Response to request for review “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.” (1343)

Dear Members of the CDM Executive Board,

We refer to the requests for review raised by three Board members concerning DNV’s request for registration of the project Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.” (1343) and would like to provide the following initial response to the issues raised by the requests for review.

Comment 1: Further clarification is required regarding why a natural gas fired plant using a different technology and the importation of electricity from other grids have not been considered as plausible alternatives.

DNV Response:

Natural gas power generation using technologies other than the project activity, i.e. simple cycle gas turbines, has a lower thermal efficiency and is presently rarely used. A publicly available lecture which in “East China Fuel Gas Information Network”\(^1\), shows that the thermal efficiency of single cycle gas turbines can be as low as 38% and hence is presently rarely used. Also during the validation, the “Zhejiang Provincial 11th electric power 5-year expansion plan” had been assessed and this expansion plan confirmed that all other natural gas projects that have recently been constructed, are under construction or are being planned in east China power grid, and which can deliver the similar service as the proposed project, apply or will apply the same technology as the proposed project - Large-scale gas-steam combined cycle for power generation. Therefore, the decision made by PP that the alternative, a natural gas fired plant using a different technology, is excluded is deemed to be acceptable.

According to the same lecture mentioned above, due to the characteristics of natural gas fired plants, these plants are only suitable as peak load type power plants in the grid electricity management, not for base load type power plant. Integrated with the acknowledgement from another public assessable lectures which can be found in “VIP information network”\(^2\), DNV was able to confirm that the imports of electricity from the Central China Power Grid usually provides base load power to the East China Power Grid thus can thus not be considered as a plausible alternatives. In its response to the requests for review, the PP also provided an official explanation

\(^1\) http://www.hdrqw.com/news/20060505-31.htm
\(^2\) http://engine.cqvip.com/content/tv/95255x/1998/016/003/gc23_tv1_3203139.pdf,
letter by Zhejiang Province Electricity Distribution Centre that confirms the above analysis, i.e. that the current situation is and in the foreseeable future is likely to remain that coal fired power plants will be providing peak load in the Zhejiang province, and all other alternatives are unlikely to replace this. It also confirms that there is no simple cycle gas turbine technology used in the Zhejiang province and the imported electricity from CCPG provides base load.

Comment 2: Further information is required to clarify how a 600MW coal fired plant could be considered capable of delivering similar services as the project activity.

DNV Response: During the documents review, DNV had assessed the feasibility study report of the project and found the output of the natural gas-fired electricity generation unit is critical to the working circumstance. Considering the circumstance that the project is located, the output of the electricity generation unit can not reach the rated output all over the year. Therefore, the installed capacity used in the investment analysis of the FSR and the PDD is calculated as 370MW for each set of gas-steam combined cycle power generation unit, with total capacity of 740MW. Also DNV had assessed a lecture, PARAMETERS SELECTION FOR 1000MW CLASS SUPER CRITICAL TURBINE GENERATORS, by GU Shou-lu, and confirmed the opinion stated in the PDD. Moreover, from the same lecture, DNV realized that the annual operational hour for natural gas-fired electricity generation units are around 3500 hours while coal-fired electricity generation units usually have annual operational hours up to 6000 hours or more. Nonetheless, coal-fired power plants, which dominate power generation in China, are considered capable of delivering similar services as the project activity as coal-fired power plants are currently providing also peak load generation as well as base load generation. The technology of providing peak load generation using coal fired plants is mature and available in China.

The levelized costs of electricity production for the proposed project not undertaken as a CDM project, 300MW coal-fired power plant and 600MW coal-fired power plant are calculated using the formula in the Projected Costs of Generation Electricity published by IEA, resulting in 0.319 RMB/kWh, 0.214 RMB/kWh and 0.172 RMB/kWh, respectively. The sources of the data used in the calculation and the calculation process have been verified by DNV.

To further demonstrate that the financial attractiveness of a 600MW coal-fired power unit is robust to reasonable variations in the critical assumptions for the alternatives (e.g. fuel prices and the load factor), a sensitivity analysis has been conducted. The sensitivity analysis confirms that the construction of a 600MW coal-fired power plant is likely to remain the most economically scenario under the reasonable variations of the assumptions.

Hence, the construction of a 600MW coal-fired power plant is identified as the baseline scenario.

Comment 3: The DOE should provide a clear validation opinion regarding how it has considered the project activity not to be common practice in light of the fact that a total of 8 similar plants have commenced construction prior to receipt of either a positive validation opinion or notification of registration by the Executive Board. In particular the DOE is requested to explain how it has considered the project activity not to be the plausible baseline scenario as the PDD states that “all other natural gas projects that have recently been constructed or are under construction or are being planned in the region, which can deliver the similar service as the proposed project, apply or will apply the same technology of proposed project”.

DNV Response: During the validation, the PP had expressed their confidence that the project activity can meet all the CDM requirements and the PP made the decision to start the construction based on their own risk assessment, accepting the risk of starting construction prior to receipt of either a positive validation opinion or notification of registration by the Executive Board. It can be assumed that also the other 8 similar plants have carried out similar risk assessments.
Natural gas power plants with similar scale in east China region are listed in the common practice analysis in the PDD. The source of the information, including the formal notice from the National Development and Reform Commission, has been verified by DNV.

