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Re Request for review of the request for registration for the CDM project activity "Beijing Taiyanggong CCGT Trigeneration Project" (Ref. no. 1320).

Dear Mr. Stehr,

SGS has been informed that the request for registration for the CDM project activity "Beijing Taiyanggong CCGT Trigeneration Project" (Ref. no. 1320) is under consideration for review.

Through this letter we would like to provide the following response and clarify the issues raised in the requests for review as follows:

Issue 1:
The PDD has applied investment analysis in order to demonstrate that project IRR (6.01 %) without CDM revenue do not exceed benchmark rate of return (8 %) and the project would have not happened in absence of the CDM benefits. However, further clarification is required on the IRR analysis, particularly on:
a. the assumptions regarding natural gas prices and load hours; and
b. the 20-year period of analysis.

Most assumptions including natural gas prices, load hours and operation period used in the IRR analysis are derived from the Feasibility Study Report (FSR) of the proposed project. In China, the FSR must be prepared by an accredited third party. Assumptions and data sources for the economic evaluation of a project in the FSR are required to be based on relevant national standards and criteria, among others, the main criteria referred to in this FSR is "*The Methodology and Parameters for Financial Evaluation of Construction projects*", which is jointly issued by National Development and Reform Commission (NDRC) and the Ministry of Construction in China. Therefore, assumptions and data from the FSR are regarded as most trustworthy.

In the case of the proposed project activity, the FSR of the proposed project was prepared by Beijing Guodian Huabei Power Engineering Co. Ltd., which is an independent third party entity accredited by the relevant national authority to carry out feasibility studies for new projects, including power plants, (Please refer to http://www.ncpe.com.cn/ncpe/gszz/bjgdzz.htm). The FSR was approved by the Beijing DRC Committee on 8th Oct 2005 (Nr. JING FA GAI [2005]2129). SGS concluded therefore that assumptions and data from the approved FSR are reliable, accurate and concrete to the concerned project.

Furthermore, the assumptions regarding natural gas prices, load hours and 20-year period of lifetime were assessed as below:

- Gas Price: The gas price to be paid by the proposed project is the market price, according to announcement of Beijing DRC (http://www.bjpc.gov.cn/tztg/200608/t129243.htm), the price was 1.55RMB/M3 at time of validation, and this price was indicated in the FSR and used in the IRR analysis. Gas prices are likely to rise further as this has been the case in China in recent years following international gas price trends. During the last week, the project owner received and presented to us a new announcement of Beijing DRC (JING FA GAI [2007] 2154), wherein the gas price for power plants has rise to 1.95 RMB/M^3.
- Load Hours: To be a gas-fired power plant providing power, heating and cooling, the load hours are directly related to such demands. Provision of heating and cooling are subject to the local demands, as set out in the heat and cooling supply contracts, instead of the wishes of project owner. The load hours for heating and cooling (based on seasonal demand) have been properly considered in the FSR. Electricity from gas-fired power plants is a relatively expensive source of power in China compared to power from coal-fired power plants which dominate the Chinese power grids. The electricity tariff of the proposed project used in the IRR analysis was 0.48RMB/kWh, while according to the Notice from the NDRC numbering [2006]1228, in the North China Power Grid, the standard grid tariff for new power plants in the Beijing-Tianjin-Tangshan area is 0.3354 RMB/kWh. So power from gas-fired plants is generally reserved and delivered to the grid at times of peak demand, this has also been properly considered in the FSR. Also, the load hours used in the FSR or IRR analysis are higher when compared to the load hours for heat and power projects mentioned in the "*Thermal Power Engineering Design Reference Cost Index*" issued by China Institute of Power Planning and Design (4528Hrs vs. 3500Hrs). The amount of heat and power mentioned in the FSR has been stated in the approval of Beijing DRC.
- 20-year period of analysis: The 20 years was determined by FSR in accordance with "*The Methodology and Parameters for Financial Evaluation of Construction projects*" (Page 62, 2rd Edition). This Methodology is used as a national standard for financial evaluation of all construction projects in China, and makes the IRR analysis consistent with the benchmark mentioned in the same standard. Further, the 20-year period is concluded based on the lifetime of main components of the power plant as this is the core requirement in the above mentioned standard.

