RESPONSE TO THE REVIEW REQUEST

Bureau Veritas Certification (formerly BVQI) had performed the validation of the CDM Project 1368- "Qinghai Ge-ermu Gas Turbine Power Plant Project ". Subsequently, there have been three requests for review.

Based on our response, the CDM Executive Board has sought further clarification on certain specific issues, which are given below .We thank the CDM Executive Board and the Secretariat for giving us another opportunity to explain our position in validating the said project.
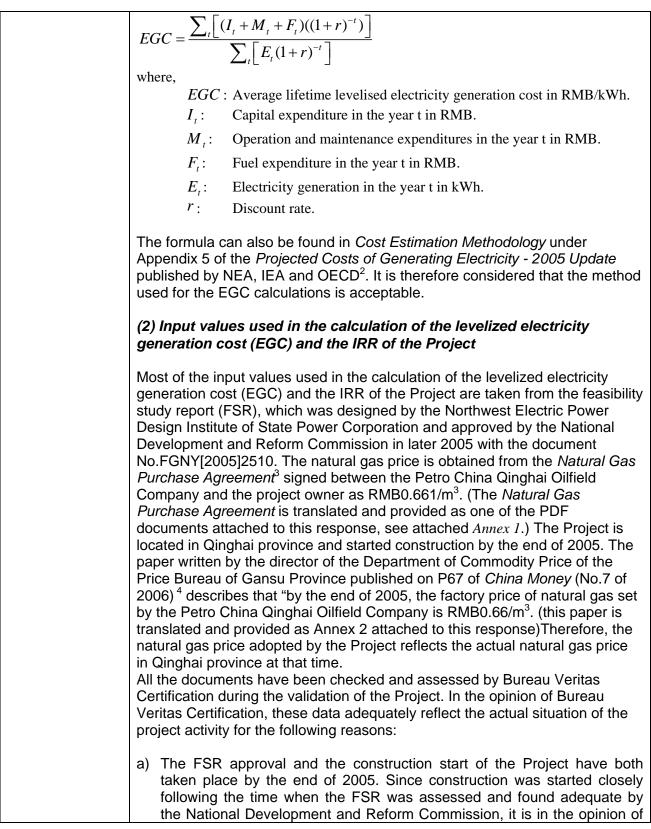
Our responses to the clarification requests raised are given below:

Reasons for Request for Review	Bureau Veritas Certification's response
RR -1	
1. The DOE should provide further details regarding how the assumptions used in the calculation of levelized electricity generation cost (EGC) and the IRR have been validated. The DOE shall confirm how it has validated that the input values of the IRR meet the requirements of EB 38 paragraph 54.	Key assumptions used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project are taken from the feasibility study report (FSR). Key assumptions used in the calculation of the levelized electricity generation cost (EGC) of other power generation technologies are taken from the Global Climate Change Institute of Tsinghua University and the book published by the China Electric Publishing Press and etc, which are reliable sources. Further details regarding validation of these assumptions are described respectively as following. ***(1) Assumptions used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project*** For IRR: The validation team has reviewed the source of the 8% benchmark applied in the PDD - *Interim Rules on Economic Assessment of Electric Power Retrofit Projects*, which is deemed as an appropriate benchmark reference for retrofit and greenfield power generation projects in China because of the high degree of its relevance to the power industry. Furthermore, it has been commonly adopted in the investment analysis section for nearly all of the already registered renewable energy and natural gas fired power generation CDM projects in China. As highlighted in Section 1.11 of the *Interim Rules on Economic Assessment of Electric Power Retrofit Projects*, this benchmark is set for the entire power industry. For EGC: The validation team had reviewed the approach adopted for the calculation of the levelized electricity generation cost (EGC), and confirmed that it is carried out in accordance with Section 2 of the approved baseline methodology of AM0029 version 01, and based on the *International Comparisons of Electricity Generation by Types & Costs*[1] written by Nathan Ilten. The formula applied to calculate the levelised electricity generation cost (*EGC*) is:

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1 Http://people.cs.uchicago.edu/~nilten/docs/
final.pdf#search='International%20Comparisons%20of%20Electricity%20Generation%20by%20Types%20%26%20Costs'.

$$EGC = \frac{\sum_t \left[(I_t + M_t + F_t)((1+r)^{-t}) \right]}{\sum_t \left[E_t (1+r)^{-t} \right]}$$

where,

EGC : Average lifetime levelised electricity generation cost in RMB/kWh.

