EcoSecurities Limited

ECO SECURITIES

1st Floor
Park Central
40/41 Park End Street
Oxford OX1 1JD
UK

Tel +44 (0)1865 202 635
Fax +44 (0)1865 251 438
Email uk@ecosecurities.com
www.ecosecurities.com

Members of the CDM Executive Board
UNFCCC Secretariat
Martin-Luther-King-Strasse 8
D-53153 Bonn
Germany

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Dear Members of the CDM Executive Board,

Request for review – "Chongqing Iron & Steel Co. Ltd. Waste Gas to Electricity Project" (1689)

Please find below our response to the issues raised in the request for review for this project.

1. Considering that the investment being made is in the power sector, further substantiation that the benchmark reflects the risk profile of this project activity is required.

Project Proponent response: The 13% benchmark used is taken from the 'Economic Assessment of Construction Projects, Methods and Parameters, Third Edition' (2006). This book is published by the National Development and Reform Commission (NDRC) and the Ministry of Construction in China and is widely used by the relevant authorities for assessing the financial viability of potential new projects. The benchmark is applicable to all investments made in the iron and steel sector and is recommended to be used in project assessment by the NDRC, and is also the benchmark that was used in the Preliminary Design Reports/PDRs (feasibility studies) for the project components. This benchmark has also been used in several registered iron and steel sector CDM projects[1].

Although the project is an electricity production project, it is a captive power plant (not selling to the grid) and is being built on-site at a steel mill, and as such can only be built by the project developer, an iron and steel company. The project must compete with other alternative investments that the project developer may wish to make in its core business, therefore the sectoral benchmark was considered appropriate. As stated in the validation report, "An IRR of 13% has been selected as the benchmark rate, which is deemed to be reasonable for such waste gas utilisation electricity generation project and also is representing a set benchmark rate for the Chinese Iron & Steel Industry, *including investments by iron and steel companies in waste gas utilisation and power generation*".

2. The DOE shall confirm how it has validated the requirements of EB 38 paragraph 54(a), in particular, that the FSR has been the basis of the decision to proceed with the investment in the project.

[1] See for example projects 1416, 1218, 1390 & 1262

Project Proponent response: Although this question is addressed to the DoE, we would like to provide the following further clarifications:

Given that the project consists of two components, each using a different technology and with a different start date, two separate feasibility studies (called 'Preliminary Design Reports', PDRs) were carried out. The PDRs for the two components of the proposed project were both written by an independent third party, the Chongqing Iron and Steel Design Institute, an entity that is accredited by the Chinese Government to carry out independent PDRs/feasibility studies. The PDRs were formulated according to relevant national standards and criteria as set out in the document 'Economic Assessment of Construction Projects, Methods and Parameters, Third Edition' (2006) (see response to point 1, above). The PDRs were audited and approved by the local government, the Economic Committee of Chongqing City, on 18th August 2004 (for the Condensing Steam Generator – CSG- component) and on 3rd April 2006 (for the Combined Cycle Power Plant -CCPP - component). PDRs (or Feasibility Study Reports) in China contain an assessment of all aspects of the project including technological design, financial feasibility, logistics and construction schedule and, in the case of this project, carbon financing. The PDRs are used by project developers to determine whether or not to proceed with an investment (i.e. whether the investment is considered feasible).

Both PDRs considered CDM financing, and were the basis of the decision to invest in the proposed project (and of the approval of the project by the local government). The time between the completion of the PDRs and the start date of the project activity (signing of construction contracts or construction start) was relatively short. The following illustrates the timeline of the planning of the project activity:

Table 1: timeline of the planning of the project activity

Stage	**Date**
PDR written for CSG	May 2004
PDR written for CCPP	March 2006
PDR approved for CSG	18th August 2004
PDR approved for CCPP	3 April 2006
Start date of the project activity: signing of construction contract for CSG	7th April 2005
Construction start date of CCPP component	6 April 2006

Given the rising commodity and labour prices in the host country in the last 5 years, any change in the values given in the PDRs between the time of approval and time of project start is likely to have been an increase in costs, therefore using the data from the PDRs is considered conservative.

3. The DOE is requested to provide explanation for the delay in submitting the project for validation to show that CDM revenues were considered essential in the decision to invest in the project activity. The response should provide a detailed timeline of project implementation with relevant, preferably third party evidences.

Project Proponent response: Although this question is addressed to the DoE, we would like to provide the following further clarifications:

The proposed project activity is a project that has been designed with CDM in mind from the very beginning: CDM revenues were an integral part of the early planning and decision making for the project activity, and were therefore included in both the PDRs for the proposed project, as well as considered at Board level before the decision to invest in the proposed project was taken. Without CDM revenues, the project was not considered attractive by the project developer, nor would it have met the government-mandated sectoral IRR benchmark for investments by iron and steel companies.

