JAPAN CONSULTING INSTITUTE

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Date : 25 December 2009

Ref. No. : JCI-CDM-C-09-111

CDM Executive Board
c/o Mr. Daniele Violetti
Secretary to the CDM Executive Board

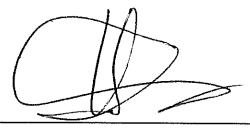
Subject : DOE Response to the Request for review
(Reference No.2926: Shimian Haiyang Hydropower Project)

Dear Sirs,

Please find the attached document which shows JCI's response to the request for review for the above CDM project with the reference number 2926.

In case you have any further question or request, please let us know by phone call or Email.

Yours sincerely,



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Issue 1: The DOE should further validate the 0.88 effective electricity coefficient and the 4% transmission loss used in the investment analysis, in line with VVM parag.109 and 112.

Response by the DOE
The DOE here validate the 0.88 effective electricity coefficient and the 4% transmission loss used in the investment analysis, according to VVM para.109 and 112.

A) <u>The 0.88 effective electricity coefficient</u>
(i)The parameter description (VVM112-a)
The relation of the underlined parameters applied to the IRR calculation are as follows.
The annual electricity delivered to the grid, which is the base of sales revenue in the IRR sheet, was calculated by the equation below, as described in Evaluation of IRR Calculation of the Validation Report 6.3.2.–(4) , also confirmed as described correctly in the PDD Section A.2.

3.2MW (installed capacity) × 5941h (annual operation hours) × 0.88(Ef) × (1- 0.008(Internal consumption)) × (1 – 0.04(Transmission Loss))

(ii)Review FSR /Appropriateness of assumptions / Correctness of computation (VVM109-c /112-c /109-d)
The DOE confirmed the relation and definition of each parameter were correctly applied in line with “Economic Evaluation Code for Small Hydropower Projects in China – SL16-95” .
The design institute, Ya’an Design & Research Institute of Water Conservancy and Hydropower and the local grid company, Sichuan Longjiang Grid Company, have provided their statement on the selection of Ef value with the interpretation of SL-16-95, as shown in Annex 1.

Because the Ef ,transmission loss and annual operation hours are key for hydropower design, the DOE verified as being defined in the original PDR as well as in the revised PDR prepared by the authorized design institutes on May 1997 and on August 2005.
These design reports were verified to be approved as a hydropower generation project by the Local authorities, by Ya’an City Development and Economic Committee in Sichuan Province on 08 September 1997, and by Shimian County Development and Reform and Economic Bureau in Sichuan Province as well as Shimian County Department of Water Resources on 01 July 2008 respectively.
Thus the DOE verified the parameter selection derived on the basis of its specific local and sectoral expertise as guided in EB38 para.54.

The DOE confirmed these parameters defined in the PDR were correctly applied as an ex-ante definition in the IRR of the CDM-PDD.

(iii)Assessment of the parameters and Cross-check (VVM109-a /109-b)
For further cross check of the validity of selection of Ef=0.88, the design institute and the local grid company made a survey report on Ef values of similar small scale hydropower projects in the same Shimian County, as shown in the Table of Annex 1.
The Ef values of three similar small scale hydropower projects in the same Shimian County are 0.85, thus the case of the project is relatively conservative.

The DOE also confirmed with the Power Purchase Agreement issued on 28/02/2009 between the project participant and a local grid company(Annex 2), where the description of the project is a run-of –river station and no restriction of power intake by the grid, thus the project was under Type 3 and “the grid agrees to absorb electrical power during abundant period and nighttime” in Table 3.4 of SL16-95, under which Ef value are defined 0.8 – 0.9.
Thus the DOE verified Ef 0.88 was adequate and relatively conservative.

(iv)Assess the sensitivity analysis (VVM109-e)
As for the assessment of likelihood of variations to reach the benchmark IRR, this case as 10%,

the sensitivity analysis simulation by applying the IRR sheet in the PDD on the variation of the annual electricity delivered to the grid to increase by +10.6% was assessed in the Validation Report 6.3.3.-2)-B).
The +10.6% of annual electricity delivered to the grid is equivalent to Ef value increases from 0.88 to 0.973 (0.88 x1.106) under the same internal consumption value and the same transmission loss value, which was confirmed by applying the IRR spreadsheet as shown in Annex 9.
For cross check, the actual higher Ef value of the registered CDM project in Sichuan Province was applied to the IRR simulation. As listed in Annex 10, the highest Ef value of collected data is 0.94 for Project number #1984. The IRR simulation with this Ef resulted 9.55% after tax without CER, thus below the bench mark.

The +10.6% of annual electricity delivered to the grid is also equivalent to the effective delivered factor (Note-1) increases from 0.838 to 0.9268 (0.838 x 1.106) under the same operation hours of the project.

Note-1: Effective Delivered Factor = 0.88(Ef) × (1- 0.008(Internal consumption)) × (1 – 0.04(Transmission Loss))
= 0.838 for Ex-ante value.

The actual operation record of the project from November 2008 to October 2009 with the copies of their sales slips were provided by the project participants as shown in Annex 3 & 3-2.
According to this record, the effective delivered factor of the project during its first year operation was 0.842, a slightly better performance but practically equal to the ex-ante value (0.838).

For cross check, the operation data of similar small scale hydropower projects in Shimian County summarized by a local grid company, Sichuan Longjiang Grid Company(Annex 4-2 & 4), shows the typical effective delivered factor (Note-1) are ranging 0.77 – 0.80 ,and an average of nine projects is 0.79.
Therefore the project (0.838) is better performance than similar projects in the same district, thus it can be concluded that the ex-ante factor of the project is conservative to those of similar projects in the same district.

For further cross check with the other small scale hydropower projects registered as CDM projects in all Sichuan province (Annex 7), their ex-ante effective delivered factors (Note-1) are ranging 0.79 – 0.99 and the average of these projects is 0.91, thus value of the project (0.838) is within the range of all Sichuan small scale CDM projects.
The ex-ante effective delivered factor (Note-1) is very much depending on system power balance as well as the performance of the grid operation of the specific district, so the comparison with all Sichuan Province is only a reference, rather the comparison of actual operation data of the same District (Annex 4-2) is more realistic.

As the summary of sensitivity analysis by cross checking with similar small scale projects in the region, actual operation record of the project, and other CDM projects in Sichuan, it is unlikely to happen that the variations of the ex-ante Ef value(0.88) as well as the ex-ante effective delivered factor (Note-1) (0.838) would go beyond the values which cross the bench mark of the IRR calculation.

Through the above discussion, the 0.88 effective electricity coefficient in the PDR and investment analysis in the PDD is conservative and credible.

B) <u>The 4% transmission loss</u>

In addition to the verification on the basic hydropower design parameters of Ef ,transmission loss, internal consumption and annual operation hours in the PDR and in the PDD as already discussed above, the rationale for selecting the transmission loss in the PDR was verified as

follows.
The 4% transmission loss was selected by the design institute of the PDR according to the guideline for “Transmission loss rate in Economic Evaluation Code for Small Hydropower Projects SL16-95”,in which an ex-ante transmission loss is defined as an estimation based on the integrated transmission loss rate of the grid in the estimated year within the county, by consideration of the grid management improvement.
According to the design institute, (Annex 1 para.1) the transmission loss of Shimian County has been generally improved and an overall transmission loss of the area has been reduced to 6.2% and construction of power networks in Shimian County is still continuing, hence, it is reasonable to set transmission loss rate as 4% for an ex-ante value of the project.