I_t : Capital expenditure in the year t in RMB.

M_t : Operation and maintenance expenditures in the year t in RMB.

F_t : Fuel expenditure in the year t in RMB.

E_t : Electricity generation in the year t in kWh.

r : Discount rate.

The formula can also be found in *Cost Estimation Methodology* under Appendix 5 of the *Projected Costs of Generating Electricity - 2005 Update* published by NEA, IEA and OECD[2]. It is therefore considered that the method used for the EGC calculations is acceptable.

(2) Input values used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project

Most of the input values used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project are taken from the feasibility study report (FSR), which was designed by the Northwest Electric Power Design Institute of State Power Corporation and approved by the National Development and Reform Commission in later 2005 with the document No.FGNY[2005]2510. The natural gas price is obtained from the *Natural Gas Purchase Agreement*[3] signed between the Petro China Qinghai Oilfield Company and the project owner as RMB0.661/m^3. (The *Natural Gas Purchase Agreement* is translated and provided as one of the PDF documents attached to this response, see attached *Annex 1*.) The Project is located in Qinghai province and started construction by the end of 2005. The paper written by the director of the Department of Commodity Price of the Price Bureau of Gansu Province published on P67 of *China Money* (No.7 of 2006) [4] describes that "by the end of 2005, the factory price of natural gas set by the Petro China Qinghai Oilfield Company is RMB0.66/m^3. (this paper is translated and provided as Annex 2 attached to this response)Therefore, the natural gas price adopted by the Project reflects the actual natural gas price in Qinghai province at that time.

All the documents have been checked and assessed by Bureau Veritas Certification during the validation of the Project. In the opinion of Bureau Veritas Certification, these data adequately reflect the actual situation of the project activity for the following reasons:

a) The FSR approval and the construction start of the Project have both taken place by the end of 2005. Since construction was started closely following the time when the FSR was assessed and found adequate by the National Development and Reform Commission, it is in the opinion of

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Bureau Veritas Certification unlikely that the input values would have materially changed.

b) Bureau Veritas Certification was also able to verify that the input values used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project are fully consistent with the values used in the FSR and the stipulation from the government. As stated above, only one value, the natural gas price, is taken from another source, i.e. the above mentioned Natural Gas Purchase Agreement signed between the Petro China Qinghai Oilfield Company and the project owner (*Annex 1*).

c) Bureau Veritas Certification has cross-checked the input values used in the calculation of the levelized electricity generation cost (EGC) and the IRR of the Project with other similar natural gas power generation projects in China and is able to confirm that the input values are reflecting appropriately the regional pricing and thus reasonable.

The above assessment is in accordance with the guidance adopted by the Board at its 38th meeting (paragraph 54) for cases where project participants rely on values from FSRs that are approved by national authorities for proposed project activities. It must be noted that the Project (Ref. no. 1368) was submitted for registration on 02/10/2007, prior to the Board's 38th meeting and even prior to the Board's 37th meeting, when it is started to request that values taken from FSRs are independently assessed by DOEs.

