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Ref: Response to request for review "Power generation from coking waste heat utilization project at Lan County Fengda Coking and Chemicals Smelting Co., Ltd in Shanxi, China" with the Reference Number 1704

4 July 2008

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

Attention: CDM Executive Board

Dear Sir or Madam,

We were informed that our project "*Power generation from coking waste heat utilization project at Lan County Fengda Coking and Chemicals Smelting Co., Ltd in Shanxi, China*" (reference number 1704) was requested for review by CDM Executive Board. As required by the Executive Board and on behalf of the project participants, we would like to answer the questions and clarify the issues raised in the requests for review as follows:

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

The benchmark internal rate of return (IRR) used for this project is taken from page 204 of the *Economic Assessment Methods and Parameters for Project Construction* (3rd Edition, 2006), hereafter referred to as "Economic Assessment Methods". This reference is widely used by Chinese authorities for assessing the financial viability of potential new projects. According to regulation No.6 in Chapter 4 of Annex II of the "Economic Assessment Methods", only when the IRR of a project exceeds the sectoral benchmark IRR, will the proposed project be considered financially feasible.

The "Economic Assessment Methods" states that when a project owner invests in a project with key characteristics of another sector rather than its own core business, and has little experience of these characteristics and the project risk, the sectoral benchmark IRR of its own core business will be applied.[1] Although this project is a power generation project, given that the core investment focus of the project owner is the coking industry, the sectoral benchmark of the coking industry is adopted (12% IRR). This is a conservative assumption, since the project owner has little experience in power generation adding significant risk to the investment decision. The project owner would therefore expect at least the same returns as they would normally expect from an investment in their core business.

In addition, because the project relies on the coking facility's production output to be maintained to generate electricity the project suffers from the following risks: a) market risk; b) technology/operational risk; and c) input-supply risk.

a) Market risk: China's coking industry is highly fragmented consisting of a large number of small-scale suppliers.[2] Although coke prices are currently increasing, the industry suffers from over-capacity which in the past has led to volatile market shares and plummeting coke prices.[3] By contrast, the Chinese power industry is highly regulated and market segments are carved up by the authorities to ensure that market shares are relatively stable. Chinese power industry operators are dominated by large scale enterprises which enjoy relatively easy access to capital.[4]

b) Technology/operational risk: As explained in the PDD, the project activity is based at a coking facility which uses a clean type *non-chemical-recovery* coking system that produces only waste heat. This is a new environmentally friendly coking technique but not as financially attractive as compared to the traditional *by-product* coke ovens. Furthermore, as the project will generate power by utilizing waste heat from coke production, which is currently vented into the atmosphere, power production is dependent upon the core business of the project owner. This brings with it its own risks not normally associated with the power industry. The power generation facility will only produce power when there is sufficient waste heat being produced by the coking ovens and there is demand from the grid. Supply will be interrupted should either the ovens or the power generation facility suffer periods of operational downtime. These operational risks are increased by the project owner's unfamiliarity with the technology involved and the additional need to provide new training to staff to operate and perform maintenance on the power generating facility.

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[1] Methods and Parameters for Economic Assessment of Construction Project (version 3), published by China's National Development and Reform Commission and Construction Ministry, December 2006, paragraph 2, point 2, page 197.

[2] See http://russian.china.org.cn/english/BAT/158034.htm

[3] *Ibid* fn. 2

[4] In China the power industry is considered a so-called "Basic Industry". This means that operators in this industry enjoy policy support such as preferential access to finance by China's policy banks. See for example: http://www.cdb.com.cn/English/NewsInfo.asp?NewsId=1926

Input-supply risk: There are uncertainties in particular about the reliability of the coal supply used for coking.[5] The project will generate electricity not based solely on power demand but based on the ability to maintain levels of production of the underlying coking facility. Such uncertainties are less of a concern for operators within the mainstream power sector who enjoy higher buyer power and base their investment assumptions on a more stable supply of inputs.[6]

In addition to the above risks the project owner has to consider the opportunity cost of making an investment decision in favour of the power generating facility. Another attractive investment opportunity for coking plant owners is to engage in vertical backward integration by investing in coal production facilities. Apart from the financial attractiveness of the coal industry due to rising fuel prices, this would also help to ensure a reliable source of coal supply for the coking process which is becoming an increasingly important concern for coking industry operators due to the persistent coal shortages described above. The project's activity's IRR of 15.22% only exceeds the IRR of the coal industry (15%[7]) due the revenue derived from participation in the CDM.