Please also refer to PP's response for more clarifications.

Issue 2:
In addition, further clarification and justification is required regarding how DOE has assessed and validated:
a. The assumptions in the feasibility study report (FSR), in particular regarding lifetime of the project activity. Section C.1.2 of the PDD mentions lifetime of the project as 30 years, whereas IRR for the project has been calculated using 20 years as the operation period.
b. Sensitivity analysis in the PDD states that changes in the gas prices and electricity generation would strongly impact IRR of the project. The DOE shall further clarify how it has validated that such variations are not possible.

(a) Following the response for Issue 1 above, an operation period of 20 years is concluded as appropriate by third-party experts based on *The Methodology and Parameters for Financial Evaluation of Construction projects.* SGS concluded that assumptions and data from the approved FSR are reliable, accurate and acceptable.

30 years is mentioned in PDD section C.1.2 as a potential lifetime of the project owner; 30 years is not the designed lifetime of project when being used for financial evaluation according to aforementioned *Methodology*. It is project owner's wish to operate the project as long as possible.

However, please note that in case the project will operate longer than the 20 year benchmark (and lifetime of main equipment components), the relevant costs for replacement and refurbishment will be increased as well. SGS even raised a New Information Request (NIR10) in this regard (see page 37 of validation report), and this was clarified by the PP during validation.

(b) The price of gas used in the IRR analysis is 1.55 RMB/M^3 (including VAT). This gas price was the market price and this is confirmed in the gas supply contract verified by SGS. The article 5.1.2 of the gas supply contract stipulates that the gas price is subject to the changes in gas market price made by announcement of local authority, which now is 1.95RMB/M3 (as set out in the announcement referred to response of **Issue 1** above). As explained in Issue 1 above, the price of gas is more likely to be increased instead of being reduced 10% on the basis of the current price. SGS concluded that the gas price in the lifetime of the project was not likely to be reduced to a level where the IRR of the project could be significantly improved above the benchmark.

As explained above, the load hours used in the IRR analysis are already higher than the recommendation in the "*Thermal Power Engineering Design Reference Cost Index*", and the potential demands have been properly considered in the FSR. So we also concluded that electricity generation/load hours was not likely to be increased 10%.

Issue 3:
The DOE shall further clarify why and by whom an IRR of 8% is regarded as benchmark for investment in fossil fuel fired power plants.

The PDD states that the 8% IRR benchmark is from the "*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*". In turn, these Interim Rules states that the benchmark is based on *The Methodology and Parameters for Financial Evaluation of Construction projects*, (Refer to Chapter 1 General, Section 1.1 of the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*). These Interim Rules were issued by the "Department of Power Generation & Transmission Operations of State Power Corporation", which was the former state authority to manage relevant power issues including new constructions of power plants.

The Interim Rules were endorsed by the former State Planning Commission (now this function is under National Development and Reform Commission) and the Ministry of Construction. These Interim Rules have been widely used as the sector benchmark rate for all kinds of electricity generation projects including natural gas power generation projects in China, as long as the project employs relatively new technology compared with ordinary power plants connected in existing power system in China. Despite the title, the application of the IRR benchmark in the Interim Rules is not related to whether the project is a new fossil fuel fired plant or a retrofit with improved technology[1].

Issue 4:
The DOE shall further clarify why this project applies the benchmark for electrical engineering retrofit projects as the project activity will comprise the installation of a 780 MW natural gas fired combined cycle power generation system which is a newly built gas fired combined cycle.

As explained above, the "*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*" was applicable to any project which employs relatively new technology compared with ordinary power plants connected in existing power system in China. This source of benchmark has

[1] Page 1, Section 1.1, and Page 2, Section 1.11, *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*.

already been used in registered CDM projects for any newly built power generation projects in China (Please refer to registered PDDs available at UNFCCC website). Further, after the reforms of State Power Corporation and State Planning Commission, in the recent 3rd edition of "*The Methodology and Parameters for Financial Evaluation of Construction projects"* issued by National Development and Reform Commission and the Ministry of Construction in 2006 (after the approval of FSR of the proposed project), the benchmark specified for natural gas fired power plant has been increased to 9% from 8% (page 203).