(3) Input values used in the calculation of the levelized electricity generation cost (EGC) of other power generation technologies

The validation team has reviewed the sources of the input values used for the EGC calculations of proposed alternative baseline scenarios, namely the 300 MW sub-critical, 600 MW sub-critical, 600 super-critical coal fired power plants and oil fired CCGT, and confirmed that they are mainly based on the literature of the Global Climate Change Institute of Tsinghua University and a book titled *Economic Evaluation of Electric Power Engineering and Tariff* (Prof. Yang Xuzhong, China Electric Publishing Press, 2003, P131). Only the local coal price and oil price are obtained from public websites

http://www.mm9mm.com/oil/lube/2006-01-13/17942.html (for oil price, see attached Annex 3) and
http://www.b2btielu.com/news/qthq/2006-3/16/6253.asp (near coal mine, see attached Annex 4)

Bureau Veritas Certification has been checked and assessed all the documents during the validation process. In our opinion, these data adequately reflect the actual situation for the following reasons:

a) Both the Global Climate Change Institute of Tsinghua University and the China Electric Publishing Press are reputed in China. Data obtained from these two sources are thus reliable. For the local coal price and oil price obtained from public websites, it was checked and confirmed by Bureau Veritas Certification that PP had adopted the conservative price level from a reasonable price range (i.e. higher coal price or lower oil price) to ensure conservativeness of the calculation result.

b) Furthermore, Bureau Veritas Certification had cross-checked the input values used in the calculation of the levelized electricity generation cost

(EGC) of coal fired and oil fired power generation technologies adopted by the Project and that used in the PDDs of already registered AM0029 CDM projects of China, and verified the input values to be reasonable.

To summarize, the above is the detailed information regarding how we validated the assumptions used in the calculation of the levelized electricity generation cost (EGC) and the IRR. Bureau Veritas Certification confirms that the input values of the IRR meet the requirements of EB 38 paragraph 54.

The evidences provided are:
Annex 1 - The Natural Gas Purchase Agreement
Annex 2 - The paper written by the director of the Department of Commodity Price of the Price Bureau
Annex 3 - Webpage of oil price. Please note that although the validated webpage used in the PDD can not be opened at present, webpages with same data can be found easily from elsewhere. Therefore, an alternative webpage is provided this time.
Annex 4 - Webpage of coal price (near coal mine). Please note that although the validated webpage used in the PDD can not be opened at present, webpages with same data can be found easily from elsewhere. Therefore, an alternative webpage is provided this time.

28/10/2005 is determined as the start date of the project activity as provided in Section C.1.1 of the PDD.

It is obtained from the *Project Implementation Schedule* (*see attached Annex 5*) which was drafted by the project owner and approved on 25/10/2005 by the supervision entity of the Project. This document was provided by PP and validated by Bureau Veritas Certification as document /17/ listed on P22 of the Validation Report. The *Project Implementation Schedule* is translated and provided as one of the PDF documents attached to this response.

To make the Project clearly understood, PP provided a detailed timeline of the project development and the CDM consideration as follows:

"The project owner, Huanghe Hydropower Development Co., Ltd. planned to implement this natural gas fired power generation project in 2004. However, due to the high capital investment and low electricity tariff that such project could get in Qinghai province, the Project was not financially feasible.

World Bank issued a report titles *Clean Development Mechanism in China - Taking a Proactive and Sustainable Approach* in June 2004 and hold a dissemination conference in 2004 in Beijing, China. About 300 persons from energy sectors, especially the power sector, were invited to attend the conference. And the report can be freely downloaded from the website of World Bank[5]. The report studied CDM opportunities in China's power sector and natural gas power generation projects are highly ranked in the pipeline of CDM project activities. The issuance of the report and the conference stimulate the interest of investors in China power industry on

5 http://siteresources.worldbank.org/CHINAEXTN/Resources/318949-1121421890573/cdm-china.pdf

CDM, including the project owner.

When Kyoto Protocol took effect on 16th Feb. 2005, the project owner realized that it could be a great opportunity to implement the Project with CDM incentive. Based on initial survey of methodology, it was found that new methodologies regarding similar natural gas fired power generation project had been developed[6] at that time. In the Directorate conference on 28th Feb. 2005 (*See attached Annex 6*), how to implement the Project was one of the main topics. It was decided to carry out the Project for the key reason that CDM assistance could significantly improve the project return.