The above assumptions are confirmed by the Shanxi Coke Association which recommends that the benchmark IRR should be 12% for the waste heat recovery power generation projects in the coking industry.[8]

Question 2
"*Considering the time gap between revised FSR and project activity start date, further clarification is required on how DOE has validated the suitability of the input values, as per EB 38 para 54(a)*"

Besides the response from the DOE, we would like to clarify as follows:

The input values used in the investment analysis are the same as in the FSR and PDD, and were valid at the time of the investment decision made by the project owner. Relevant project milestones include:

- The project's Feasibility Study Report (FSR) completed in March 2006;[9]
- The PDD published for GSP on 5 May 2007;[10]

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[5] Beyond the operational reliability constraints of the coking facility, the most likely reason for interruptions to the coking process is shortages in thermal coal supply. See also http://www.chinamining.org/News/2008-06-03/1212473878d14395.html

[6] The Chinese government has called on mines and those in charge of transport to ensure that thermal coal is supplied to power plants over coking plants. Recently China prioritised thermal coal supplies to power plants while weather impeded coal shipments from abroad: http://uk.reuters.com/article/oilRpt/idUKSHA23542120080226

[7] Methods and Parameters for Economic Assessment of Construction Project (version 3), published by China's National Development and Reform Commission and Construction Ministry, December 2006, page 204

[8] The notice on benchmark selection for waste heat power generation projects in coking industry

[9] The project's FSR has been submitted to the DOE during the validation stage.

[10] http://www.dnv.com/focus/climate_change/projects/projectdetails.asp?ProjectId=1184

- The DOE's on-site visit conducted in July 2007 and subsequent finalized validation report dated 5 March 2008[11];
- The project is currently finalising its planning and due to start implementation in July 2008.

Therefore the project did not start before the date of submission of the project's request for registration.

The requirement of EB 38 para 54 (a) states that the period of time between the finalization of the FSR and the investment decision should be sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed. The EB 38 meeting date in which this has been adopted is 15 March 2008[12] which is after the date of the completion of the final validation report. Nevertheless, the project participants have provided a clarification letter[13] by the FSR institute for the proposed project to confirm that all input values used in the FSR had not materially changed at the time of finalizing the investment decision leading to the start of the project.

Question 3

"*Further clarification is required on how the DOE has validated the identification of alternative scenarios, in particular, import of electricity from the grid as it is the current practice and will not change during the implementation of the project activity*"

Besides the response from the DOE, we would like to clarify as follows:

The alternative scenario of import of electricity from the grid has been identified and discussed in the PDD (see page 8) and confirmed in the validation report (see page 13). It is noted that for the purposes of confirming the appropriate baseline scenario an economic comparison using an NPV calculation was conducted (see also response to **Point 4**). A further clarification is provided below:

- The current import of electricity from the grid for the coking plant is small. According to "Cleaner production standard for coking industry" [14] the electricity usage for of coking production is 35KWh/Tcoke, so the total expected electricity used for the coking plant is 14 GWh per annum, accounting for only 11.97 % of the total estimated electricity generated by the project activity. In addition, all of the coking facility's electricity production has to be exported to the grid. The electricity requirement for the coking facility is then purchased back from the grid. This is a requirement in Shanxi Province if

[11] http://cdm.unfccc.int/UserManagement/FileStorage/5DK1A8H6VSX369WLNCS9WUXZ8VPA7F
[12] http://cdm.unfccc.int/EB/index.html
[13] The clarification letter by FSR institute - Shanxi Jiahua Electric Power Industry Design Company has been submitted to the DOE along with this response
[14] Cleaner production standard for Coking industry, HJ/T 126-2003, issued by Ministry of Environmental Protection (MEP) of the People's Republic of China. This engineering-design standard specifies the upper ceiling of internal electricity-usage for coke production. This simplified assumption is a conservative approach.

the project owner wishes to be grid connected and sell electricity to the grid.[15]

- According to methodology ACM0012 version 2 the proposed project is applicable to the energy/electricity generated by the project activity that may be exported from the industrial facility to the grid. As there were no external industrial facilities identified during the project investment decision stage to whom the project is able to sell the electricity generated by the project activity it has the to sell its electricity to the grid. As there is a clear government-set electricity tariff indication this made the investment analysis relatively straightforward.

As illustrated in the table below, both the baseline scenario and the project activity continue to import electricity for consumption from the grid. However, whereas the baseline scenario emits waste heat into atmosphere directly, the project activity uses the waste heat to generate electricity all of which is exported to the grid and therefore relevant according to methodology ACM0012 (version 2).

	Electricity consumption by the coking plant	Waste heat	Grid
Baseline scenario	Power from grid	Emitted	No WHR power generation
Project scenario	Power from grid	Recovered	Project power to grid

Included in Project Boundary according to ACM0012 (v2)

The relative financial attractiveness of the baseline scenario as import of electricity from the grid compared with the project implemented without CDM will not change during the implementation of the project activity. This is because the continuation of grid electricity imports is more economically attractive alternative than the project activity undertaken without CDM (see **Point 4**). During the implementation of the project activity the core business activity of the project owner (coking) and the project activity's dependence on the coking facility which requires imports of electricity from the grid to generate electricity will not change. There has been no indication that the rules pertaining to connection to the grid will change during the implementation of the project activity.