The CDM project consists of 2 components, and the PDR for the larger CCPP component was only completed in March 2006, only 5 months before the project was submitted to validation. PDD development and validation was only begun after the completion of the planning stage of the CCPP, since this is a much larger component of the project, and splitting the CDM project into two (separating off the CSG component and submitting earlier as a separate CDM project) would have incurred significant additional transaction costs, and would not be feasible under the methodology.

After the CDM was considered in the PDR for the CSG component and at Board level, the project developer began negotiations with EcoSecurities for the purchase of carbon credits from the project. An Emissions Reduction Purchase Agreement was signed by the project developer on the 15th October 2005. A clarification was submitted to the Methodologies Panel on 23rd December 2005 by Det Norske Veritas in relation to this project and the methodology was subsequently revised in March 2006[2]. The project could not begin validation until after the revised version of the methodology was approved.

The PDR for the CCPP component was finished in March 2006, the PDD was completed in July 2006, and the project started validation immediately afterwards in August 2006, which was before the start of operation of either unit. The project would not become fully operational until May 2007, and as the delays in validation and registration were not envisaged at the time of PDD development, it was expected that the project would be registered by the time it became fully operational, thus ensuring that the critical CDM revenues would be available.

The following shows a timeline of the development of the project activity, with third party references cited. The references are attached as annexes to this response.

Table 2: timeline of the development of the project activity, with third party references

Date	Stage	Evidence	Attachment #
10 Jan 2004	CDM Consideration: Board meeting minutes concerning CDM revenues for the project activity	Minutes of the Energy Working Meeting of Chongqing Iron & Steel Co. Ltd. dated 10/01/2004, with translated copy, attached (official internal document; CDM consideration is also backed up 3rd party PDRs)	1

[2] AM_CLA_0015 'Inclusion of the Top Surplus Pressure (TRT) technology'. This clarification was needed in relation to the TRT component of the project activity, which was subsequently removed in later drafts of the PDD. The clarification was assessed at MP 19, and the revised version of the methodology was approved at EB 23 and was applicable from 3rd March 2006.

May 2004	CSG PDR written, includes consideration of CDM	Front page and signed page attached, plus translation (3rd party document)	2
18 August 2004	CSG PDR approved	CSG PDR approval attached, plus translation (3rd party document)	3
07 April 2005	'Start of real action': signing of construction contract for CSG	Copy of the construction contract for CSG attached, plus translation (3rd party document)	4
July 2005	First negotiations with EcoSecurities	News stories about the co-operation between EcoSecurities and Chongqing: http://www.cq.xinhuanet.com/2005-10/16/content_5358444.htm (3rd party document)	
08 July 2005	ACM0004 v1 approved	CDM Website	
15th October 2005	ERPA signed	CSG & CCPP ERPA front pages and signature pages attached (not 3rd party, but official legal document)	5
23rd December 2005	Clarification request AM_CLA_0015 submitted	CDM website	
March 2006	CCPP PDR written	Front pages of CCPP PDR attached, plus translation (3rd party document)	6
3rd March 2006	ACM0004 v 2 approved[3]	CDM website	
3 April 2006	CCPP PDR approved	Attached, plus translation (3rd party document)	7
6 April 2006	Construction start date of CCPP	Report on commencement of work on CCPP attached, plus translation (document is dated 5th August 2006, showing that work commences on 6th April 2006) (official internal document)	8
27 July 2006	PDD completed	Please refer to PDD uploaded for public comments, file is dated 27.07.06	
27 July 2006	Validation initiated	Signed validation contract with DNV (3rd party document)	9
01st August 2006	Operation start of CSG	Minutes of the completion acceptance of 12MW attached, plus translated copy (document is dated 10th November 2006, stating that operation started 01st August 2006) (official internal document)	10
05 August 2006	Public comments period starts	CDM website	
05 March	Host country LoA	CDM website (LoA uploaded as part of	

[3] Validation could not start until the revised version of the methodology was approved

2007	granted	submission for registration)	
25th March 2007	Modalities of Communication signed	CDM website (MoC uploaded as part of submission for registration)	
26th April 2007	CCPP unit begins operation	Report on the acceptance of the CCPP unit attached, plus translation (official internal document; verified by the design institute (3rd party))	11
05 June 2007	Annex 1 LoA granted	CDM website (LoA uploaded as part of submission for registration)	
02 July 2007	Draft validation report developed	As stated in the validation report	
25 February 2008	Final Validation report issued	As stated in the validation report	
05 March 2008	Submission to registration	As confirmed by email from the UNFCCC Secretariat	
15 May 2008	Request for registration period starts	CDM Website	

4. Further clarification is required on how the DOE has validated the baseline determination, in particular that the continuation of grid electricity import is more economically attractive alternative than the project activity undertaken without the CDM.