Afterwards, the project owner spend more than half a year to get necessary approvals from national authorities, including the EIA Approval with document No.HUANSHEN[2005]669 issued by the Ministry of Environmental Protection (former State Environment Protection Agency) in August, 2005 and the FSR Approval with document No.FGNY[2005]2510 issued by the National Development and Reform Commission on 29/11/2005. At the same time, the project owner kept tracking the methodology and looking for a CER buyer. On the date of 16 August, 2005, the project owner signed a CDM consulting agreement with Electricity Energy (Beijing) Industry Development Co., Ltd (see attached Annex 7).

With necessary approvals, the project owner drafted *Project Implementation Schedule* and got the approval from the supervision entity of the Project on 25/10/2005. After getting this approval, the project owner started construction work from 28/10/2005 thus started actual investment on the Project.

The project owner continued their work on tracking the methodology and searching for a CER buyer during construction. However it is difficult for the project owner to directly find a CER buyer at that early stage of CDM, so the project owner spent a long time to get in touch with Energy Systems International B.V. and finally achieved ERPA 3 months after the approval of methodology AM0029 version 01 (19/05/2006). Energy Systems International B.V. is also the project participant (as the buyer) listed in the first PDD from China submitted for validation (Ref 0296: Anding Landfill Gas Recovery and Utilisation Project).

Currently, the natural gas price including VAT has been increased from RMB 0.773/m^3 (by the end of 2005) to RMB 1.107/m^3. The letter to adjust the natural gas price is translated and provided as one of the PDF documents attached to this response (see attached Annex 8). At the same time, the project owner is still struggling with power grid regarding the bus-bar tariff thus the Project can not put into operation. "

In conclusion, as per the timeline described above, 28/10/2005 is deemed as the earliest date at which the implementation or construction or real action of the project activity commenced. All the documents mentioned above had been validated by validation team and the minutes of directorate conference

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6 NM0080 (Baseline methodology for grid connected electricity generation plants using non-renewable and less GHG intensive fuel) was public available from 17 Nov 04 till 07 Dec 04 and NM0153 (Baseline methodology for grid connected electricity generation plants using Natural Gas (NG) / Liquefied Natural Gas (LNG) fuels) was public available from 16 Feb 06 till 08 Mar 06 on UNFCCC website.

	on 28th Feb. 2005 is translated and provided as one of the PDF documents attached to this response.

In conclusion, serious consideration of CDM prior to the commence of the Project has been verified to be traceable with a clear timeline.

The evidences provided are
    Annex 5 - Project Implementation Schedule
    Annex 6 - Directorate conference on 28th Feb. 2005
    Annex 7 - CDM Consulting Agreement
    Annex 8 - Letter about Adjusting the Natural Gas Price |
| 3. Further clarification is required to demonstrate the prior consideration of the CDM before the start date of the project activity, particularly in context of: a) the methodology AM0029 v1 was approved on 19 May 2006, after the start date of the project activity and b) the soil and water conservation plan of the project was approved in September 2004, before the date of CDM consideration. | According to the Guideline of CDM PDD, if the starting date of the project activity is before the date of validation, evidence should be provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity.

In Section B.5 of the PDD submitted for registration, the evidence of considering the incentive from CDM prior to the start of the project activity has been described. Relevant evidences regarding the date of considering CDM (28/02/2005) and the stating date of the project activity (28/10/2005) had been validated by validation team as document /16/ and /17/ listed on P22 of the Validation Report. As described above, both of these documents are translated and provided as PDF documents attached to this response.

Regarding context a): As described above in the "detailed timeline of the project development and the CDM consideration" in response to Issue 2, the project owner started consideration of CDM since 28/02/2005 and 28/10/2005 is deemed as the earliest date of actual action of the Project. The decision on CDM is not only prior to the construction of the Project, but also half a year earlier than the EIA approval and the FSR approval of the Project. It shows that CDM was seriously considered before the starting date of the project activity.