(i)Cross-check the parameters (VVM109-b)
The DOE verified this estimation was reasonable judging from the fact that three similar small scale hydropower projects in the same Shimian County apply the same 4% transmission loss. (Annex 1 Table)
In addition, the DOE cross checked with the operation rules for power stations in Sichuan, requesting a condition that the hydropower stations participating in the dispatch optimization program should bear the transmission loss corresponding to 4% of the optimized dispatched electricity amount.(Annex 5)
Thus the DOE verified the value 4% was one of the common guidelines for estimating an ex-ante parameter of the transmission loss.

The effective delivered factor (Note-1) of the project (0.838), which is rather integrated factor covering line loss, Ef and internal consumption, was cross checked by comparing with similar small scale hydropower projects in the same Shimian County(Annex 4-2), which are ranging 0.77 – 0.80 ,thus the ex-ante value of the project is higher and conservative for the IRR calculation.
In addition, even if the ex-ante transmission value was zero, (which means the effective delivered factor (Note-1) would increase from 0.838 to 0.873 (+4.2%)), the IRR result would not cross the bench mark.

Through the above discussion, the 4% transmission loss in the PDR and investment analysis in the PDD is reasonable and credible.

Issue 2: The PP/DOE are requested to submit an unprotected spreadsheet which allows the replication of the calculations, in line with EB41 Annex45 paragraph 8.

Response by the PP/DOE
The an unprotected spreadsheet is attached.

Issue 3: 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.

Response by the DOE
An ex-ante tariff value, 0.246 (excluding VAT) was applied to the IRR calculation in the PDD.
The DOE here explain how this value was determined as an ex-ante value for the IRR calculation in the PDD , and demonstrate the determination was valid and applicable at the time of the investment decision as guided by EB38 para.54 (C).

The reference tariff policy, which is regulated by National Development and Reform Commission (NDRC) , was introduced in the host country since 2004,under which newly built power stations whose power generation are directly dispatched by the Provincial Grid should apply the same tariff based on regional or provincial average cost.
According to the announcement by NDRC for Sichuan Province on 22 April 2005 (Annex 6), the

electricity tariff for a newly-built hydropower plant in Sichuan Provincial Grid was adjusted as 0.288 CNY/kwh (0.246 without VAT) .
Because the project participant had decided to seek the CDM application on 25 October 2005 (The serious consideration) and also on 15 January 2006 (The decision by Board meeting), the project participant selected the ex-ante tariff value as 0.246 with consideration of this announcement by NDRC. (Annex 6)

The DOE verified during its on-site assessment about the above decision by confirming board meeting memos and the recommendation report for CDM made by the CDM consultant on September 2005.
After 2005, the reference power tariff for newly built power stations in Sichuan Province has been unchanged up to June 2009 as 0.246 excluding VAT as confirmed by the public announcement by Sichuan Price Bureau.

For cross-checking with the similar projects within the Province, the DOE reviewed the all registered small scale hydropower CDM projects in Sichuan Province,(Annex 7) whose values are taken from the tariff values described in their PDDs, therefore the ex-ante tariff values of the registered CDM projects.
As shown, the tariff values are ranging 0.151 – 0.334 without VAT with an average 0.217 and are mostly below the standard power tariff 0.246.

Only 7 projects are above the reference tariff value, and if we apply the maximum tariff 0.334, the after tax IRR simulation has resulted over the bench mark 10%.
All these seven projects, 6 of them are in the same region in the northern part of the Province, determined their CDM project decisions on 25 August 2004, or on 18 October 2004, or on 18 February 2005, according to their PDDs. The time of their project decision was before the announcement of the standard tariff on 22 April 2005, therefore the tariff determination must have been based on their specific local environment condition.
The only plausible and public reference for the tariff determination at the time of the CDM decision by the project participant (during the year of 2005) is the reference tariff value (0.246 without VAT) announced by NDRC and the Provincial Price Bureau since April 2005. (Annex 6)

For further substantiation of the validity of the ex-ante tariff value of the project, the survey of actual tariff of similar small scale hydropower plants in the same district, Shimian County, of this project was carried out by the grid company(Annex 4-3).
As shown by the survey, the actual present tariff of the similar scale plants in Shimian County are ranging 0.165 – 0.195 without VAT and its average is 0.18 without VAT, which are much lower value compared with the reference tariff (0.246) guided by the Sichuan Price Bureau.

In addition actual applied tariff record of the project reported by the project participant was also confirmed.(Annex 3-2).
The actual electricity sales record of the project, during one year operation from November 2008 to October 2009, shows the averaged value 0.186 without VAT, which is confirmed as the same tariff value as described in the power purchase agreement issued on 28 February 2009. (Annex 2)

The project participant explained ,during on-site assessment, that small scale hydropower stations have to accept relatively low tariff value because they can not be directly dispatched by the Provincial Grid, instead they are dispatched by local grid company which does not apply the reference tariff value of Sichuan Province.
The DOE confirmed with the reference quoted recently by the Sichuan Price Bureau (Annex 8), that small scale hydropower projects delivering to a local grid company are not ruled under the reference tariff even after the introduction of the reference tariff rule.
Therefore it would be natural the contracted tariff values of small scale hydropower stations

would be lower than the reference value.

Through the above discussion, it is plausible and conservative that the tariff value guided by the provincial Price Bureau (0.246 without VAT) was applied as an ex-ante value for the investment decision, and such determination was valid and applicable at the time of the investment decision as guided by EB38 para.54 (C)

Annex list

No.	Title
1	Statement on effective coefficient, internal consumption rate and transmission loss rate of Haiyang Hydropower Station, by Ya'an Survey & Design Research Institute for Water Conservancy and Hydropower and by Sichuang Longjiang Electrical Power Co.,Ltd. on July 2009
2	Power Purchase Agreement for the project on 28/02/2009
3	Actual Operation record of the project 2008 November – 2009 October (Date source by the project owner)
3-2	Copy of power sales slips of the project 2008 November – 2009 October (Date source by the project owner)
4	Statistics on Annual electricity delivered and Tariff of similar small scale hydropower stations in Shimian County, Sichuan Province: Original (Date source by Sichuan Longjiang Electrical Power Co.,Ltd. on 18/Dec/2009)
4-2	Statistics of similar small scale hydropower stations in Shimian County, Sichuan Province: English translation of Annual electricity delivered (Date source by Sichuan Longjiang Electrical Power Co.,Ltd. on 18/Dec/2009)
4-3	Statistics of similar small scale hydropower stations in Shimian County, Sichuan Province: English translation on Tariff (Date source by Sichuan Longjiang Electrical Power Co.,Ltd. on 18/Dec/2009)
5	Information on estimation for Transmission line loss of power station in Sichuan (Information source: http://gymnasium.blog.hexun.com/42023860_d.html.
6	Notice on the Establishment a Fuel-Electricity Tariff Price Linkage Mechanism in CCPG by NDRC on 22/04/2005
7	Summary of Tariff for CDM registered small scale hydropower station in Sichuan Province, China
8	Information on Public reply by Sichuan Price Bureau (No.227 2007) on Tariff for small scale hydropower stations in Sichuan Province. (Information source: http://www.34law.com/lawfg/law/1797/2550/law_178909098946.shtml.
9	The IRR simulation result by changing Ef from the design value to cross the bench mark
10	Data of Ef values of some registered CDM projects in Sichuan Province

Annex 1
(Translation)

Statement about effective coefficient, internal consumption rate and transmission loss rate of Haiyang Hydropower Station

Haiyang Hydropower Station is a run-of-river small station without reservoir, located on the main stream of the Nanya River at Haiyang Village, Caluo Countryside, Shimian County. Considering the actual available water flow, the total installed capacity is designed as 3200 kW, the average annual electricity generation is 19011MWh, and the average annual operation hours is 5941h.