Project Proponent response: Although this question is addressed to the DoE, we would like to provide the following further clarifications:

(a) Explanation of the financial analysis method used in the PDD:

The import of electricity from the grid to meet the plant's excess power needs represents the continuation of current practices, and incurs zero additional investment or operational costs, since all the required infrastructure is in place. Since the alternative to the project activity does not represent a comparable investment opportunity (zero investment costs), a benchmark analysis was used to determine whether the project activity represents the most economically attractive course of action, comparing the project (without CDM revenues) to an appropriate benchmark (see response to point 1, above). This method of analysis is specifically recommended by the guidance in EB 39, Annex 35 "Guidance on the Assessment of Investment Analysis", paragraph 14: "*14. Guidance: If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate*".

The revenues from avoiding importing electricity from the grid, at a conservatively high tariff, are already included in the IRR analysis. This means that the analysis already considers the

economic attractiveness vis-à-vis grid imports, and demonstrates clearly (by the negative NPV and low IRR) that the project is less attractive than grid imports. If grid imports were *not* more attractive than building the project, the IRR of the project would be above the benchmark. This therefore shows that the project is not an economically attractive alternative when compared to grid imports. Not only was a benchmark analysis done for the project as a whole, it was also carried out for each component separately, in case it could have been an attractive option for the project developer to build one of the units independently, e.g. to build only CSG capacity. This approach was considered conservative. It was demonstrated that neither the project as a whole nor the independent units had a sufficiently high IRR to surpass the benchmark without carbon revenue.

(b) In order to further address this request for review, we have additionally carried out a comparison of the net present value of the costs associated with each of the 2 alternatives (grid and project):

Both the project activity implemented without CDM revenues, and the alternative, grid electricity, would provide the plant with the same service (electricity supply), but at different levels of cost. In order to provide a comparison between the costs of getting this electricity from the grid compared to building the project, the discounted Net Present Value of the costs associated with each scenario is calculated. The NPV of the baseline (grid imports) is calculated as the discounted net present value of the costs associated with grid electricity imports, i.e. the tariff paid by the plant (minus VAT), multiplied by the amount of electricity consumed. All numbers are taken from the original spreadsheet 'CQ_Iron_Steel_CEF_FA_Calculator_BOTH_v2_13.02.08.xls' and are fully consistent with the PDD. A 13% discount rate is used in order to be consistent with the benchmark (please note: a 12% discount rate was erroneously used in the spreadsheets uploaded for registration and in the PDD – although this did not affect the results since the PDD relies on an IRR calculation applying the 13% benchmark, and the IRR is lower than 13% without carbon revenue and higher than 13% with carbon revenue). The results of the new NPV comparison are shown in the table below, and also in the attached spreadsheet 'CQ_Iron_Steel_CEF_FA_Calculator_COST_NPV_FOR_COMPARISON.xls'. Please see the NPV results for the project scenario in the tab labeled 'financial analysis' (cell C54), and the NPV results for the baseline in the tab labeled 'NPV of Grid Costs' (cell C12).

Table 3: NPV comparison results

Scenario	**Net Present Value, using 13% discount rate**
Baseline (purchase of electricity from the grid)	-$97,353,127
Project (construction and operation of CSG and CCPP units) (without CDM revenues)	-$108,158,553
DIFFERENCE	-$10,805,426

As can be seen, the NPV of the project is significantly lower than that of the baseline, demonstrating that the continuation of grid electricity import is a more economically attractive alternative than the project activity undertaken without the CDM.

(c) Justification of the values used in the financial analysis:

The financial analysis was carried out using the input values from the PDRs, which were formulated by an independent government-accredited third party. The assumptions and data sources for the PDRs are based on relevant national standards and criteria, from the 'Economic Assessment of Construction Projects, Methods and Parameters, Third Edition' (2006) (see response to point 1), in accordance with Chinese procedures. The PDRs were then assessed by designated independent experts and finally approved by the Economic Committee of Chongqing City.