Issue 5:
The DOE shall further clarify why the IRR of 8% is acceptable as a benchmark if the Interim Rules used in this case were issued by the former State Power Corporation of China and which is the current status of that corporation.

As explained in response of issue 4, the IRR of 8% mentioned in the Interim Rules was widely accepted in all newly constructed power plants in China, and has also been accepted as benchmark for registered CDM projects in power sector. The former State Power Corporation was reformed and its function of establishing benchmarks now is performed by relevant department in the National Development and Reform Commission (NDRC). The benchmark for gas-fired power plant has been increased to 9% by the new regulatory authority.

Issue 6:
The DOE shall further clarify why the sensitivity analysis does not include variation in prices of net electricity generated as this variable is included in the revenue stream.

We accepted the sensitivity analysis without including the variation in prices of electricity because:

- The proposed project is distinct from other ordinary power generation projects, because sale of heat is another revenue stream besides the sale of electricity, the price of heat is more likely to fluctuate than the price of electricity (see below reason). The price of heat has been included in the sensitivity analysis.
- In China, the electricity tariff is regulated by government and cannot change without approval by government authority, once the tariff for a plant is set, it has no opportunity to change unless the power plant can demonstrate that the costs have been increased significantly. Any request for change of price needs to go through certain approval procedures, therefore, even if the tariff can be increased in the future, it is because the costs have increased (as accepted by the Beijing DRC) and the increased tariff is for mitigating the loss rather than improving the projected IRR..

Issue 7:
Further justification is required on why the project activity is not a common practice.

See below response.

Issue 8:
Further clarification is required on how DOE has validated the common practice analysis.

It is common knowledge that coal-fired power plants dominate the power supply of China and are expected to continue to dominate in the near future.[2]
In 2006, the total capacity of gas-fired power plants in China is 10,627 MW, accounting for 1.7% of China's total installed capacity[3]. In 2005, the total capacity of NCPG (regional grid to which the proposed project will be connected) was 114,620MW (China Electrical Power Year Book 2006), and the total capacity of all gas-fired power plants in this region till 2006 is 1.426MW. This means in 2006, the share of gas-fired power plants in this region is less than 1.2%. It was of SGS opinion that such a small share of practice should not be seen as common. In addition, the combined heat, power and cooling capacity of the project activity means that project activities of this type constitute an even smaller part of the power mix than ordinary gas-fired power plants.

Issue 9:
Further justification is required regarding the technological risk mentioned in the PDD.

Firstly we would like to point out that the additionality of the project is not based on the technological risk. The technological risk (use of imported GE's PG9351 gas turbines) was described in Step 2 of section B.5 for common practice analysis. There were no references that could be referred to at time of validation as the type of project activity is relatively new in China, therefore, we did not object it, and it did not change the status of either the additionality or the common practice analysis of the project (Please refer to response for Issue 8 above). Although, as described above, the technology risk analysis is not part of the validation requirements (as the PDD uses investment risk analysis), please see the PP's response for further justification of the mention of technology risk.

Issue 10:
The DOE shall further clarify if the construction of the newly built Shaanjing Number 2 line for the provision of natural gas does not create the conditions for a CCGT as a business as usual activity.

One of the applicability conditions set out in AM0029 is "*Natural gas is sufficiently available in the region or country, e.g. future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity*". The proposed project met with this condition, one of the reasons is the newly built Shaanjing Number 2 line will provide sufficient natural gas to the region where project is situated. The additionality and common practice analysis has already demonstrated that the proposed project is not a business as usual activity. We believe that similar CCGT projects will encounter the same barriers thus cannot be seen as business as usual activity though this is out of this validation scope and should be further analyzed for other projects on a case-by-case basis..

Issue 11:
The DOE shall further clarify if during the process of consultations with local stakeholders the same stakeholders participated of the four different meetings, as there is a reference to a final

[2] For example, see the International Energy Agency's "World Energy Outlook 2007: China" publication, available from http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1987
[3] Chun Chun Ni, China's Natural Gas Industry and Gas to Power Generation, the Institute of Energy Economics, Japan (July 2007). Available at http://eneken.ieej.or.jp/en/data/pdf/397.pdf.

unanimous support of the construction of the project, and why the number of participants in the survey changed over time.

