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TÜV®

## CDM Executive Board

Our / Your Reference

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Date  
16.11.2009

### Request for Review

"Sichuan Xiba Small Hydro Power Project" (2725)

Dear Sir/Madam,

Please find below the response of the TÜV NORD JI/CDM Certification Program to the request for review for the above mentioned project No. 2725.

If you have any questions, please do not hesitate to contact us.

Yours sincerely,

TÜV NORD JI/CDM Certification Program



Rainer Winter

Request for Review 1	
Issue raised by EB Members / DNA	<i>The DOE should confirm if the actual income tax payment (i.e., with interest payments and/or financing cost considered) was used in the investment analysis.</i>
Response of PP	<p>The calculation of the income tax in the SPDR and PDD is in accordance with the regulations for small scale hydropower projects in China and reflects the actual income tax payment.</p> <p>According to the <i>Economic Evaluation Code for Small Hydropower Projects (SL 16-95)</i> approved by the Ministry of Water Resources of the People's Republic of China, the calculation of the income tax for small scale hydropower projects is shown as below:</p> $\text{Income tax} = \text{benefit before income tax} \times \text{rate of income tax} \quad (1)$ <p>Where:</p> $\text{Benefit before income tax} = \text{total income (excl. VAT)} - \text{total cost} - \text{city build tax \& education added tax} \quad (2)$ $\text{Total cost} = \text{O \& M costs} + \text{depreciation} + \text{interest cost} \quad (3)$ <p>The method mentioned above has been adopted in the IRR calculation in the SPDR and PDD for the proposed project and also widely used for the financing assessment of small scale hydropower projects in China. Please note that while it is included for the purpose of calculation tax, the cost of financing does not be included as an expense in the ultimate analysis as required in the EB guidance, to avoid double counting. Therefore, the calculation of the income tax in the SPDR and PDD is in accordance with the regulation of the small scale hydropower projects in China and can reflect the actual income tax payment well when the project put into operation.</p>
Response of DOE	<p>TÜV NORD provides clarification as following:</p> <p><b>Assessment of applicability of the reference/ guidance utilized to calculate IRR:</b></p> <ul style="list-style-type: none"> <li><i>Economic Evaluation Code for Small Hydropower Projects (SL 16-95)</i>, containing detailed information for small hydropower projects, was approved by the Ministry of Water Resources of the People's Republic of China in year 1995, it is widely used in all the hydropower projects with capacity below 25MW and still applicable.</li> <li>"Sichuan Xiba Small Hydro Power Project" is a new built hydropower project with capacity of 5MW. Therefore it meets the applicability criteria of SL16-95.</li> </ul> <p>In conclusion TÜV NORD assessed that it is appropriate to utilize the guidance SL 16-95.</p> <p><b>Assessment on the value of income tax rate:</b></p> <p>The value 33% is derived from Corporate Income Tax Temporary Terms of People's Republic of China published on 23/12/1993. This tax law was valid until end of year 2007<sup>1</sup>.</p> <p>The validation confirms that the value was valid during SPDR composing.</p> <p>In 2008 the income tax rate was adjusted to 25%. TÜV NORD checked the impact on</p>

<sup>1</sup> <http://www.lawtime.cn/zhishi/sszsglf/xiangguanfangui/20070426/63781.html>

