CDM Executive Board
UNFCCC Secretariat
CDMinfo@unfccc.int

17th July 2009

Re: Request for review for project activity "Bhushan Power and Steel Limited - Waste Heat Recovery based Captive Power Project" [CDM Ref. #: 2519]

Dear CDM Executive Board Members,

SGS has been informed that the request for registration for the proposed CDM project activity "Bhushan Power and Steel Limited - Waste Heat Recovery based Captive Power Project" has been requested for review.

SGS would like respond to the queries raised by the request for review as below:

Request for Review Issues 1 – 4:

Request for Review, Issue 1:

The DOE is requested to provide further justification on how it has validated the suitability of input values used in calculating the unit cost of generation for the project activity and the alternatives as per EB 41, annex 45, para 6.

SGS Response to Issue 1:

As per EB41, annex 45, para 6 – *"Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing. The DOE should also validate that the listed input values have been consistently applied in all calculations."*

The DOE confirms the date of decision was 29/10/2002 which was verified with the Board Note (Appendix 4 to the PDD) which is already uploaded with the request for registration. The unit cost of generation (Annex 1 of this letter) was calculated before the decision on project activity based on the different offers from the suppliers. The input values were verified with the offers available mentioned below in the table. The other expense was verified by the cost accountant. Please refer Annex 2 for the attested copy from the accountant for the cost verified for the project.

However, the unit cost of generation was also calculated by the project participant based on the actual purchase orders (PO) which was also verified with the actual PO values. This PO sheet (Appendix 2 of the PDD) is already submitted with request for registration, there was no difference in the unit cost of generation if both sheets are compared.

Out of all the plausible baseline scenarios, this was concluded that the possible baseline scenarios for the project activity was W2, P4a, P4b and P6 as discussed in validation report page 12. By evaluating further for options P4a, P4b and P6, it was found that the cost of generation for P4a was INR 1.56 / kWh as per CEA report of February 2004 available at

http://www.cea.nic.in/thermal/Special_reports/Report%20of%20the%20expert%20committee%20on%20fuels%20for%20power%20generation.pdf and the cost of generation for P4b was INR 5.96 /kWh in the same report. The cost of grid power P6 was INR 4.00/kWh which was verified with the electricity bills from State Electricity Board. Hence the most likely baseline scenario was selected as W2 and P4a i.e. Waste gas is released to the atmosphere after incineration (waste pressure energy is not utilized) and on-site coal, coal washery rejects, coal char based captive power plant (CPP) to cater the equivalent power as that of the WHRB system. The actual cost of generation which was analyzed before decision was made is attached in annex 1 to this letter. The cost of generation for P4a was INR 1.13/kWh and the cost of generation from project activity was INR1.45/kWh.

The baseline was selected considering the economic attractiveness of the coal, coal washery rejects, coal char based CPP. All the input values were verified with the document/information available at the time of decision making. The detail is as follows:

Assumptions to arrived Cost of Generation	**Value**	**Unit**	**Source of information**	**Remarks**
Project Cost				
Power Plant Turbine	14143	Rs. Lacs	Quotation from BHEL dated 31/07/2002 & ALSTOM dated 09/02/2002 Total project cost	Annex 3 & 4
WHRB Boiler	5012	Rs. Lacs	Quotation from –Thermax dated 10/9/2002, ESP 29/09/2002 & 15/10/2002, Total project cost	Annex 5 & 4
AFBC Boiler	4866	Rs. Lacs	Quotation from Thermax dated 10/09/2002 & 5/10/2002 ; ESP 15/10/2002 Total project cost	Annex 5 & 4
Capacity				
Power Plant Turbine	100	MWPH	Technical specification Document No 10,11	Annex 3
WHRB Boiler	204	MTPH	Technical specification – Document No 12	Annex 5
AFBC Boiler	225	MTPH	Technical specification – Document No 9 and 12	Annex 5
Auxiliary Consumption	10%		Technical assumption supported Central electricity authority. (Document no 15)	Annex 6
PLF				
WHRB Boiler	60%		1.Letter from Avant Garde dated 18/10/2002. Document no 19 2.Letter from MECON dated 16.12.2002 (Document No 5) 3.Letter from VP projects to Director commercial Bhushan Limited dated	Annex 7 & Annex 8