Regarding context b): The approval on the *Soil and Water Conservation Plan* is obtained at the very early stage of the project design. To be in line with the regulations by Item 3 of the *Management on Soil and Water Conservation Plan for Construction Projects* issued by Ministry of Water Resources, former State Development and Planning Commission and former State Environment Protection Agency on 22nd November, 1994 with the document No.SB[1994]513[7], compilation of the EIA report should be carried out after getting the approval of the *Soil and Water Conservation Plan*, while the finalization and approval of the FSR should be after the approval of the EIA. The validation team considered the approval of *Soil and Water Conservation Plan* can be seen as one of the preconditions of the approval of FSR based on existing government regulations in host country and therefore can not be deemed as start date of the Project. |
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7 Website of government of Luzhou City:.
http://www.luzhou.gov.cn/zwgk/sjbm/slj/flfg/200610/20061023153359_12818.html

| 4. Clarification is required from the DOE how it has validated that the determination of $EF_{BL,upstream,CH4}$ is in line with the methodology AM0029, version 01. | We would like to further clarify the determination of $EF_{BL,upstream,CH4}$ following two parts as provided in the PDD:

PART I: On P21 to P22 of the PDD, it is described that:

"Since Option 1 (the build margin, calculated according to ACM0002) is selected for the calculation of the baseline emission factor, relevant emission factor for upstream fugitive CH_4 emissions ($EF_{BL,upstream,CH4}$) is calculated as follows:

$$EF_{BL,upstream,CH4} = \frac{\sum_j FF_{j,k} \cdot EF_{k,upstream,CH4}}{\sum_j EG_j} \qquad (11)$$

where:
$EF_{BL,upstream,CH4}$ is the emission factor for upstream fugitive methane emissions occurring in the absence of the project activity in tCH_4 per MWh electricity generation in the project plant;
j is the plants included in the build margin;
$FF_{j,k}$ is the quantity of fuel type k (a coal or oil type) combusted in power plant j included in the build margin;
$EF_{k,upstream,CH4}$ is the emission factor for upstream fugitive methane emissions from production of the fuel type k (a coal or oil type) in tCH_4 per MJ fuel produced;
EG_j is the electricity generation in the plant j included in the build margin in MWh;

The emission factor for fugitive upstream emissions for coal ($EF_{k,upstream,CH4}$) include fugitive emissions from underground coal production, is obtained from Table 2 provided in methodology AM0029.

In China, it is very difficult to obtain the data of the plant j. Therefore, according to the deviation in application of methodology AM0005[8] approved by CDM EB, recent 20% capacity additions of the Northwest China Grid during 2003~2005[9] were used for estimating the Build Margin emission factor for grid electricity and the 600 MW sub-critical coal-fired power generator was used as the proxy of efficiency level of the best technology in China[10]. Based on these data, formula (11) can be conservatively converted into formula (12) [11]:

$$EF_{BL,upstream,CH4} = \varphi_{coal} \times PGCC_{coal,best} \times EF_{coal,upstream,CH4} \times \frac{NCV_{coal}}{NCV_{Rawcoal}} \qquad (12)$$ |

8 Http://cdm.unfccc.int/Projects/Deviations .

[9] Capacity additions during 2003~2005 are greater than and most close to 20% of the electricity system. See Annex 3 of the PDD for details.

[10] Http://www.ccchina.gov.cn/source/fa/fa2002082803.html.

11 The conservativeness of such switch has been demonstrated in Annex 3 of the PDD..

12 As per the data on P287 of China Energy Statistical Yearbook (2006 Edition), caloric value of raw coal is 5000 kcal/kg and that of standard coal is 7000 kcal/kg.

where,

φ_{coal} is the share of coal-fired generation in BM generation (0.5984, see Annex 3 of the PDD for details).

$PGCC_{coal,best}$ is the power generation standard coal equivalent consumption of the 600 MW sub critical coal-fired generation technology within the grid boundary.