	<p>the IRR calculation and came to the conclusion that the IRR is changing to 8.82 % which still lower than benchmark (10%).</p> <p>Nevertheless, according to EB41 annex 45 paragraph 6 “Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant”, the income tax of 33% rather than 25% was available during CDM consideration and investment decision making, thus it is appropriate to use income tax of 33% in investment analysis.</p> <p><b>Assessment on calculation method</b></p> <p>The validation team confirms that the calculation of annual income tax payment does consider interest payments in the investment analysis.</p> <p>This calculation method is suggested in accordance to SL16-95 and hence according to Chinese regulation.</p> <p>However, to show that the additionality is robust and stable, the validation team checked the impact on IRR when the interest payments are not considered. The IRR is changing to 7.68%.</p> <p>All the results are shown in the Annex to this response. The IRR calculation sheet provided by the client is traceable and without material mistakes. This has been checked by the validation team. The DOE confirms that the income tax payment is calculated under consideration of interest payments.</p> <p>If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person:</p> <p>Mr. Li Yong Jun CDM project manager China Room 11C, East Ocean Centre II, No. 618 Yan An Rd. (E), Huangpu District, Shanghai China 200001 Tel: +86 (0)21 53855353-259 Fax: +86 (0)21 53855369</p>
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## Request for Review 2

Issue raised by EB Members / DNA	<i>The DOE should clarify how it has validated the investment analysis in line with VVM paras. 112(a) and (c), in particular the effective power coefficient applied.</i>
Response of PP	<p>All the input values for the investment analysis are sourced from approved SPDR, which was completed by Sichuan University Engineering Research Institute (Certificate No. 221047, Grade B) authorized by the Ministry of Construction of the People's Republic of China, as stated in the PDD and validation report. The parameters in the investment analysis are determined by the design institute based on the <i>Economic Evaluation Code for Small Hydropower Projects (SL 16-95)</i>.</p> <p>The validation report discusses each of the input values of the investment analysis in detail in Table 4 and clearly states that the input values are in line with EB38 para 54 and guidance of EB41 Annex 45, and thus compliant with VVM paras 111 and 112.</p>

### Effective Power Coefficient

The input value for net electricity generation, made up from the load factor based on hydrological data and the effective power coefficient etc, is taken direct from the approved SPDR, and is already discussed in detail in Table 4 of the validation report. The validation report clearly states that the input values are in line with EB38 para 54 and guidance of EB41 Annex 45, and thus compliant with VVM paras 111 and 112 and in line with guidance of EB48 Annex 11 (which was only issued after the project had been submitted for registration).

The project is a small scale low-head hydro power station. It is classed as a grid connected seasonal regulating hydropower station. In accordance with the Economic Evaluation Code for Small Hydropower Projects (SL16-95) the effective power coefficient for the proposed project is between 0.90 and 0.95, as shown in Table 1 below. The effective power coefficient of 0.93 adopted in the SPDR (and thus also in the PDD), therefore, is in the middle of the range indicated in the national regulations. Therefore, the effective power coefficient of 0.93 used in PDD for requesting registration is appropriate and credible, and is in line with EB38 para 54, EB41 Annex 45, EB48 Annex 11 and VVM paras 111 and 112.

Table 1 Effective Power Coefficient 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
2. Grid connected, seasonal regulating hydropower stations	0.90-0.95
3. Grid connected, monthly/weekly/daily regulating hydropower stations <ul style="list-style-type: none"> <li>The grid will take all electricity generated in rainy season and night</li> <li>The grid will only take part of the electricity generated in rainy season and night</li> </ul>	0.80-0.90 0.70-0.80
4. Not connected to the grid, Daily/No regulating capacity	0.60-0.70

Source: Economic Evaluation Code for Small Hydropower Projects (SL16-95)

Note: The effective power coefficient incorporates the estimated absorptive capacity of the power grid, the regulating/storage capacity of the power plant, and the estimated plant maintenance and emergency shut down.

As stated above, the effective power coefficient chosen is in the middle of the range and is appropriate and credible, and replicates the data from the SPDR. However, even if the most conservative value for the coefficient (in relation to the additionality assessment) were assumed, i.e. 100%, the IRR would increase from 8.18% to 9.11%, which is still below the benchmark 10%.

### Conclusion

Each of the input values is discussed in detail in the validation report, and the validation report states that each of the parameters are in line with EB38 para 54 and guidance of EB41 Annex 45, and thus compliant with VVM paragraphs 111 and 112 and the load factor is in line with guidance of EB48 Annex 11.