Furthermore, there are two key differences between the economic analysis in the PDRs and that of the PDD, both of which make the analysis in the PDD more conservative from the point of view of additionality (i.e. lead to a higher IRR). The key differences are in relation to the electricity tariff and the waste gas processing cost. The PDRs were developed on the basis of an internal charging system for waste gas and electricity, since the project is being developed by a subsidiary company of Chongqing Iron and Steel Group, which must account for costs and revenues separately. It is standard practice for iron and steel companies in China to have internal charges for the users of waste gas and consumers of electricity, in order to account for such costs. The internal charging system is a fair and appropriate mechanism to bill the project for costs incurred by other subsidiaries. Indeed, these costs are applied to all other subsidiaries of the iron and steel group company. Therefore the PDRs considered an internal waste gas cost and an internal electricity tariff, reflecting the expected values that would be paid/received by the project.

For increased conservativeness, the CDM PDD financial analysis was instead carried out on the basis of the current market price for electricity (i.e. the tariff the iron and steel plant pays to purchase electricity from the grid). This tariff was higher than the one used in the PDRs, therefore the investment analysis in the PDD is considered to be conservative. The tariff was substantiated by invoices showing the price paid by the iron and steel plant over the last 3 years, as validated by the DoE.

Furthermore, the waste gas cost used in the PDD is based on a detailed breakdown of the actual costs incurred in the operation of the project, since the project began operating whilst still in validation. The costs represent all the additional treatment equipment and processes needed to use the waste gases in an electricity generation system. Excess BFG, LDG and COG are waste gases and as such would normally be flared with very limited associated cost. However, for utilisation they must be collected, processed and distributed. There are a number of costs associated with gas treatment, storage, distribution, maintenance and management and this requires significant investment with continued costs for operation and maintenance[4]. Only those additional waste gas treatment costs incurred as a result of the CDM project activity are included, and any costs associated with any waste gas treatment (flaring) in the baseline were excluded. This resulted in a slightly lower waste gas cost than in the PDRs, and again, this is conservative from the point of view of additionality. The waste gas costs were substantiated with invoices, which were audited by the DoE.

[4] For example, Blast Furnace Gas contains particulate matter (including heavy metals), carbon monoxide, carbon dioxide, sulphur compounds, ammonia, cyanide compounds, hydrocarbons and polycyclic aromatic hydrocarbons. Therefore pre-treatment, cleaning and management is required for the safe utilisation of this gas; Coke oven gas contains hydrogen, methane, carbon monoxide, hydrocarbons, sulphur compounds and ammonia. Tar and naphthalene in the raw gas may also clog the piping and must therefore be removed.

The investment and operational costs of the CSG and CCPP units were taken from the approved PDRs, but were further substantiated by a detailed breakdown of the costs of each individual component, and since the project was already operational during validation, with invoices which were audited by the DoE.

(d) Comparison of input values with other projects

We would like to bring to the attention of the reviewers the response to the request for review of another similar project, Project 1624 ' Pingyuan Tongli WHR Project', recently submitted by TUV-SUD (see http://cdm.unfccc.int/Projects/DB/TUEV-SUED1203346530.12/ReviewInitialComments/YRSJA6AP8ES29JB36BZ52FGLZMPISQ).

In response to issue 1 ("*The DOE shall confirm how it has validated that the input values of the IRR meet the requirements of EB 38 paragraph 54 (c)*") the DoE provided the following response:

"To provide additional certainty that the figures used for the IRR calculation are applicable we are comparing the main parameters with other CDM projects of the same type. For the Pingyuan WHR project the specific investment per power is 6.52 Mio. RMB / MW and the specific operational costs per year are 1.11 Mio. RMB / MW. The average specific investment per power in China (based on the evaluation of 120 waste recovery projects in China that applied or are applying for CDM) is 7.273 Mio. RMB / MW (see figure below); the average specific operational costs are 1.069 Mio. RMB / MW *[please note that for the Chongqing project, the investment costs are 4.893 mio RMB/MW and the operational costs are 0.867 mio RMB/MW]*. For the operational hours the average is 6415 h whereas Pingyuan is calculated with 6216 h *[for Chongqing the figures are 7,500 h for the CCPP and 6,912 h for the CSG]*, the grid tariff is 0.326 RMB / kWh compared to 0.335 RMB / kWh as the Chinese average. *[Chongqing tariff: 0.4695 RMB/kWh]*. Hence, it can be confirmed that the Pingyuan project does not apply unreasonable assumptions."

This demonstrates that the financial analysis for the Chongqing Iron and Steel project is reasonable and conservative, since all key figures are significantly more conservative than the average, therefore backing up the conclusion that the continuation of grid electricity import is a more economically attractive alternative than the project activity undertaken without the CDM.

We hope the justification provided above sufficiently addresses the requests.

Yours sincerely

Jonathan Avis
Principal CDM Project Manager
EcoSecurities
jonathan@ecosecurities.com