NCV_{coal} is the net caloric value of standard coal equivalent in GJ/tCe.

$NCV_{Rawcoal}$ is the net caloric value of raw coal which is used for power generation in GJ/tCe[12]."

PART II: To demonstrate the conservativeness of converting formula (11) into formula (12), complete justification is provided in Annex 3 of the PDD from P52 to P54 as

"**Demonstration of the conservativeness of converting formula (11) into formula (12)**

According to Methodology AM0029, in the absence of the project activity, emission factor for upstream fugitive CH_4 emissions ($EF_{NG,upstream,CH4}$) should be calculated consistent with the calculation of the baseline emission factor ($EF_{BL,CO2,y}$). Since Option 1 (calculation of the build margin emission factor according to ACM0002) is adopted to calculate the baseline emission factor, relevant calculation of emission factor for upstream fugitive CH_4 emissions ($EF_{BL,upstream,CH4}$) should be consistent with that used by ACM0002 to calculate the build margin emission factor ($EF_{BM,y}$).

According to ACM0002, the formula to calculate the build margin emission factor ($EF_{BM,y}$) is

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m,y}}{\sum_m GEN_{m,y}} \qquad (A1)$$

Referring to the *Notification on Determining Baseline Emission Factor of China's Grid*, and as per the deviation approved by CDM EB, formula (A1) is converted to the following formula to calculate the Build Margin emission factor ($EF_{BM,y}$):

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \qquad (A2)$$

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \qquad (A3)$$

$$EF_{k,Adv} = PGCC_{k,best} \times EF_k \times \frac{NCV_{coal}}{NCV_k} \qquad (A4)$$

Where,

$PGCC_{k,best}$ is the power generation standard coal consumption of the best technology commercially available for power generation of fuel type k (raw coal, oil or natural gas) fired within the grid boundary(tCe/MWh);

$CAP_{Thermal}$ is the increased thermal capacity as defined in Notification on Determining Baseline Emission Factor of China's Grid (MW);

CAP_{Total} is the total increased capacity as defined in Notification on Determining Baseline Emission Factor of China's Grid (MW);

EF_k is the CO2 emission factor of fuel type k (raw coal, oil or natural gas) (tCO$_2$/t);

NCV_{coal} is the net caloric value of standard coal equivalent (GJ/tce);

NCV_k is the net caloric value of fuel type k (raw coal, oil or natural gas) (GJ/t).

Since calculation of relevant emission factor for upstream fugitive CH$_4$ emissions ($EF_{BL,upstream,CH4}$) is consistent with that of Build Margin emission factor ($EF_{BM,y}$) based on methodology ACM0002, as per the *Notification on Determining Baseline Emission Factor of China's Grid*, formula to calculate emission factor for upstream fugitive CH4 emissions ($EF_{BL,upstream,CH4}$) is converted from formula (11)

$$EF_{BL,upstream,CH4} = \frac{\sum_j FF_{j,k} \cdot EF_{k,upstream,CH4}}{\sum_j EG_j} \qquad (11)$$

into

$$EF_{BL,upstream,CH4\,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal,,upstream,CH4} \qquad (A5)$$

$$EF_{Thermal,upstream,CH4} = \lambda_{Coal} \times EF_{Coal,Adv,upstream,CH4} + \lambda_{Oil} \times EF_{Oil,Adv,upstream,CH4}$$
$$+ \lambda_{Gas} \times EF_{Gas,Adv,upstream,CH4}$$