Assumptions to arrived Cost of Generation	Value	Unit	Source of information	Remarks
			1/10/2002 (Document No 4)	
AFBC Boiler	90%		1.Letter from Avant Garde dated 18/10/2002. (Document no 19) 2.Letter from MECON dated 16.12.2002 (Document No 5) 3.Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 7 & Annex 8
Rate of Depreciation				
Plant & Machinery	5.28%		Income tax act 1956 Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 9 & Annex 8
Building	3.34%		Income tax act 1956 Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 9 & Annex 8
Rate of Interest	10.50 %		Lending rates of schedule commercial banks October – December 2002 (Document No 6) Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 10 & Annex 8
MinimumDemand Charges				
Rate / KVA (fixed charges)	200	Rs./KVA	WESCO Tariff From Feb 2001 (Document No 1) ORIEC Tariff order 1998 (Document No 2)	Annex 11
Debt Equity Ratio				
Debt	66.67 %		Bhushan Ltd Phase one project financial report (Document No 17, 20) Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 4, 12 & Annex 8
Equity	33.33 %		Bhushan Ltd Phase one project financial report (Document No 17, 20) Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 4, 12 & Annex 8

Assumptions to arrived Cost of Generation	Value	Unit	Source of information	Remarks
O & M Charges	8%	of Project Cost	Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4) Cost accountant certificate	Annex 8 & Annex 2
Raw Material per KWh				
Washed Coal Rejects (0-4)	0.200	MT per MW	Calculation	Annex 1
Coal Middling (0-6)	0.600	MT per MW	Calculation	Annex 1
Char	0.500	MT per MW	Calculation	Annex 1
Raw Material Rate				
Washed Coal Rejects (0-4)	405	Rs. Per MT	Inani coal corporation 15th Oct 2002 (INR 405/ton) Padmavati commodities 25th Sep 2002 (INR 390/ton)	Annex 13
Coal Middling (0-6)	350	Rs. Per MT	Inani coal corporation 15th Oct 2002 (INR 340/ton) Padmavati commodities 25th Sep 2002 (INR 350/ton)	Annex 13
Char (Waste Product From Kiln)	0	Rs. Per MT		-
Consumables at WHRB	0.10%	Per MW Gen.	Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 8
Consumables (Including Fuel) at AFBC	0.15%	Per MW Gen.	Letter from VP projects to Director commercial Bhushan Limited dated 1/10/2002 (Document No 4)	Annex 8

Request for Review, Issue 2:

Further clarification is required on how the DOE has validated the unit cost of generation. The DOE is requested to substantiate that the alternatives considered will provide the similar level of output/services as that of the project activity.

SGS Response to Issue 2:

The unit cost of generation calculated in annex 1 was validated for all the input values and assumptions as described in the above table.

As the project activity was applied to the new facility there was no prior release of waste heat/ gas in the baseline scenario. Since there is practically no other use of waste gases from the kiln of the steel plant, in absence of the proposed project the waste gas thus generated would have been quenched,

cleaned and released into the atmosphere and the heat content would have been wasted. Therefore the option W2 i.e. 'Waste heat is released to the atmosphere' was selected as the most relevant baseline scenario for the project activity. On-site new fossil fuel based captive plant was selected as baseline for power generation. This was supposed to use on-site coal, coal washery rejects, coal char to generate power to cater to the sponge iron plant.

