

Our ref.: KFQGHG-02

Date : 6 November 2009

## **Response to request for review**

### **“SeAH Besteel fuel switching project”(Ref. no. 2735)**

Dear Members of the CDM Executive Board,

We would like to provide the following clarifications for your perusal and review for the “SeAH Besteel fuel switching project”(Ref. no. 2735).

PP and DOE response to each comments are indicated below.

#### **Comment 1:**

The DOE is requested to further validate the input values used in the cost comparison analysis, in particular the fuel prices, the price trends over time, and the fuel consumption.

#### **Response to comment 1 by KFO:**

The fuel prices for LNG and B-C on GSP PDD has been adjusted because PP could not justify their estimation for the value are reasonable in the context of invest decision making timing(Febuary, 2005).

The adjusted fuel prices are 489.22 KRW/m<sup>3</sup> for LNG and 306.54 KRW/l for B-C, respectively. The validation team assessed these values through LNG price information(2001~2005) provided by Gunsan gas provider and price information B-C from past actual purchasing record. In the case of LNG price, the validation team again crosschecked the value with actual invoice(587.36 KRW/m<sup>3</sup>) generated since the project activity's commencement.

As a result, we could be able to the applied fuel prices for LNG and B-C are valid at the time of investment decision.

Price trend of B-C and LNG had been very stable in past years(2001~2004) and onward.

price/MJ	LNG	B-C oil
	KRW/MJ	KRW/MJ
2001	11.09	7.13
2002	10.10	7.11
2003	11.36	8.58
2004	11.12	8.30
2005	12.23	7.84
2006	13.23	10.88
2007	13.43	9.76
2008	14.68	14.83
2009	15.91	13.90

According to result of analysis, after year 2005 LNG price increased 6 % in average and B-C price increased 15% in average. Also, validation team has assessed above analysis result and found additionality is not affected by above consideration.

Thus, the validation team has concluded the applied fuel prices and the variation range for sensitivity are valid in the investment analysis in order to show the project activity's economic performance at the decision making timing.

Fuel consumption is estimated based on rated unit of WBFs, production, and NCV of each fuel. The rated units which are provided by the technology providers(required energy per ton of production, GJ/ton) and applied as 1.040 GJ/ton for large size WBFs and 1.582 GJ/ton for small size WBF. Production is applied as the expected production based on SeAH Besteel' Production Plan in each year considering the demand increase.

Validation team has reviewed validated the facilities' specification and national NCV data by Ministry of Commerce, Industry and Energy/Korea Energy Management Corporation, and assessed the rationale of the production plan containing forecasted demand increase considering past production record and opinion of market trend expert for steel industry.

Hence, KFQ got to conclusion the variation range for fuel price and fuel consumption are valid and appropriate at the time of investment decision. KFQ provided a detailed description of validated result in the revised validation report.

Please refer to page 16 and 17 of the validation report version 03.

## **Comment 2:**

The DOE is requested to clarify how it has validated the prior consideration of CDM for the project activity in line with VVM paragraphs 96 and 100 guidance.

### **Response to comment 2 by PP:**

SeAH Besteel is a steel making company, so it consumes large amount of energy. Therefore They has been deeply interested in energy saving for cost reduction and lasted good relationship with KEMCO(Korea Energy Management Corporation), public government agency for energy saving in Korea. Since 2003, SeAH Besteel came to know that fuel switching could be a CDM project from KEMCO, it began to consider fuel switching as a CDM project. At last it started fuel switching in furnaces and boilers in 2005 and decided to apply CDM registration after settlement of final capacity. Because it was very difficult to anticipate the capacity of all facilities in 2005 owing to construction stepwise. SeAH Besteel understood that once registered, changing PDD would be very difficult and it would give most CERs to register after all constructions. (Refer to section B.5 of PDD)

At the beginning, SeAH Besteel tried to make a PDD single-handed, but soon realized it would be better with consulting company. Since then, SeAH Besteel asked around proper consulting company, but there were not enough companies which had experiences in steel making process in Korea. Finally SeAH Besteel decided to contract with KEMCO and promote energy auditing and GHG inventory at the same time. The result of energy auditing and inventory are now used for energy saving and GHG reduction action.

SeAH Besteel started this project in order to reduce CO2 gas in spite of cost increase, and now hope to see good result to be encouraged for additional effort to GHG reduction.