Question 4

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

[15] "Coke Ovens CDM Due Diligence in Shanxi, China" report by Mott MacDonald (Page 7, section 2.24)

Besides the response from the DOE, we would like to clarify as follows:

The proposed project activity without CDM has an IRR of 8.02% it does not reach the relevant coking industry benchmark and the proposed project is therefore not economically attractive. As illustrated in **Point 1**, the project owner will only make an investment over the coke industry benchmark of 12% as only then does it consider the investment sufficiently profitable. The baseline scenario is therefore that the project owner will continue to buy electricity from the grid and will endeavor to find projects to invest its limited capital other than the project activity undertaken without CDM.

In further confirming the additionality of the project, the approach taken in the submitted PDD is in line with the "Tool for the demonstration and assessment of additionality"[16] (EB39 Report). As the proposed project generates financial and economic benefits through the sale of electricity other than CDM-related income, the simple cost analysis (Option I) cannot be used. The investment comparison analysis (Option II) is applicable to projects where alternatives are similar investment projects. However, as the proposed project activity without CDM is not economically attractive Option II was also excluded. As the alternative scenarios do not require similar amounts of investment the investment benchmark analysis (Option III) was chosen to confirm the project's additionality.

EB 39 Report Annex 35 provides further relevant guidance stating that in a situation such as this project activity, an investment comparison analysis is not appropriate as the alternative to the project activity is to make no investment and take the supply of electricity from the grid: *"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."*

As the alternative to the project activity is continued import of electricity from the grid, the project developer's decision is simply to invest in the project activity or not invest (i.e. the project developer does not require the project activity to provide its limited electricity demand as it can be sourced from the grid) the following elaboration in the aforementioned EB 39 Report Annex 35 is relevant: ***"****The benchmark approach is therefore suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest."*[17]

In order to further illustrate succinctly that continuation of grid electricity imports is more economically attractive than the project activity undertaken without CDM, a

[16] "Tool for the demonstration and assessment of additionality" (version 5) EB39 Report
[17] EB 39 Report Annex 35 "Guidance on the Assessment of Investment Analysis" page 3

comparative NPV calculation can be conducted. The comparative calculation adopted here is based on a conservative calculation of the NPV between a) *"The project activity undertaken without CDM*" and b) "*Continuation of grid electricity imports*".

a) *"The project activity undertaken without CDM*": In the NPV calculation for this alternative scenario all of the coking facility's electricity production is exported to the grid. The electricity requirement for the coking facility is then purchased back from the grid. This is a requirement in Shanxi Province if the project owner wishes to be grid connected and sell electricity to the grid.[18] The NPV calculation result for "*The project activity undertaken without CDM*" is minus 50.6 million RMB.

b) "*Continuation of grid electricity imports*": The calculation of the NPV is simplified based on a number of assumptions which make the result of the calculation conservative:

1. It is assumed that the project owner cannot find an alternative invest project which is more economically attractive than the project activity undertaken without CDM.
2. The project owner has no shareholders or third parties who can put to productive use the capital used as the project cost. This means in effect that the project owner's capital lays dormant.

The NPV calculation result for the "*continuation of grid electricity imports*" based on these conservative assumptions is minus 31.7 million RMB.

The result of the comparative NPV calculation indicates that b) "*continuation of grid electricity imports*" is more economically attractive than a) *"the project activity undertaken without CDM*". The NPV results can be found in the spreadsheet attached to this document and are based on the economic analysis previously submitted to the DOE.

The baseline scenario as outlined in the PDD has therefore been confirmed as alternative b) "Continuation of equivalent import of electricity from North China Power Grid" without the use of waste heat for electricity production. As the benchmark analysis in the PDD had already shown, the potential revenue derived from the project is insufficient without the revenues resulting from participation in the CDM. Due to the project owner's relative unfamiliarity with the risks involved in power generation the coking industry investment benchmark chosen for this project is conservative (IRR of 12%). This project will therefore not have occurred without the additional revenue derived from of CERs (at an IRR of 8.02%). Under these conditions, the continued use of grid electricity carries with it no additional risks and provides several attractive investment alternatives for the project owner's limited capital, for example in expanding its current coking capacity or by investing in coal mining activities (see also response to **Point 1**).

[18] "Coke Ovens CDM Due Diligence in Shanxi, China" report by Mott MacDonald (Page 7, section 2.24)