp.org.cn/index.do?act=mess&modu=160&mess=361

[5] Statement issued on the 10 February 2009 by the Lianghe Branch of the Agriculture Bank of China

Question 4: ***The data used to calculate the grid emission factor in the PDD submitted for registration was not available at the commencement of validation (June 2007). The PP and DOE are therefore requested to amend the grid emission factor using data, which was available as of this date and provide the corresponding calculation of the emission reductions.***

DNV's response:
The PDD published for the global stakeholder's consultation on 27 June 2007. This date is defined as the commencement of the validation. On 27 June 2007, the following sources for calculating the grid emission factor for the project were available and the most recent:

- China Electric Power Yearbook 2004 – 2006 (published November 2006)
- China Energy Statistical Yearbook 2004 – 2006 (published April 2007)
- 2006 IPCC guidelines (final version published end of 2006)

The yearbooks of 2006 use data from 2005. In the PDD published on 20 July 2007, data from 2005 were not included. DNV therefore requested the project proponent to update the calculation to the most recent data, as per the methodology. The PDD sent for registration was hence per DNV's request, using the most recent data available at the time of the commencement of validation.

We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully
for DET NORSKE VERITAS CERTIFICATION AS

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