Detail evidences, indicating that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project, are provided by translation in the PDD. Evidences include minutes related to the consideration of the decision by the preliminary meeting and the Board of Directors. It is the preliminary meeting record held on 17 January 2005 and the documents used for decision making by its Board of directors dated on 23 February 2005. (Refer to annex 3 of PDD)

### **Response to comment 2 by KFO:**

Validation team checked evidences, which are the minutes of the preliminary meeting and of the board of directors provided by PP and confirmed that evidences indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Thus, validation team concluded those evidences demonstrate awareness and consideration of the CDM prior to the starting date of the project activity.

Also validation team checked that evidences from project participants indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. The table of B.5 of the PDD presents timeline of the project activity. PP had tried to proceed with the project activity as CDM project seeking consulting company and discussing with CDM expert via participating in seminar since investment decision. Finally, CDM consulting agreement has been finalized on 2007. Thus, validation team reviewed relevant documentation such as meeting minutes and training record to show these efforts of PP and concluded evidences from project participants indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.

KFQ provided a detailed description of validated result in the revised validation report.  
Please refer to page 13 of the validation report version 03.

**Comment 3:**

The DOE is requested to further justify the exclusion of the alternatives of using other fuels than natural gas, as neither the fuel costs nor the price trends were presented.

**Response to comment 3 by KFQ:**

It is also technically feasible to use other fossil fuels, such as diesel, kerosene, gasoline or LPG as fuel sources. However, due to its high price per caloric values, such fuels are seldomly used as fuel source in these types of equipment and facility. Generally, gasoline and light oil are used in transportation field, kerosene and LPG are used in residential and commercial field, diesel is used for emergency. In industrial field, only B-C and LNG are used in Korea. Thus, the alternatives of using other fuels was never considered by project proponents. Validation team has also been confirmed through the “Energy consumption statistics” from Ministry of Commerce, Industry and Energy of Korea and concluded that the exclusion of the alternatives of using other fuels is reasonable under our sectoral knowledge in Korea circumstances.

KFQ provided a detailed description of validated result in the revised validation report.  
(Refer to page 14 of validation report)

**Comment 4 and 5:**

The PP/DOE are requested to clarify how the baseline emissions calculations comply with the methodology which defines the project output in terms of energy.

The PP/DOE are requested to clarify how the monitoring plan complies with the methodology which defines the project output in terms of energy.

**Response to comment 4 and 5 by PP:**

As per Paragraph 1 of AMS-III.B (version 13) “This methodology comprises fossil fuel switching in industrial, residential, commercial, institutional or electricity applications<sup>1</sup> (e.g. fuel switch from fuel oil to natural gas in ~ “, “<sup>1</sup> Fuel switch in transportation technologies is not eligible under this methodology.”, it seems that any fuel switching project except for transportation technologies could apply using this methodology.

And as per Paragraph 6 of AMS-III.B (version 13) “In case of existing facilities historical information on the use of fossil fuels and the plant output (e.g. heat or electricity) in the baseline captive energy generation ~ “, it seems that heat or electricity are simply expressed as examples of plant output.

In this project, 2 values can be considered as output. One is output heat and the other is output product. Output product can be measured simply and recorded in ERP system automatically. (Refer to section B.7.1 of PDD)

The output heat can be calculated as followings. (Refer to section B.2.6 of PDD)

$$H_{output} = \sum \{W_b \times C \times (T_{out} - T_{in})\}$$

$H_{output}$ (MWh/yr) : Heat Output

$W_b$ (ton) : The weight of each Bloom or Billet which is put into furnace

$C$ (MWh/ton °C) : Specific Heat of Bloom or Billet, fixed value

$T_{out}$ (°C) : The temperature of bloom or billet at the exit of furnace

$T_{in}$ (°C) : The temperature of bloom or billet at the entrance of furnace

Each values also are measured and recorded automatically.

By the way, to use output product is easier than output heat for calculating baseline and monitoring in this case. So, PP investigated that it would be possible to use output product in this methodology. At first, PP compared the trends of output product and output heat. The trends are very similar to each other. (Refer to Annex. 3 of PDD). Next, PP carried out regression analysis and got 0.984 as coefficient of correlation, 0.969 as coefficient of determination (confidence interval 95%).

Finally PP tried to find examples which use output product as output in AMS-III.B. PP could find next 3 projects already registered as CDM project.