The effective coefficient is 0.88, the transmission loss rate is 4%, and internal consumption rate is 0.8%, the methods to determine these rates are shown as below:

1. **Internal consumption rate and transmission loss rate:**
   According to Clause 3.2.1 of "*Economic evaluation Code for small hydropower projects (SL16-95)*", internal consumption rate and transmission loss rate are determined, see Figure 1.

3.2.1 For electricity generation and supply in a construction project, the computing formula is:

Electricity sales profit = Effective electric quantity × (1 − Internal consumption rate) × (1 − Transmission loss rate) × Electricity tariff （**3.2.1**）

Wherein:

Effective electric quantity —— By means of system load forecasting, system power balance, overhaul of the equipments and equipment failure rate, figure out the electrical energy which can be used by the user or system;

Internal consumption rate —— Based on detailed knowledge of the constructed project, or refer to statistical data of the similar project;

Transmission loss rate —— Based on the actually integrative transmission loss rate of the grid in the right year within the county, considering the management improvement, transmission loss rate reduction and other factors during the period of construction.

Figure1. Effective coefficient, internal consumption rate, and transmission loss rate in SL 16-96.

Internal consumption rate: according to Clause 4.7 of "*Hydroenergy design code for small hydropower projects (SL76-94)*", the scale of internal consumption rate for small hydropower plants is 0.5%~1%. In the PDR of Haiyang project, the internal consumption rate is 0.8%, in which is consistent with the range in SL76-94.

Transmission loss rate: Since 1998, retrofit and construction of power networks have been started in Shimian County. With these measurements, the power quality has been generally improved, thereinto, the transmission loss has been reduced to 6.2%. Considering that the retrofit and construction of power networks in Shimian County is still continuing, hence, it is reasonable to set the transmission loss rate as 4% for Haiyang project.

The following table lists the Station service power consumption rates and network losses of Haiyang station in Shimian County and other hydropower stations around.

	Haiyang hydropower station	Gongyi 1st hydropower station	Xichong hydropower station	Yaoheba hydropower station
Installed capacity	3.2MW	3.2MW	0.5MW	0.5MW
Internal consumption rate	0.8%	0.8%	0.8%	0.8%
Transmission loss rate	4%	4%	4%	4%

2. Effective coefficient

According to Clause 3.4 of "*Economic evaluation for small hydropower projects (SL16-95)*", effective electric quantity is allowed to calculate using the simplified effective coefficient method. See Figure 2.

3.4 For the construction project which allows the using of simplified methods, the effective electric quantity can be estimated by flowing formula:

Effective electric quantity = designed electricity generation × effective coefficient (3.4)

Effective coefficient can be determined from the following Table 3.4.

Table3.4 Effective coefficient

Types of power station	Effective coefficient α
1.annually or multi-year regulated networked hydropower station	0.96~1.00
2.Quarterly regulated networked hydropower station	0.90~0.95
3.Monthly, weekly, daily regulated and non-regulated power station:	
Electricity grid agrees to absorb electrical energy during abundant period and nighttime	0.80~0.90
Electricity grid restricts to absorb electrical energy during abundant period and nighttime	0.70~0.80
4.Daily regulated and non-regulated independent hydropower station	0.60~0.70

Figure 2. Effective coefficient in SL16-95

Haiyang Hydropower Station is a run-of-river station without reservoir, so it belongs to the third type power stations in figure 2 as "non-regulated networked hydropower station", and its Effective electric quantity coefficient is 0.70~0.90.

Considering the limiting factors such as overhaul of the equipments, accident halt, transmission resistance of electricity grid, etc., and the grid agrees to absorb electrical power during abundant period and nighttime, the effective coefficient is defined as 0.88.

The following table lists the Effective coefficient of Haiyang hydropower station and other hydropower stations around the project in Shimian County:

	Haiyang hydropower station	Gongyi 1st hydropower station	Xichong hydropower station	Yaoheba hydropower station
Installed capacity	3.2MW	3.2MW	0.5MW	0.5MW
Effective coefficient	0.88	0.85	0.85	0.85

Hereby certified.

Ya'an Survey & Design Research Institute for Water Conservancy and Hydropower

July, 2009

Sichuang Longjiang Electrical Power Co., Ltd.

July, 2009

Annex 1
(Original)

关于海洋电站有效电量系数、厂用电率和网损率的说明

海洋电站位于石棉县擦罗乡海洋村境内，南椰河流域，属于小型径流引水式电站，无水库，综合考虑实际可利用的流量，总装机容量设计为 3200kW，多年平均发电量为 1901.1 万 kWh，年利用小时数为 5941 小时。

海洋电站设计的有效电量系数为 0.88，网损率为 4%，厂用电率为 0.8%，这些数据的确定方法如下：

1. 厂用电率和网损率：

依据《小水电建设项目经济评价规程(SL16-95)》第 3.2.1 条，厂用电率和网损率见图 1。

3.2.1 建设项目为发、供电统一核算单位时，计算式为：

售电收益 = 有效电量×(1−厂用电率)×(1−网损率)×计算电价 **(3.2.1)**

式中 有效电量——通过系统负荷预测、系统电力电量平衡、计入设备检修及设备事故率因素，计算出可为用户或系统利用的发电量；

厂用电率——根据建设项目的具体情况计算或参照类似工程的统计资料分析确定；

网损率——根据本县电网当年实际综合网损率，适当考虑在建设期间改进管理工作、减少网损等因素确定。

图 1. SL16-95 中关于有效电量、厂用电率和网损率的说明

厂用电率：根据《小水电水能设计规程(SL76-94)》第 4.7 条，小水电站厂用电率的取值范围是 0.5%~1%。初步设计报告中，海洋电站的厂用电率按 0.8%取值，满足 SL76-94 规定的取值范围。

网损率：1998 年起，石棉县开始实施电网建设和改造工程，通过电网建设和改造，电能质量普遍提高，其中网损率降低至 6.2%。考虑到石棉县仍在进行小范围的电网建设改造工程，因而，网损率取值为 4%是合理的。

下表列出了石棉县海洋电站及周边其他水电站厂用电率和网损率：

	海洋电站	公益一级电站	西冲电站	姚河坝电站
装机容量	3.2MW	3.2MW	0.5MW	0.5MW
厂用电率	0.8%	0.8%	0.8%	0.8%
网损率	4%	4%	4%	4%

2. 有效电量系数：

依据《小水电建设项目经济评价规程(SL16-95)》第 3.4 条，允许采用有效电量系数法简化

计算有效电量，见图 2。

3.4 允许采用简化方法计算的建设项目，其有效电量可按下式估算：

有效电量＝设计发电量×有效电量系数 **(3.4)**

有效电量系数可按表 **3.4** 选用。

表 3.4 有效电量系数表

电站类别	有效电量系数 α
1. 年或多年调节的联网电站	**0.95～1.00**
2. 季调节的联网电站	**0.90～0.95**
3. 月、周、日调节及无调节的联网电站：	
电网同意吸收丰水期及夜间电能时	**0.80～0.90**
电网限制丰水期及夜间电能时	**0.70～0.80**
4. 独立运行的日调节及无调节的电站	**0.60～0.70**