Attendance at these meetings was open and voluntary. Questionnaires were filled out and returned by stakeholders who wanted their views recorded, therefore, the stakeholders and the numbers were not exact same at the these meetings. The first 3 meetings were conducted in accordance with national regulation regarding the process of EIA, and the EIA has been approved by Beijing Environmental Protection Bureau in June 2005. The 4th consultation was conducted because PP considered it prudent to conduct a separate consultation specifically for CDM. There was no way of compelling the same participants to attend and submit feedback to all 4 meetings.

Issue 12:
Approved methodology AM0029, version 01 has been applied to prepare the PDD. As per the methodology baseline scenario should be identified as the most economical plausible alternative scenario. Based on financial analysis of levelised cost, construction of a new 2x600 MW sub critical coal fired power plant has been selected as the plausible baseline scenario. As specified in the methodology baseline emission factor should be selected as the lowest value of following three options
(a) Build Margin (b) Combined Margin (c) Emission factor of technology and fuel identified as the baseline scenario. Calculations in the PDD assume that option (c) gives the lowest value 0.8731 tCO2/Mwh. However further clarification is required on following points:
a. The PDD has included assumptions and parameters to calculate the levelised cost of electricity production. Further justification is required on how DOE has validated assumptions about various parameters of FSR.
b. How DOE has validated the coal prices mentioned in Table 5 on page 12 of the PDD which has been used in the levelized cost analysis. PDD mentions that this has been taken from FSR of Shanxi Zhongshan.
c. Further clarification is required on how the DOE has validated the assumptions on the various parameters for the levelized cost analysis including coal and gas prices and currency exchange rate.

(a) Please refer to responses of **Issue 1** and **Issue 2** above on how DOE has validated assumptions about various parameters of FSR.

(b) Coal prices: In China, the majority of electricity is generated by coal-fired power plants. To maintain a stable electricity price, the coal price for power plants is regulated by the government. The proposed project connects with the regional NCPG, which covers Beijing, Tianjin, Hebei, Shandong, Shanxi and Inner Mongolia. This is the main coal production area in China, where power plants are situated close to coal mines and coal prices are lower than in other parts of China. According to the approved FSR of a coal-fired plant Shanxi Zhangshan, the price was 210RMB/metric tonne which was considered as a representative price of coal for power plants regulated by government, further, according a notice from the National Development and Reform Commission of China on the operation trends of the coal industry in 2005-2006, the average coal price for power generation was 212.75 RMB/metric tonne[4], therefore, 210RMB/metric tonne was accepted to be used in the levelized cost analysis.

(c) The gas prices used in the levelized cost analysis is same with the one in FSR, please refer to response of **Issue 1** and **Issue 2** regarding how DOE has validated the gas prices. No exchange rate was used in the levelized cost analysis.

[4] Http://www.ndrc.gov.cn/jjxsfx/t20060317_126320.htm

Issue 13:
In addition, the DOE shall further clarify how they have verified the statistics published by the Chinese DNA regarding thermal power plants, that are used to determine the levelized cost analysis and whether the DNA is the only source of official statistics.

In the statistics published by Chinese DNA, data were derived from official statistics "China Energy Year Book 2004/2005/2006" and "China Electrical Power Year Book 2004/2005/2006". This data has been widely accepted by international communities, and also have been used in determining the emission factor of Chinese Grids in many registered CDM PDDs.

Issue 14:
The monitoring plan should specify the means of determining the natural gas and diesel consumption.

Please find attached a revised version of the monitoring plan providing further detail on the means of determining the natural gas and diesel consumption (Section B.7.1 and Annex 4).

We hope that this information addresses the concerns of the Board. If you require further information, Elton Chen Wu (+86 13801995031) will be the contact person for the review process and is available to address questions from the Board during the consideration of the review in case the Executive Board wishes.

Yours sincerely,

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Attachments: Revised TYG Project Design Document (with amendment to monitoring plan)