1. Quimvale and Gas Natural Fuel Switch Project, No. 0828. This project used AMS-III.B version9, and the quantity of CaCO<sub>3</sub> is defined as output.
2. Switching of fuel from Natural Gas to Hydrogen in CCU-II at Dahej complex of GACL, No. 0940. This project also used AMS-III.B version9, and the quantity of Caustic Soda Flakes is defined as output.
3. Acos Villares Natural Gas fuel switch project, No. 1037. This project also used AMS-III.B version10, and the quantity of steam and steel is defined as output.

From the above investigation, PP decided to use output product as output. and it will be easier and simpler in this case.

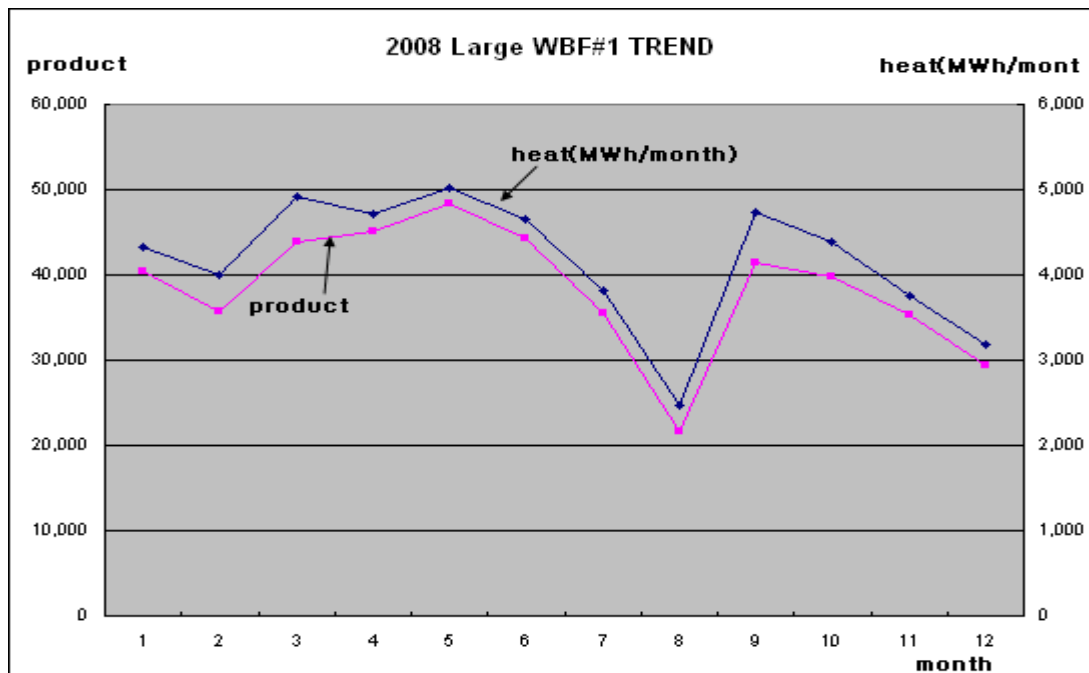
Furthermore, PP will monitor  $W_b, T_{out}, T_{in}$  for the purpose of crosscheck to strengthen this method. (Refer to section B.7.1 of PDD)

#### **Response to comment 4 and 5 by KFO:**

The validation team checked below correlation analysis figure and data of product output and Heat output provided by PP.

There is interrelationship between product output and heat output. Thus, both product output and heat output may be applied as project output. However, heat output can be calculated with three factors as shown in the equation above and thus, uncertainty may be higher than product output. For this reason, PP had applied heat output as project output. The validation team also concluded that product output is appropriate as parameter substituting net energy output as product output can be considered as indirect energy output.

Additionally we investigated any registered similar project to support our conclusion. There exist “Switching of fuel from National Gas to Hydrogen in CCU-II at Dahej complex of GACL”. Validation team had found that Caustic soda flakes(CSF) as product output was applied instead of energy output in the project activity.



Finally, the validation team had concluded that Bloom or Billet as product output can substitute as net energy output and it is comply with the methodology.

KFQ provided a detailed description of validated result in the revised validation report.  
Please refer to page 22 of the validation report version 03.

We sincerely hope that the Board accepts our aforementioned explanations and we look forward to the registration of the project activity.

Your sincerely

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Director of R & D Division