Response of DOE	<p>TÜV NORD provides clarification as following:</p> <p><b>Assessment on project type:</b></p> <p>“Sichuan Xiba Small Hydro Power Project” is a new built hydropower project with capacity of 5MW, which meets the criteria of <i>Economic Evaluation Code for Small Hydropower Projects (SL 16-95)</i>.</p> <p>By means of on-site interview with the chief engineers<sup>2</sup> of the construction team and project owner, it could be confirmed that the proposed project is a low-head hydro power station.</p> <p><b>Data eligibility</b></p> <p>Financial parameters of the projects are sourced from Supplementary Preliminary Design Report (SPDR), which is established by Sichuan University Engineering Design Institution (SUI) in June 2007. SUI is authorized by the Ministry of Construction of the People’s Republic of China for providing the service with the necessary expertise.</p> <p>In order to address the appropriateness of TÜV NORD’s validation approach, the following should provide clarification:</p> <ul style="list-style-type: none"> <li>• By means of cross checking main contracts, the validation team confirmed that the total investment is appropriate;</li> <li>• By means of checking approval of SPDR and relevant public information, the validation team confirmed that the design and investment analysis has been confirmed by local experts, including the electricity generation, O&amp;M cost, project lifetime, tax etc;</li> <li>• By means of checking PPA, the validation team confirmed that the assumed electricity tariff is appropriate;</li> <li>• By means of referring to SL16-95, the validation team confirmed that the calculation method is correct;</li> <li>• Furthermore, an analysis was adopted in sensitivity analysis spreadsheet and final PDD, the DOE has reconfirmed that the justification on why key parameters (total investment, electricity generation, O&amp;M cost and electricity tariff) are unlikely to cross the benchmark is appropriate.</li> </ul> <p>To sum up, the validation team assessed the financial parameters according to guidance of EB41 Annex 45. All assumption and calculation methods using the available evidence and expertise in relevant accounting practices are assessed to be appropriate. A detailed assessment is provided in table 4 to the Annex of the validation report submitted for registration.</p> <p><b>Assessment on EPC</b></p> <p>The Effective Power Coefficient (EPC) value is sourced from SPDR.</p> <p>As per SL16-95, the value of EPC depends on absorptive capacity of the power grid, the regulating/storage capacity of the power plant, and the estimated plant maintenance and emergency shut downs.</p> <p>As a seasonal regulation hydropower station, the EPC of the project should be 0.90~0.95. EPC of 0.93 is indicated in SPDR, composed by SUI.</p> <p>For cross checking purposes the validation team checked the IRR result with the most conservative EPC of 1. The IRR changed from 8.18% to 9.11%, which is still lower than</p>
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<sup>2</sup> Mr. XIAO Zuo Wen, the Chief Engineer from Guangdong Tianyuan Engineering Corporation (construction company); Mr. TUO Chao Hong, the Chief Engineer from Leshan Kaiyuan Hydro Power Co., Ltd. (project owner)

	<p>the benchmark of 10%. This clearly shows that the additionality assessment is stable and robust. The validation team came to the conclusion that EPC of 0.93 is appropriate.</p> <p>In conclusion, the analysis of parameters impacting the cash flow of the proposed project activity is provided in detail in Table 4 to the Annex of the validation report. The financial calculations are correct, the investment analysis is in line with EB41 annex 45, and the validation is based on VVM paras. 112 (a) and (c).</p> <p>If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person:</p> <p>Mr. Li Yong Jun CDM project manager China Room 11C, East Ocean Centre II, No. 618 Yan An Rd. (E), Huangpu District, Shanghai China 200001 Tel: +86 (0)21 53855353-259 Fax: +86 (0)21 53855369</p>
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### Request for Review 3