The **maximum** power demand of sponge Iron plant was estimated as 104 MW as verified with power distribution details of the plant attached as Annex 14 of this letter. PP would have installed the CPP to cater the full demand of the sponge Iron plant in absence of project activity due to economical attractiveness of generating power on-site from coal, coal washery rejects, coal char. The unit cost of electricity generation from coal based CPP was validated as INR 1.13/kWh and from WHRB as INR 1. 45/kWh. Even though the cost of power generation from WHRB was higher, the PP decided to implement the WHRB plant because of CDM benefits as verified with the board note dated 29/10/2002. The maximum potential of power generation from WHRB was estimated as 48MW (assumed 60% load factor). Considering the fluctuating nature of waste gas availability, the grid connection for maximum demand of 4950kVA (~3.96MW) was also planned to have by PP. To meet the rest of the demand, PP decided to implement 52MW coal, coal washery rejects, coal char based power plant.

Thus, in absence of the project activity, one more 52MW coal, coal washery rejects, coal char based power plant would have been implemented. Because, in that case, the import of power from grid was not required. The two plants (2x52=104MW) would have met the total demand of the plant.

Hence, the baseline of 52MW CCP was compared with the project scenario of 48MW WHR based capacity and Import of 3.96MW power from the grid. Thus the baseline alternatives considered will provide the similar level of output/services as that of the project activity.

Please note that the steam generated from WHRBs (204TPH) and AFBC (225TPH) enter the common header before entering the 40+60=100MW turbines.

Request for Review, Issue 3:

Further clarification is required on how the DOE has validated the barrier analysis, in particular, it should be clarified what third party evidence has been assessed to determine the prohibitive nature of the barriers.

SGS Response to Issue 3:

The barriers for the implementation of the project activity were also analyzed however the investment analysis proved to be prohibitive enough for implementation of the project activity as discussed above and accepted of project additionality. The barrier analysis was also presented by the project participant which includes investment barrier – access to finance, technological, institutional and barrier due to prevailing practice.

The capital cost, commonly available technology and prevailing practice in the relevant region shows that AFBC Boiler would not have faced the above barriers. The following documentary third part evidences were assessed to determine the prohibitive nature of the barriers.

- Bhusan Power & Steel Limited (BPSL) had initiated the dialogue with various institutions for the financing of the project in which CDM revenues was also considered. The application to the financial institution highlighting the CDM revenues from the proposed project and the communications thereof are enclosed as Annex 15 of this letter.

- Letter from directorates of factories and Boilers, Bhubaneshwar, Orissa" dated 18th July 2008. This was checked by telephonically interviewing the person who had signed the letter. The first of its kind plant was given on the basis of high pressure and temperature configuration used with 500 TPD sponge iron kiln. The evidence (Appendix 1 of the PDD) was already uploaded with the request for registration.

- Institutional barriers along with the documents from RETL and GRIDCO which has been provided. In RETL & GRIDCO letter support of institutional barriers faced by the PP. Please refer to Annex 11.

- The SL/RN technology is the technology used in the sponge iron kiln at BPSL which generates waste gas. The performance of the WHRB depends upon and is directly related to the quantity and quality of the waste gases emanating from the kiln. This SL/RN technology is imported from Germany. Frequent variation in the type of raw material used results in fluctuation of both quantity and quality of waste gas generated and hence it leads to disruption in power generation from the WHRBs. Documentary evidence in support of SL/RN technology has been provided which shows that that the performance of the project activity is linked to the performance to the kiln. Detailed project copy in support of SL/RN technology and the document by Lurgi Metallurgie GmBH (an Outokumpu technology company) (Annex 16) were verified for technological barrier.