图 2. SL16-95 中关于有效电量系数的说明

由于海洋电站属于小型径流引水式电站，无水库，因而海洋电站属于图 2 中的第 3 类电站中的“无调节的联网电站”，有效电量系数取值范围为 0.70～0.90。

考虑到设备检修、事故停机、电网输电能力等限制因素，以及电网同意吸收丰水期和夜间电能，有效电量系数的取值为 0.88。

下表列出了石棉县海洋电站及周边其他水电站有效电量系数：

	海洋电站	公益一级电站	西冲电站	姚河坝电站
装机容量	3.2MW	3.2MW	0.5MW	0.5MW
有效电量系数	0.88	0.85	0.85	0.85

特此说明

雅安市水利水电勘测设计研究院

二零零九年七月

四川龙江电力有限公司

二零零九年七月

Annex 2
(Original with partial translation)

四川龙江电力有限公司电力营销部购电合同编号：(2009)028

购 售 电 合 同

Power Purchase Agreement

本购售电合同(以下简称本合同)由下列双方签署：

购电人：四川龙江电力有限公司，系一家电网经营企业，在石棉县工商行政管理局登记注册，税务登记号：511824765062502，住所：四川省石棉县康棉路 10 号，法人代表：邱虹伟。

售电人：石棉县海洋电力有限公司，系一家有法人资格的发电企业，在石棉县工商行政管理局登记注册，税务登记号：51182479583527，住所：四川省石棉县擦罗乡南桠村，法人代表：刘福全。

双方提供联络通讯及银行信息如下：

购电人名称：四川龙江电力有限公司电力营销部

电话：0835—8860895，传真：0835—8861522，邮编：625400

开户名称：四川龙江电力有限公司

开户银行：工商银行石棉支行

帐号：2319618109201022159

售电人名称：石棉县海洋电力有限公司

电话：8885975，13684452679　　邮编：625400

开户名称：石棉县海洋电力有限公司

开户银行：中国工商银行股份有限公司石棉支行

帐号：2319618109201029422

双方根据《中华人民共和国合同法》、《中华人民共和国电力法》、《电网

调度管理条例》以及国家其他有关法律法规，本着平等、自愿、诚实信用的原则，经协商一致，签订本合同。

一、容量：

售电方按计划向购电方 35KV 网络供电(本站站用电除外)，上网机组为 2×1600KW，总容量为 4000KVA，售电方不得再增加并网机组和并网容量。

二、产权划分及维护管理

以购电方 35KV 海公线 号杆"T"接点为界，"T"接点搭接线(含搭接线)以下至售电方归售电方，产权归售电方。引流线以上归购电方所有，双方按产权划分，负责各自的维护责任，当设备出现故障时，应尽快排除恢复送电。

三、上网电量、计量方式和计费电量

1、售电方在其升压站变压器高压侧装设高压分时记度箱，内设上下网双向分时电量表，双方以该表作为结算电费的关口表，其表由购电方检验，并予加封。

2、丰、平水期(每年 5 月 1 日至 11 月 30 日)售电方每日 7 点至 23 安计划向购电方供给的电量(在计划的±2%范围以内)全部计费，超过部分按照电网的考核规定扣减当月有效电量，每日 23 点至次日 7 点的上网电量，为 7 点至 23 点电量的一定比例(按 20 小时考核)。超过部分不予计费，并按电网规定扣减有效电量。

3、枯水期(每年 12 月 1 日至次年 4 月 30 日) 23 点至次日 7 点的上网电量，按 7 点至 23 点电量的一定比例(按 21.2 小时考核)，超计划部分不能计费。

四、力率考核、电价和电费结算

1、丰平期有效电量按 0.180 元/KWH 加 6%的增值税计价，枯水期有效电量按 0.195 元/KWH 加 6%的增值税计价，如遇同类电站调整电价时，本电价作相应调整。

2、售电方上网电量按力率 85.0%考核。不足部份按照电量折扣有功电量。

The tariff of the project effective electricity is 0.180CNY/kWh (without 6% of VAT) during the high water period and the normal water period; the electricity tariff of the project is 0.195CNY/kWh (without 6% of VAT) during the low flow period. If the electricity tariff of other similar hydropower stations is adjusted, the electricity tariff of the project will be adjusted accordingly.

3、双方每月在上网关口表上按时抄表作为结算电费的依据。

五、双方义务

(一)购电人的义务：

1、按照本合同的约定购买售电人电厂机组的电能。

2、遵守双方签署的并网调度协议，按照国家标准、电力行业标准运行、维护有关输变电设施，维护电力系统安全、优质、经济运行。

3、按照国家有关规定，公开、公正、公平地实施电力调度及信息披露，为履行本合同提供有关用电负荷、备用容量、输变电设施运行善等信息。

4、依据国家有关规定或双方约定，向售电人提供重新启动电厂机组所需的电力。

5、按照国家有关规定向售电人补偿其按要求提供的有偿辅助服务所发生的合理费用。

(二)售电人义务

1、按照本合同的约定向购电人出售符合国家标准和电力行业标准的电能。

2、遵守双方签署的并网调度协议，服从电力统一调度，按照国家标准、电力行业标准及调度规程运行和维护电厂，确保发电机组的运行能力达到国家有关部门颁发的技术标准和规则的要求，维护电力系统安全、优质、经济运行。

3、按月向购电人提供电厂机组可靠性指标和设备运行情况，及时提供设备缺陷情况，定期提供电厂机组检修计划，严格执行经购电人统筹安排、平衡并经双方协商确定的电厂机组检修计划。