Issue raised by EB Members / DNA	<p><i>The DOE is requested to further explain how the proposed tariff for the project activity has been determined, as with the application of the highest tariff issued for similar projects in the province, the IRR crosses the benchmark.</i></p>
Response of PP	<p>Each of the input values, including the tariff, is already discussed in detail in Table 4 of the validation report. As stated in the report, the input values are in line with EB38 para 54 and guidance of EB41 Annex 45, and thus compliant with VVM paras 111 and 112.</p> <p>The tariff of the proposed project was set by the Leshan Power Grid Company at a level of 0.25 RMB/kWh (incl. VAT) or 0.236 RMB/kWh (excl. VAT) on 8 May 2006 in the power connection approval. Therefore the tariff was fixed more than a year before the project start date, and the consideration of any other tariff for the financial assessment is not credible. Furthermore, the tariff was approved and fixed at the time of the investment decision, thus the tariff used in the investment analysis is correct and unlikely to change.</p> <p>The agreed tariffs for small scale hydropower projects vary due to the different characteristics of the power stations and the local grid<sup>3</sup>, taking into account for example the regulating capacity of the plant. According to the statistics in Sichuan Province, the tariffs for small scale projects range from 0.18 to 0.288 RMB/kWh (incl. VAT)<sup>4</sup>. The highest available tariff approved in the province is 0.288 RMB/kWh (incl. VAT) with the VAT of 17%, thus the highest tariff without VAT is 0.246 RMB/kWh (excl. VAT)<sup>5</sup>. The VAT of 17% is in accordance with the regulation published by Decree of the State of the Council of the People's Republic of China in 1993 and revised document in 2008<sup>6</sup>.</p>

<sup>3</sup> <http://www.my.gov.cn/MYGOV/150597964467798016/20061201/138686.html>

<sup>4</sup> <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=2433>

<sup>5</sup> <http://www.scpi.gov.cn/newzcfg/zcfg-content.asp?id=2433>

<sup>6</sup> Decree of the State of the Council of the People's Republic of China (No. 134), 13 December 1993



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	<p>However, the VAT for remote small scale hydropower projects, located in the county or countryside, is only 6% according to the regulation published by the Ministry of Finance in 1994 (caishui [1994] No.4)<sup>7</sup> and revised in 2009 (caishui [2009] No.9)<sup>8</sup>. Because the proposed project is located at Xiba Town, Wutongqiao District (County), Leshan City, the VAT of the proposed project will be only 6%, which is the same with the hydropower projects that located at the upper stream<sup>9</sup>.</p> <p>While the tariff was fixed more than a year before the project start date, and the consideration of any other tariff for the financial assessment is not credible, it is shown in Table 2 that even if the highest tariff were assumed – taking into account the VAT rate – the IRR is still below the benchmark 10%.</p> <p><b>Table 2 Calculated project IRR with the actual and highest tariffs, taking into account the VAT rates</b></p> <table><tr><th></th><th>Actual tariff, actual VAT rate</th><th>Highest tariff, higher VAT rate</th><th>Highest tariff, actual VAT rate</th></tr><tr><td>Tariff excl. VAT (RMB/kWh)</td><td>0.236</td><td>0.246</td><td>0.246</td></tr><tr><td>VAT rate</td><td>6%</td><td>17%</td><td>6%</td></tr><tr><td>Tariff incl. VAT (RMB/kWh)</td><td>0.25</td><td>0.288</td><td>0.261</td></tr><tr><td>Project IRR</td><td>8.18%</td><td>8.61%</td><td>8.73%</td></tr></table> <p>Therefore, even if applying the highest tariff in Sichuan Province for the investment analysis, the proposed project is additional with an IRR lower than the benchmark of 10%.</p>		Actual tariff, actual VAT rate	Highest tariff, higher VAT rate	Highest tariff, actual VAT rate	Tariff excl. VAT (RMB/kWh)	0.236	0.246	0.246	VAT rate	6%	17%	6%	Tariff incl. VAT (RMB/kWh)	0.25	0.288	0.261	Project IRR	8.18%	8.61%	8.73%
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Project IRR	8.18%	8.61%	8.73%																		
Response of DOE	<p>TÜV NORD provides clarification as following:</p> <p><b>Assessment of the data source of tariff</b></p> <p>The tariff (incl. 6% VAT) of 0.25 RMB/kWh was approved by Leshan Power Grid Company on 2006-05-08, and it is the base for SPDR and CDM consideration.</p> <p>In comparison with other hydropower projects located in Sichuan province, the highest tariff (incl. 17% VAT) is 0.288 RMB/kWh<sup>10</sup>. It is clearly stated in table 4 to the Annex of the validation report that the tariff was already pre-negotiated with the grid operator. Thus it is very unlikely that the tariff will change once the project is commissioned. Furthermore the power purchase agreement has been checked to confirm the value applied.</p> <p>The VAT of 17% should be applied by average taxpayer, which is confirmed by Decree No. 134 released by the State Council on 1993-12-13 and reconfirmed by Decree No. 538 released on 2008-11-10. Therefore, it is correct to use 17% VAT in most of the hydropower projects.</p>																				