From the information above, it could be seen that China is dominated by coal-fired power plants and that this is unlikely to change in near future. Also in the China Electric Power Yearbook, the capacity for gas-fired power plants accounts for less than 0.5% among the total capacity of ECPG, which the electricity generated by the proposed project will connect to. Such a small share of gas-fired power cannot be regarded as common practice.

In the PDD submitted for registration the common practice analysis has been carried out using the steps in the Tool for the demonstration and assessment of additionality version 03 according to the AM0029 version 01, which is the latest version at the time of PDD submission. Each step carried out in the analysis and the evidence provided had been verified by DNV.

Based on the Bulletin by National Development and Reform Commission, which contains the information of the approved projects, 8 natural gas for power generation projects are identified as similar projects to the proposed project as they are in the same region (east China grid region), rely on a broadly similar technology and are of similar scale. Among the 8 projects, 7 projects are under the process of applying for registration as CDM projects. Detailed information can be found on the Chinese DNA official website. As they are facing the same financial unattractiveness as the proposed project and are seeking CDM benefits, they are excluded in the common practice analysis. Among them, the Fujian Xiamendongbu CCGT power project is totally invested by an international company, East Asia Power (EAP) China, which is owned by RGM International, a multinational corporation with the head office in Singapore. This project can enjoy financial benefits in the Fujian Province, which is likely to make it more financially attractive than the proposed project. Other natural gas power plants are applying for CDM support due to the same financial unattractiveness as the proposed project activity.

Comment 4: The PDD states that the “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. (hereafter called “the project”) is the construction and operation of a new natural gas fired grid-connected power plant owned by Zhejiang Southeast Electric Power Co., Ltd. The project will install two sets of gas-steam combined cycle for power generation units with the total rated output of 2×403MW”. The DOE shall further clarify how the Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects, issued by former State Power Corporation of China, apply to this project activity and how they have validated that they are still valid.

DNV Response:
The former State Power Corporation of China was responsible for the establishment of the rules for the power sector, implementation of government policies related to power sector, etc. After restructuring, its function such as setting benchmarks is now performed by the relevant department within the National Development and Reform Commission (NDRC). However, the official documents issued by the former State Power Corporation of China is still valid until further modification, if any, will be made by the succeeding authority.

The document entitled with “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects”, issued by former State Power Corporation of China, Document No. GuoDianFa [2002]623 is generally adopted for both new power projects and retrofit projects. The benchmark specified in the documents has also been accepted as the standard for registered CDM projects in power sector in China.

Comment 5: The DOE shall further clarify how they have validated the operational lifetime of the project activity as per the benchmark investment analysis.

DNV Response:
According to Chinese regulation, a feasibility study needs to be conducted and the feasibility study report (FSR) needs to be completed and approved before the project can be approved. The FSR was completed by the independent third-party Zhejiang Electric Power Design Institute, which is accredited as a Grade A institute for power plant design. The FSR has been approved by National Development and Reform Commission of China.

As indicated in the Cash Flow Table of the project activity in Annex 5 in the PDD, the lifetime used in the benchmark investment analysis is exactly the same as that in the feasibility study, which is 24 years including 2-3 years construction period and the remaining operation period. The construction period and operation lifetime are both consistent with those in the FSR.

Comment 6: The DOE shall further clarify how they have assessed and validated the sensitivity analysis.

DNV Response:
The IRR of 8% for total investment of project has been selected as the benchmark and this is deemed properly justified by referring to the “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects.” by State Power Corporation of China in 2003. Based on the data in the feasibility study report and the Notice regarding the price of natural gas by National Development and Reform Commission, the project IRR without CER revenues is calculated at 6.75%, which shows that the project is not financially attractive compared to the benchmark in the absence of CDM benefits.

For the sensitivity analysis, four factors are considered including total investment, natural gas price, annual output and annual O&M cost. The electricity tariff is not considered in the sensitivity analysis because the tariff is strictly regulated by the government. When the total investment, annual output and annual O&M cost fluctuates within the range of -10% and 10%, the IRR for total investment will still not reach the benchmark. If the natural gas price decreases by about 8%, the IRR of the project will exceed the benchmark. However this is very unlikely considering the decreased price of natural gas as shown in the public assessable lecture “Chinese Natural Gas Industry Analysis and Investment Consultation Report in 2007~2008” in the “Chinese Investment Consultation Network”.

As a matter of fact, according to the document issued by the Price Bureau of Zhejiang Province in 2006, the natural gas supplied to NG power plant has increased to 1.445 RMB/Nm$^3$.

In conclusion, the investment analysis and sensitivity assessment have shown that the project activity is unlikely to be the most financially attractive option. DNV had assessed the calculation and found it to be correct.

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4 http://www.ocn.com.cn/reports/2006123tianranqi.htm
We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully
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