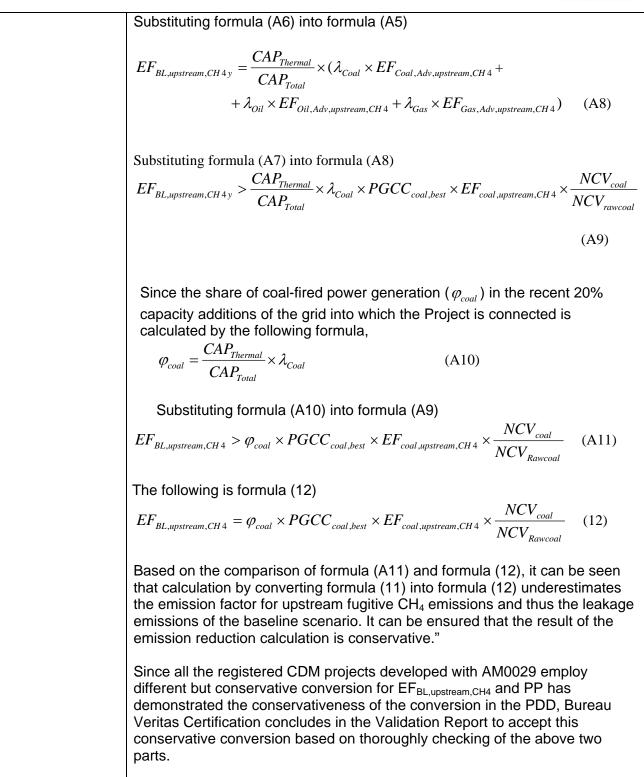$$(A6)$$

$$EF_{k,Adv,upstream,CH4} = PGCC_{k,best} \times EF_{k,upstream,CH4} \times \frac{NCV_{coal}}{NCV_k} \qquad (A7)$$

Where,

$EF_{k,upstream,CH4}$ is the upstream fugitive CH$_4$ emissions ($EF_{BL,upstream,CH4}$) from power generation by the best technology commercially available for power generation of fuel type k (tCH4/MWh);while definition of other parameters is identical to the above.

Substituting formula (A6) into formula (A5)

$$EF_{BL,upstream,CH4\,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times (\lambda_{Coal} \times EF_{Coal,Adv,upstream,CH4} +$$
$$+ \lambda_{Oil} \times EF_{Oil,Adv,upstream,CH4} + \lambda_{Gas} \times EF_{Gas,Adv,upstream,CH4}) \quad (A8)$$

Substituting formula (A7) into formula (A8)

$$EF_{BL,upstream,CH4\,y} > \frac{CAP_{Thermal}}{CAP_{Total}} \times \lambda_{Coal} \times PGCC_{coal,best} \times EF_{coal,upstream,CH4} \times \frac{NCV_{coal}}{NCV_{rawcoal}}$$

$$(A9)$$

Since the share of coal-fired power generation (φ_{coal}) in the recent 20% capacity additions of the grid into which the Project is connected is calculated by the following formula,

$$\varphi_{coal} = \frac{CAP_{Thermal}}{CAP_{Total}} \times \lambda_{Coal} \quad (A10)$$

Substituting formula (A10) into formula (A9)

$$EF_{BL,upstream,CH4} > \varphi_{coal} \times PGCC_{coal,best} \times EF_{coal,upstream,CH4} \times \frac{NCV_{coal}}{NCV_{Rawcoal}} \quad (A11)$$

The following is formula (12)

$$EF_{BL,upstream,CH4} = \varphi_{coal} \times PGCC_{coal,best} \times EF_{coal,upstream,CH4} \times \frac{NCV_{coal}}{NCV_{Rawcoal}} \quad (12)$$

Based on the comparison of formula (A11) and formula (12), it can be seen that calculation by converting formula (11) into formula (12) underestimates the emission factor for upstream fugitive CH$_4$ emissions and thus the leakage emissions of the baseline scenario. It can be ensured that the result of the emission reduction calculation is conservative."

Since all the registered CDM projects developed with AM0029 employ different but conservative conversion for EF$_{BL,upstream,CH4}$ and PP has demonstrated the conservativeness of the conversion in the PDD, Bureau Veritas Certification concludes in the Validation Report to accept this conservative conversion based on thoroughly checking of the above two parts.

Hope the above responses given clarify the queries raised. We request the early registration of the project as a CDM project.

Thanking you,

For Bureau Veritas Certification Holding SAS

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Team Leader

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