Updated regulation for the VAT of China, Decree of the State of the Council of the People's Republic of China (No. 538), 10 November 2008.

[http://www.chinaacc.com/new/63\\_67\\_/2008\\_11\\_17\\_wa8088515201711180021980.shtml](http://www.chinaacc.com/new/63_67_/2008_11_17_wa8088515201711180021980.shtml)

<sup>7</sup> <http://www.chinaacc.com/new/63/67/84/2006/1/ti69381426571021600210776-0.htm>

<sup>8</sup> [http://szs.mof.gov.cn/shuizhengsi/zhengwuxinxi/zhengcefabu/200901/t20090122\\_110501.html](http://szs.mof.gov.cn/shuizhengsi/zhengwuxinxi/zhengcefabu/200901/t20090122_110501.html)

<sup>9</sup> <http://www.lsep.com.cn/ReadNews.asp?NewsID=2284>

<sup>10</sup> In FVR, the tariff range was mentioned as 0.18~0.29 RMB/kWh, due to two digital reserving for 0.288 RMB/kWh

Besides, the VAT of 6% could be applied by some taxpayer, including small hydropower project owner who built a plant in a county or remote rural region. The regulation was released by the National Financial Ministry document Caishui [1994] No.4, though it was revised as Caishui [2009] No.9 on 2009-01-19, the revision did not impact the applicability of 6% of remote small hydropower project.

By means of site visiting, the validation team confirms that the project's capacity is 5MW and its location is Xiba Town, Wutongqiao District, Leshan City, Sichuan Province, a remote and rural area. Thus the VAT of 6% suggested in SPDR and used in financial analysis is correct.

#### **Test IRR with highest tariff in the province**

Since there is a gap between VATs in different hydropower projects, a spreadsheet including three tariff (excl. VAT) scenarios is attached with this RfR (refer to Appendix), which shows that the IRR will not cross the benchmark even the highest tariff is applied.

If the highest tariff of 0.246 (excl. VAT) was applied in project, i.e.

- Tariff of 0.288 RMB/kWh (incl. VAT of 17%), the IRR is changing from 8.18% to 8.61%, which is still lower than the benchmark of 10%;
- Tariff of 0.261 RMB/kWh (incl. VAT of 6%), the IRR is changing from 8.18% to 8.73%, which is still lower than benchmark of 10%.

In conclusion, the proposed tariff for the project activity has been determined by authorized grid company. It has been checked and it can be confirmed that even applying the highest tariff in the province, the IRR does not cross the benchmark.

In conclusion, a detailed assessment of the tariff is provided in table 4 to the Annex of the validation report. TÜV NORD confirms that the tariff applied is the only valid during CDM decision. Even when assuming higher tariffs it is clearly shown that the IRR is still below the benchmark of 10 %. Therefore the applied tariff is appropriate.

If this information is not sufficient to close the request for review, we appoint Mr. Li Yong Jun as our contact person:

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