4、按照国家有关规定向购电人补偿其按要求提供的有偿辅助服务所发生的合理费用。

5、未经国家有关部门批准，不经营直接对用户的供电业务。

六、其它

1、本合同经双方法定代理人或委托代理人签字并加盖公章后生效。

2、本合同期限，自二〇〇九年一月一日二〇〇九年十二月三十一日止。期满后双方无异可继续执行。

3、当情况发生变化，一方无力履行协议时，必须提前一年告知对方，否则，将赔偿由此造成的损失。

4、本协议共 4 页，一式六份，售电方二份，购电方四份。

购电人：四川龙江电力有限公司电力营销部　　售电人：石棉县海洋电力有限公司

法定代表人
（或委托代理人）：

法定代表人
（或委托代理人）：

签字日期：二〇〇九年二月二十八日

Annex 3

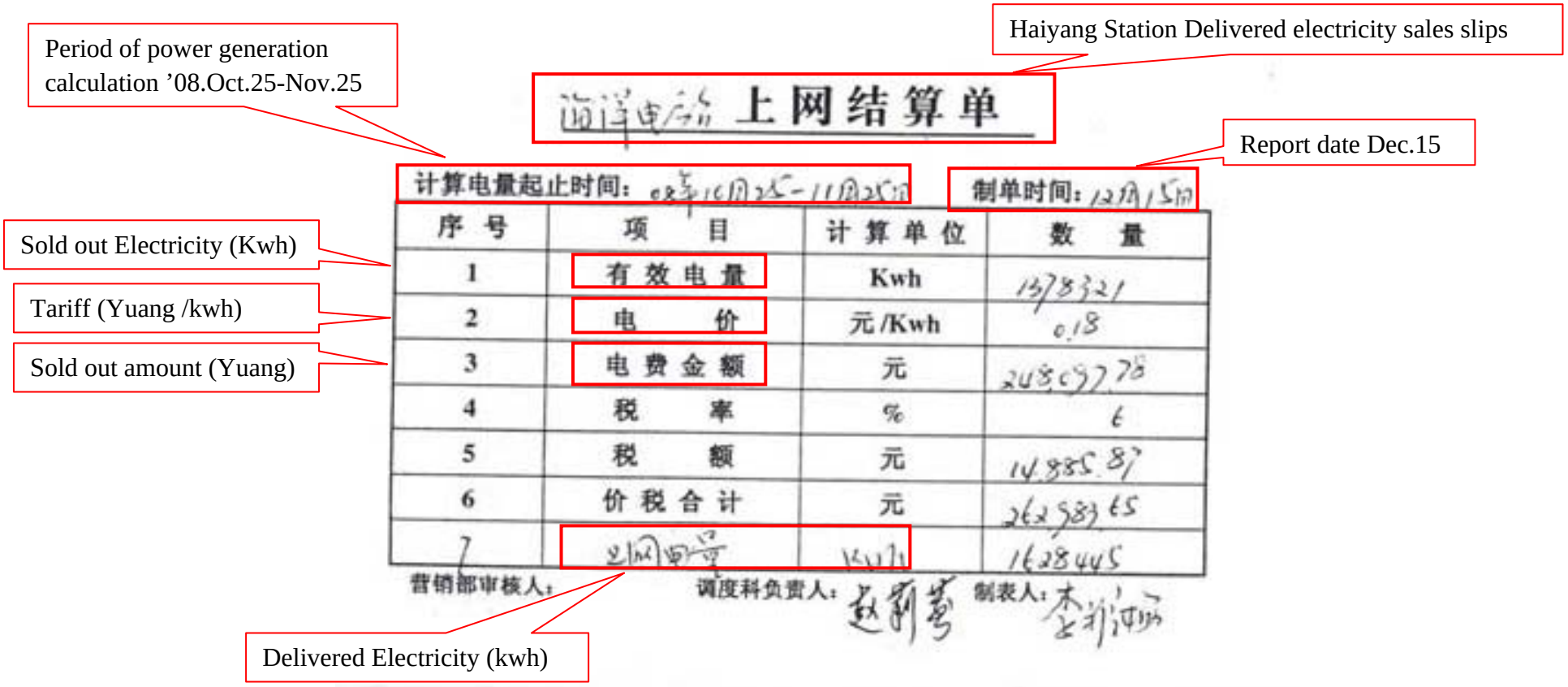
Actual operation record of Haiyang Hydropower Project 2008-2009

Data source by the project owner December 2009

Month	(G) Generated Electricity (MWh)	(D) Delivered Electricity (MWh)	(S) Soldout Electricity (MWh)	(S / G)Effective Delivered Factor (%)
2008 Nov.	1640.7	1628.445	1378.321	84.0
2008 Dec.	1338.912	1332.975	1163.273	86.9
2009 Jan.	630.252	623.595	539.099	85.5
2009 Feb.	1010.16	995.61	888.734	88.0
2009 Mar.	641.412	630.525	560.634	87.4
2009 Apr.	836.784	831.495	734.563	87.8
2009 May	1462.032	1445.22	1197.263	81.9
2009 June	1230.732	1220.835	1023.688	83.2
2009 July	1303.02	1298.01	1091.741	83.8
2009 Aug	1643.472	1633.905	1347.97	82.0
2009 Sep.	1605.96	1598.94	1349.39	84.0
2009 Oct	1925.568	1894.095	1587.819	82.5
Total	**15269**	**15133.7**	**12862.5**	**84.2**

Annex 3-2

Copy of power sales slips of the project



海洋电站 上网结算单

计算电量起止时间：08年10月25-11月25日　　制单时间：12月15日

序 号	项 目	计 算 单 位	数 量
1	有 效 电 量	Kwh	1378321
2	电 价	元/Kwh	0.18
3	电 费 金 额	元	248097.78
4	税 率	%	6
5	税 额	元	14885.87
6	价 税 合 计	元	262983.65
7	上网电量	Kwh	1628445

营销部审核人：　　调度科负责人：赵刚等　　制表人：李[illegible]

Period of power generation calculation '08.Nov.25-Dec.25

Report date Dec.31

海洋电站 上网结算单

计算电量起止时间：08年11月25－12月25日　　制单时间：12月31日

序 号	项 目	计 算 单 位	数 量
1	有 效 电 量	Kwh	1163273
2	电 价	元/Kwh	0.195
3	电 费 金 额	元	226838.24
4	税 率	%	6
5	税 额	元	13610.29
6	价 税 合 计	元	240448.53
	0.4KV电量	Kwh	1332575

营销部审核人：　　调度科负责人：　　制表人：

Period of power generation calculation '09.Sep.25-Oct.25

Report date Nov.24

上网结算单

计算电量起止时间：09年9月25-10月25日　　制单时间：11月24日

序号	项目	计算单位	数量
1	有效电量	Kwh	1587819
2	电价	元/Kwh	0.18
3	电费金额	元	285807.42
4	税率	%	6
5	税额	元	17148.45
6	价税合计	元	302955.87
	上网电量	kwh	1894095

营销部审核人：　　调度科负责人：　　制表人：

Annex 4-2
(Translation)

Annual electricity delivered by similar small scale hydropower stations in Shimian County, Sichuan Province

Annual electricity delivered by similar small hydropower stations in Shimian County, Sichuan Province

Data source by Sichuang Longjiang Electrical Power Co., Ltd. on 18/Dec/2009

Project Name	Installed Capacity (MW)	(G) Annual electricity generated (MWh)	(S) Annual electricity delivered (MWh)	Effective Delivered Factor (S / G %)
Haizigou Hydropower Station	2	10874	8736	80
Yulong Hydropower Station	2.06	11577	9035	78
Liangchahe Hydropower Station	2.5	13493	10335	77
Huitonggou Hydropower Station	2.5	13013	10394	80
Dazhongyin Hydropower Station	3.2	17044	13638	80
Dagoutou Hydropower Station	3.2	16723	13077	78
Gongyi First Cascade Hydropower Station	3.2	16293	13053	80
Gongyi Third Cascade Hydropower Station	3.2	17035	13878	81
Xiaonanguaqiao Hydropower Station	3.75	19358	15509	80
Average				**79.3**

Annex 4-3
(Translation)

Tariff for similar small scale hydropower stations in Shimian County, Sichuan Province

Tariff for similar small scale hydropower stations in Shimian County,Sichuan Province

Data source by Sichuang Longjiang Electrical Power Co., Ltd. on 18/Dec/2009

Project Name	Installed Capacity (MW)	Tariff (without VAT) (CNY/kWh)	Average Tariff (without VAT) (CNY/kWh)
Haizigou Hydropower Station	2	High water and normal water period : 0.195 Low-flow period: 0.175	0.185
Yulong Hydropower Station	2.06	High water and normal water period : 0.170 Low-flow period: 0.160	0.165
Liangchahe Hydropower Station	2.5	High water and normal water period: 0.195 Low-flow period: 0.175	0.185
Huitonggou Hydropower Station	2.5	High water and normal water period: 0.170 Low-flow period: 0.160	0.165
Dazhongyin Hydropower Station	3.2	High water and normal water period:0.195 Low-flow period: 0.175	0.185
Dagoutou Hydropower Station	3.2	High water and normal water period: 0.170 Low-flow period: 0.160	0.165
Gongyi First Cascade Hydropower Station	3.2	High water and normal water period: 0.195 Low-flow period: 0.175	0.185
Gongyi Third Cascade Hydropower Station	3.2	High water and normal water period:0.195 Low-flow period:0.175	0.185
Xiaonanguaqiao Hydropower Station	3.75	High water and normal water period: 0.205 Low-flow period: 0.185	0.195
Average			**0.179**

Annex 4
(Original & Translation)

The electricity and tariff statistics of small scale hydropower stations in Shimian County

Due to the differences in power demand periods and the power grid fragility in Shimian County, the County applies in high water period, normal water period and low flow period different tariffs in order to control the electric power and energy balance and restrict the surplus electricity during high water period, normal water period and nighttime. In Shimian County, the high water period and normal water period start on from May 1st and finish on November 30th, while the low flow period is from December 1st to April 30th, and the tariff of high water period and normal water period is lower than that of low flow period. The on-grid electricity tariff in Shimian County has been quite stable in recent years, and the average electricity tariff of the small hydropower stations which were exported to the grid is 0.180 CNY/kWh. Statistics of electricity and tariffs are shown in the following table:

No.	Name of station	Installed capacity (MW)	Designed annual power generation (MWh)	Annual electricity exported to the grid (MWh)	Coefficient of effective electricity	Tariff CNY/KWh
1	Haizigou Station	2	10874	8736	80%	0.195 (LFP[1]) 0.175 (HFP&AFP[2])
2	Yulong Station	2.06	11577	9035	78%	0.170(LFP) 0.160(HFP&AFP)
3	Liangchahe Station	2.5	13493	10335	77%	0.195(LFP) 0.175(HFP&AFP)
4	Huitonggou Station	2.5	13013	10394	80%	0.170(LFP) 0.160((HFP&AFP)
5	Dazhongying Station	3.2	17044	13638	80%	0.195(LFP) 0.175((HFP&AFP)
6	Dagoutou Station	3.2	16723	13077	78%	0.170(LFP) 0.160((HFP&AFP)
7	Gongyi First-stage Station	3.2	16293	13053	80%	0.195(LFP) 0.175(HFP&AFP)
8	Gongyi Third-Stage Station	3.2	17035	13878	81%	0.195(LFP) 0.175(HFP&AFP)
9	Haiyang Station	3.2	19011	15134	80%	0.195(LFP) 0.18(HFP&AFP)
10	Xiaonangua Station	3.75	19358	15509	80%	0.205(LFP) 0.185(HFP&AFP)

Sichuan Longjiang Grid Company

December 18th, 2009

[1] LFP is the abbreviation for “low flow period”
[2] HFP&AFP is the abbreviation for “high water period and normal water period"

石棉县小水电站电量电价统计表

由于石棉县地区电力需求时段的差异和电网较为脆弱，为了控制石棉县电网的电力电量平衡，限制丰平水期和夜间盈余的电量，石棉县实行的是丰平枯电价，丰平期为每年5月1日至11月30日，枯期为每年12月1日至次年4月30日，丰平期电价均比枯期电价低。石棉县最近几年的上网电价较为稳定，其中石棉县地区经我电力公司电网输送电量的小水电站平均电价为0.180元/kWh，小水电站电量电价统计结果如下：

序号	电站名称	装机 MW	年设计发电量 MWh	年上网电量 MWh	有效电量系数	电价 元/kWh
1	海子沟电站	2	10874	8736	80%	枯期 0.195 丰平期 0.175
2	玉龙电站	2.06	11577	9035	78%	枯期 0.170 丰平期 0.160
3	两岔河电站	2.5	13493	10335	77%	枯期 0.195 丰平期 0.175
4	汇同沟电站	2.5	13013	10394	80%	枯期 0.170 丰平期 0.160
5	大中营电站	3.2	17044	13638	80%	枯期 0.195 丰平期 0.175
6	大沟头电站	3.2	16723	13077	78%	枯期 0.170 丰平期 0.160
7	公益一级电站	3.2	16293	13053	80%	枯期 0.195 丰平期 0.175
8	公益三级电站	3.2	17035	13878	81%	枯期 0.195 丰平期 0.175
9	海洋电站	3.2	19011	15134	80%	枯期 0.195 丰平期 0.18
10	小南瓜桥电站	3.75	19358	15509	80%	枯期 0.205 丰平期 0.185

四川龙江电力有限公司

2009年12月18日

Annex 5

Estimation for transmission line loss of power station in Sichuan Province

以往,四川省内是以<四川省优化配置水火电量管理办法(试行)>和<四川省优化配置水火电量实施细则(试行)>为依据来调节水火电企业的电量配置。凡并入省电力公司电网内,总装机容量大于或等于 1 万千瓦的独立核算发电企业,每年的丰水期,即 6 月至 10 月,都可申请参与发电上网优化配置,火电厂的优化配置电量按国家批准的上网电价并根据其管理及结算具体情况,分别由省电力公司或相关电业局向该企业直接支付购电费。但是参与优化配置的水电厂按优化配置电量的 4%承担线损。

The allocation of thermal and hydro-power stations in Sichuan Province has been planned and controlled through the Detailed Operation (temporary) Rules for Optimum Allocation of Thermal and Hydro-power Stations.

Under this rule, any power station over 10MW capacity could apply to connect to Sichuan Power Grid network, under the condition that a hydropower station should bear the 4 % transmission line loss and other conditions.

Annex 6

国家发展改革委关于华中电网实施煤电价格联动有关问题的通知

Notice on the Establishment a Coal-Electricity Price Linkage Mechanism in CCPG

湖北、湖南、江西、河南、四川、重庆省（市）发展改革委

按照我委《印发关于建立煤电价格联动机制的意见的通知》（发改价格〔2004]2909号）精神，经国务院批准，决定实施煤电价格联动，疏导突出电价矛盾，相应调整上网电价和销售电价水平。现将有关事项通知如下：

一、实施煤电价格联动，取消超发电价，适当调整上网电价。

(一) 为解决2004年6月以来煤价上涨以及取消超发电价对电价的影响，适当调整发电企业上网电价。华中电网有关省（市）电网统调燃煤机组（含热电联产机组）上网电价（含税，下同）提价标准每千瓦时分别为：湖北省3.1分钱、湖南省2.4分钱、江西省2.2分钱、河南省3.1分钱、四川省2.3分钱、重庆市1.8分钱；统调水电机组上网电价提价标准每千瓦时分别为：湖南省0.1分钱、江西省0.9分钱、河南省0.9分钱、四川省0.8分钱、重庆市0.3分钱，湖北省统调水电机组上网电价不高于0.30元的每千瓦时提高0.3分钱。同时，为解决从电网分离出来的电厂和部分低电价电厂的经营困难，按保本微利原则提高其上网电价，有关电厂具体水平见附件。

(二) 湖南省分步取消超发电价，第一步将水电超发电价提高为每千瓦时0.279元，火电超发电价提高为每千瓦时0.332元；政府核定上网电价的发电利用小时按我委发改价格〔2004]1038号文件的有关规定执行，其中耒阳电厂3号、4号机组按燃煤机组统一发电利用小时执行。其他省（市）发电企业在本省内销售的所有上网电量均执行政府规定的上网电价水平。

(三) 将葛洲坝电厂、丹江口电厂和小浪底水电站的上网电价分别提高为每千瓦时0.1599元、0.1687元和0.317元。将重庆市小水电最低保护价提高为每千瓦时0.185元。二滩水电开发有限责任公司在四川电网的上网电价提高为每千瓦时0.273元，在重庆电网的上网电价（不含输电费）提高为每千瓦时0.245元。四川净送重庆的9亿千瓦时电量按双方协商电价每千瓦时0.255元执行。外商直接投资的河南省南阳普光电力有限公司上网电价调整水平由河南省发改委与企业协商后确定。

(四) 三峡电量到华中有关省市的落地电价每千瓦时分别提高为：湖北省0.2855元、湖南省0.2949元、江西省0.3364元、河南省0.2940元、重庆市0.2838元；三峡电量对华中有关省市结算的上网电价每千瓦时分别提高为：湖北省0.2236元、湖南省0.2327元、江西省0.2729元、河南省0.2319元、重庆市0.2220元；三峡电量输电价格和输电准许损耗率仍按我委发改价格〔2003]1028号文件的规定执行。