- The evidences include the Board note on CDM consideration dated 29th October 2002 also indicating that BPSL was aware of the technological hurdles and challenges due to high pressure and temperature configuration of the waste heat recovery boiler which was prior to the project decision. The technological barriers section clearly indicates that there were training related barriers, risk of technological failures, quality of waste gas, temperature control related, boiler operational problem and due to failure of other equipments. Regarding waste gas quality aspects, it may be noted that WHRB's are designed based on flue gas emanating from the DRI Kiln having definite parameters. Any change in the parameters would have adverse impact on performance of the boiler. For example, the flue gas inlet temperature is 1000 degC and in case the temperature goes beyond 1000 degC, it would have an adverse impact on boiler tubes and there may be premature failure due to excessive heat. Further, coal is a vital raw material used in the DRI Kiln to produce DRI/ sponge iron. Better coal quality is directly related with the productivity of DRI and the quality of flue gas which has a direct impact on steam generation. On the other hand, inferior coal quality (having high ash content) will generate flue gas with high ash content and this has got an impact on wear and tear on the boiler tubes. Evidence from BPSL on desired ash content in coal was also provided by the PP which indicated that the ash content desired is about 27.5% . Further other equipments such as electrostatic precipitator (ESP) which is placed between boiler and the stack. Any breakdown in ESP would paralyse the performance of WHRB. The gas coming out from the kiln contains moisture and un-burnt coal which could stick to the wall of the electrodes and adversely affect the performance of the ESP connected to the WHRB. The functioning of the ESP is dependent on the quality of the waste gas from the kiln as against that of the AFBC.

Request for Review, Issue 4:

Further details regarding the common practice should be provided in accordance with the requirements of step 4 of the additionality tool, i.e. similar project activities should be described and the differences between each of these activities and the project should be clearly indicated.

SGS Response to Issue 4:

The requirements of step 4 of the additionality tool is described as below:

Sub-Step 4a: Out of 147 units surveyed by the Joint Plant Committee (constituted by Govt. of India), there were 33 coal based sponge iron industries located in the Orissa state. It was observed that out of 33, only 4 had captive power generation facilities. The same was verified with the Joint Plant Committee (JPC) report (table-15) for 2005-06 (survey work was up to 31.08.2005). As the survey pertaining to JPC report ended on 31st August 2005, this report would be relevant to BPSL's project. The report table 15-page 38 was already uploaded with request for registration.

Sub Step 4b: Out of 4 industries which had captive power generation facility, these were CDM project activities namely OSIL, TSIL, SML and OCL.

1. Orissa Sponge Iron Limited (http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1152711605.33/view) started crediting period 1st Jul 2001
2. Tata Sponge Iron Limited (http://cdm.unfccc.int/Projects/DB/DNV-CUK1140622960.5/view) started crediting period 1st Jan 2002

3. Sree Metaliks Limited (http://cdm.unfccc.int/Projects/DB/SGS-UKL1204734963.42/view) start date 10th Jul 2002

4. OCL India limited (http://cdm.unfccc.int/Projects/DB/SGS-UKL1145002776.48/view) start date Aug 2004 but started crediting period 1st April 2006

5. Bhushan Power – project activity itself – start date 27th Feb, 2003

The first four plants are registered CDM project activities and are availing CDM benefits. Hence this was accepted and concluded that the project activity was not the common practice in the region.

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We hope that this letter addresses the concerns raised by the Board. If further information is required, the following members of the Validation Assessment Team will be the contact persons for the review process and they would be available to address questions from the Board during the consideration of the review, if necessary.

Yours sincerely,

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Enclosures:

Annex 1- Unit cost analysis proposal basis
Annex 2 cost verified by accountant 28.10.2002
Annex 3 Turbine cost
Annex 4 Bhushan Ltd Phase - 1 project financials
Annex 5 Boilers offers
Annex 6 Auxiliary power consumption
Annex 7 Letter from Avant garde & Mecon
Annex 8 Note VP projects to director commercial
Annex 9 depreciation rate
Annex 10 Lending Rates
Annex 11 Grid TARIFF
Annex 12 Bank Project Report
Annex 13 Coal quotations
Annex 14 Load distribution
Annex 15 CDM_Bhushan1
Annex 16 SL RN Technology
Annex 17 PP Response on request for review_150709

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