(五) 电价调整后，发电企业要加强管理，挖潜降耗，努力消化煤炭价格上涨等成本增支因素。

二、适当提高销售电价水平。有关省（市）电网销售电价平均提价标准每千瓦时分别为：湖北省3.1分钱、湖南省2.4分钱、江西省3.97分钱、河南省3.99分钱、四川省2.28分钱、重庆市2.89分钱。各类用户电价具体调整标准如下：

(一) 农业、中小化肥生产用电价格暂不调整。

(二) 湖北、湖南、四川、重庆省（市）居民生活用电价格暂不调整。同意河南、江西省电网适当调整居民生活用电价格，具体调价水平请省级价格主管部门组织召开听证会后报我委核准。

(三) 国家产业政策鼓励类项目中，采用离子膜法工艺的氯碱生产用电和年产能10万吨以上的电解铝生产用电电价适当少调，电度电价提价标准每千瓦时分别为：湖北省2.3分钱、湖南省2分钱、江西省2.5分钱、河南省2.4分钱、四川省1.8分钱、重庆市2分钱。

(四) 其余用户电度电价每千瓦时提价标准为：四川省3.7分钱、河南省大工业用电4.8分钱，其他各类用电5分钱；江西省非居民照明用电 8分钱，其他各类用电 5分钱；湖北、湖南、重庆省（市）趸售电价分别提高 1.6分钱、2.6分钱和1分钱，其他各类用电分别提高4.6分钱、3.9分钱和4分钱。四川省居民生活区（含居民住宅小区和单位宿舍院内）的路灯用电价格按国家有关规定执行。

三、提高新投产机组标杆上网电价。电网统一调度范围内新投产未安装脱硫设备的燃煤机组（含热电联产机组）上网电价每千瓦时分别调整为：湖北省0.351元、湖南省0.369元、江西省0.357元、河南省0.321元、四川省0.318元、重庆市0.312元；安装脱硫设备的在此基础上每千瓦时提高0.015元。湖南、四川电网统一调度范围内新投产水电机组上网电价分别调整为每千瓦时0.316元和0.288元。新投产机组进入商业运营后，上网电价一律按上述价格执行。

Tariff of centralized dispatched newly operation hydropower generation units connecting Hunan and Sichuan Provincial Grid is adjusted to 0.316 CNY/kWh and 0.288 CNY/kWh respectively. This tariff applies to all centralized dispatched newly operation hydropower generation units once the commercial operation starts.

四、电解铝、铁合金、电石、烧碱、水泥、钢铁等6个高耗能行业实行的差别电价政策和规范企业自备电厂有关价格、收

五、河

起执行。

六、各

时得到贯彻落实。我委将会同国家电监会对各地的执行情况进行检查。各地执行中如有问题，请及时报告我委。

附件：华中电网部分电厂上网电价表（略）

二○○五年四月二十二日

http://www.pzhjg.gov.cn/ShowArticleContent.asp?InfoId=1115

Annex 7

Tariff for CDM registered small scale hydropower stations in Sichuan Province

No	Reference Number	Project Name	Capacity (MW)	Tariff (with VAT) (CNY/kWh)	Tariff (without VAT) (CNY/kWh)
1	1814	Yuexi Dayan Small Hydropower Project	14.2	0.16	0.151
2	2255	Siliping Small-Scale Hydro Power Project	10	0.17	0.16
3	2256	Shilong Small-Scale Hydro Power Project	10	0.17	0.16
4	1508	Lixian Yikeyin Small Hydropower Project	13.6	0.173	0.1632
5	1190	Pingwu Renjiaba 12.6MW Small Hydropower project	12.6	0.18	0.1698
6	2463	Sichuan Xiaohegou 12.6MW small-scale hydropower project	12.6	0.1908	0.18
7	2177	Pingwu Huangyanghe Stage I Small Hydropower Project	6.4	0.18	0.1698
8	2071	Sichuan provincial Longchi & Caoyuan 9 MW Small-scale Hydro Power Bundle Project	9	0.18	0.17
9	1322	Sichuan Banzigou Small Hydropower Project	11.4	0.193	0.182
10	1966	Sichuan Miyaluo Hydroelectrci Station	15	0.2129	0.182
13	1498	Baji River Stage I 10MW Run-of-river Hydropower Project	10	0.212	0.2
14	2046	Sichuan Cong'en 8MW Hydropower Project	8	0.2173	0.205
15	1231	Shanmugou Small Hydropower Project	10	0.248	0.211
16	1515	Caoying Small Hydropower Project	4.8	0.226	0.2132

No	Reference Number	Project Name	Capacity (MW)	Tariff (with VAT) (CNY/kWh)	Tariff (without VAT) (CNY/kWh)
17	1810	Shanshuping 12MW Small Hydropower Project in Sichuan Province, China	12	0.2353	0.222
19	2592	Sichuan Yonghe Yulong Hydropower Project	2.06	0.26	0.246
20	2616	Shimian Danihe Hydropower Project	5	0.26	0.246
21	2082	Cangxi Donghe Fengziyan Hydroelectric Power Station	12	0.288	0.272
22	2066	Cangxi Liyuan Hydropower Station	12	0.288	0.272
23	2058	Cangxi Donghe Likou Hydroelectric Power Station	10	0.29	0.273
24	2084	Cangxi Donghe Yangmousi Hydropower Station	8	0.29	0.274
25	2069	Cangxi Donghe Dongxi Hydropower Station	10	0.29	0.274
26	2154	Cangxi Donghe Beituo Hydropower Station	10	0.29	0.274
27	1490	Yuejiang Small-Scale Hydropower Project	12	0.37	0.334
Average of 24 Projects				**0.2323**	**0.2168**

Annex 8

四川省物价局关于合江县小水电上网电价相关问题的复函

Public reply by Sichuan Price Bureau (No.224 2007) to a question raised by a small scale power stations society on Tariff for small scale hydropower stations in Sichuan Province

川价函〔2007〕224 号

合江县小水电行业协会：

你协会《关于泸州市物价局是否有权批准小水电上网电价的情况反映》（合水电协〔2007〕3 号）悉。Z203。0 现将有关情况回复如下：

一、根据省物价局川价电发〔2003〕32 号和《四川省物价局关于地方电网上网电价管理权限的复函》（川价函〔2004〕136 号）文件精神，为减少价格审批事项，促进经营城市战略的实施，我省将地方电网电力销售价格及地方电网调度的发电厂的上网电价授权市、州物价局管理。据我们了解，合江县小水电上网电价在此次调价之前，一部分是在 1996 年制定的，另一部分是由小水电站与电力公司签定上网协议确定，实行的是一厂一价。为了规范小水电上网电价管理，泸州市物价局对只发不供的 27 个小水电站的上网电价进行了规范和调整。

二、根据国家颁布的《政府价格决策听证办法》规定，我省制订了《四川省价格决策听证目录》，发电厂上网电价没有列入价格决策听证目录。

三、国家发改委从 2004 年起对由国家电网调度的发电厂上网电价实行标杆电价管理。我省对地方电网调度的发电厂上网电价未作统一规定。

Since the determination by National Development Reform Committee in 2004, the standard tariff control has been practiced on the power stations connected to the national grid.
But in Sichuan Province, there is no standardized rule to the power stations connected to local grid.

Haiyang / 海洋 - Project IRR

The IRR simulation by changing Ef=0.88 → 0.973

Annex 9

Ⅰ. Investment

No.	Items	Amount (10^4CNY)
	Total Investment	3,014.3
1	Fixed assets	3,014.3
1.1	The first year	1,707.7
1.2	The second year	1,306.6
2	Circulating capital	0
Remarks	Construction years	2
	Operation years	30

Ⅱ. Operation & Maintenance Costs

No.	Items	Unit	Unit Cost	Unit	Operatin Year	Remarks	
1	**O&M costs**			10^4CNY/year	60.1		
1.1	Repair costs		1.0%	10^4CNY/year	30.1	Fixed assets * repair cost rate	
1.2	Labor costs and pension	10^4CNY/year	1.14	10^4CNY/year	20.5	Number of staff	18
1.3	Material costs	CNY/kW	0	10^4CNY/year	0	Installed capacity (kW)	3,200
1.4	Maintenance fund for reservoir	CNY/kW·h	-	10^4CNY/year	-		
1.5	Fixed assets premium		0	10^4CNY/year	0	Fixed assets * rate	
1.6	Water resource fee	CNY/kW·h	0.001	10^4CNY/year	1.8		
1.7	Other costs	CNY/kW	24	10^4CNY/year	7.7		
2	**CER costs**			10^4CNY/year	17.6		
2.1	EB SOP-Admin	US$/CER	0.1 \ 0.2	10^4CNY/year	1.4	EB	
2.2	EB SOP-Adap		2%	10^4CNY/year	3.1	EB	
2.3	Transaction costs by Chinese DNA		2%	10^4CNY/year	3.1	Chinese CDM Regulations	
2.4	Verification/Certification costs	10^4CNY/year	10.0	10^4CNY/year	10	Assumption	

Ⅲ. Depreciation

No.	Items	Unit	Amount
1	Fixed assets	10^4CNY	3,014.3
2	Depreciation period	Year	20
3	Annual depreciation value	10^4CNY/year	151
4	Residual value	10^4CNY	0

Ⅳ. Revenues

No.	Items	Unit	Operation Year
1	Electricity Revenues	10^4/year	433
2	Electricity generation	MWh/year	19,011
3	Electricity sales	MWh/year	17,616
4	CER Quantity	tCO_2e/year	17,149
5	Gross CER Revenues	10^4/year	155
6	Net CER Revenues	10^4/year	138

Remarks	
Electricity Tariff (without VAT) (CNY/kWh)	0.246
Annual operation hours (hrs)	5941
Effective power coefficient	97%
Transmission Loss rate	4%
Electricity consumption rate by the project	0.8%
Effective electricity (MWh/year)	18,498
Exchange Rate (¥/$)	7.4
CER Price (US$/CER)	12.25
Emission Factor of Central China Power Grid (tCO2e/MWh)	0.9735

Ef=97.3% (But cell shows only round off number)

Ⅴ. Tax

No.	Items	Rate
1	Value Added Tax	6%
2	City Construction and Maintenance Tax	1%
3	Educational Surcharge	3%
4	Income Tax	4%

Ⅵ. Total Cost

With CERs

No.	Items	Total	Average	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	O&M costs (10^4CNY/year)	1803	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2	CER costs (10^4CNY/year)	371	12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	0	0	0	0	0	0	0	0	0
3	Depreciation (10^4CNY/year)	3014	100	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	0	0	0	0	0	0	0	0	0
4	Total costs (10^4CNY/year)	5188	173	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	78	60	60	60	60	60	60	60	60

Without CERs

No.	Items	Total	Average	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	O&M costs (10^4CNY/year)	1803	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2	CER costs (10^4CNY/year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Depreciation (10^4CNY/year)	3014	100	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	0	0	0	0	0	0	0	0	0
4	Total costs (10^4CNY/year)	4817	161	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	60	60	60	60	60	60	60	60	60

Ⅶ. Profit and Loss

With CER

No.	Items	Total (10^4CNY)	Average (10^4CNY)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Elec.revenues	13001	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
2	CER revenues	3265	109	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	0	0	0	0	0	0	0	0	0
3	Taxes	811	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
4	Total costs	5188	173	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	78	60	60	60	60	60	60	60	60
5	Gross profits	10266	342	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	484	346	346	346	346	346	346	346	346
6	Making up losses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Income tax	411	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	19	14	14	14	14	14	14	14	14
8	Profits after tax	9855	329	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	465	332	332	332	332	332	332	332	332

Without CER

No.	Items	Total (10^4CNY)	Average (10^4CNY)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Elec.revenues	13001	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
2	Taxes	811	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
3	Total costs	4817	161	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	60	60	60	60	60	60	60	60	60	60
4	Gross profits	7372	246	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	346	346	346	346	346	346	346	346	346	346
5	Making up losses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Income tax	295	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	14	14	14	14	14	14	14	14	14	14
7	Profits after tax	7077	236	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	332	332	332	332	332	332	332	332	332	332

Ⅶ. Cash Flow

With CER

No.	Items	Total (10^4CNY)	Average (10^4CNY)	Construction period		Operation period																												
				1	2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	**Cash inflow**	16265	542			589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	589	433	433	433	433	433	433	433	433	433
1.1	Elec.revenues	13001	433			433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
1.2	CER revenues	3265	109			155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	0	0	0	0	0	0	0	0	0
1.3	Recovered fixed assets residual value	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4	Recovered circulating capital	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**Cash outflow**	6410	214	1708	1307	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	124	101	101	101	101	101	101	101	101	101
2.1	Fixed assets investment	3014	100	1708	1307																														
2.2	Circulating capital																																		
2.3	O&M costs	1803	60			60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2.4	CER costs	371	12			18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	0	0	0	0	0	0	0	0	0
2.5	Sales tax	811	27			27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
2.6	Income tax	411	14			13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	19	14	14	14	14	14	14	14	14	14
3	Net cashflow (before income tax)	10266	342	(1708)	(1307)	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	484	346	346	346	346	346	346	346	346	346
4	Net cashflow (after income tax)	9855	329	(1708)	(1307)	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	471	465	332	332	332	332	332	332	332	332	332

No.	Financial indicator	Before tax	After tax
1	IRR	14.41%	13.99%
2	NPV（Ic=10%）	1050	945

Without CER

No.	Items	Total (10^4CNY)	Average (10^4CNY)	Construction period		Operation period																												
				1	2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	**Cash inflow**	13001	433			433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
1.1	Elec.revenues	13001	433			433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
1.2	Recovered fixed assets residual value	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3	Recovered circulating capital	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**Cash outflow**	5924	197	1708	1307	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	101	101	101	101	101	101	101	101	101	101
2.1	Fixed assets investment	3014	100	1708	1307																														
2.2	Circulating capita	0	0																																
2.3	O&M costs	1803	60			60.1	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2.4	Sales tax	811	27			27.0	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
2.5	Income tax	295	10			7.8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	14	14	14	14	14	14	14	14	14
3	Net cashflow (before income tax)	7372	246	(1708)	(1307)	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346
4	Net cashflow (after income tax)	7077	236	(1708)	(1307)	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	332	332	332	332	332	332	332	332	332

No.	Financial indicator	Before tax	After tax
1	IRR	10.28%	10.00%
2	NPV（Ic=10%）	65	-1

The IRR (After Tax)　8.73% →10.0%

Annex 10

Effective electricity coefficients of registered CDM projects in Sichuan province

Project No.	Project name	Installed Capacity (MW)	Effective electricity coefficient
1897	Sichuan Pingshan Pingbian&Guanyintuo Hydropower Station	40	83%
1984	Sichuan Wanyuan Baiyangxi Hydropower Station	32	94%
1987	Sichuan Pingwu Xiannvbao Hydropower Station	76	88%
2009	Sichuan Jiajiang Qianfoyan Hydro Project	102	81%
2155	Sichuan Baishuijiang Shuanghe Hydro Power Project	81	90%
2189	Tianquan Qieshan Hydro Power Project	22.5	79%
2195	Tianquan Shiyang Hydro Power Project	21	88%