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	IS-CMS-MUC/ Rachel Zhang	++49 8957 913038 Rachel.zhang@tuev-sued.de	++49 8957 912756	2008-11-10	1 of 14

Request for Review

Dear Sirs,

Please find below the response to the review formulated for the CDM project with the registration number 1905. In case you have any further inquiries please let us know how we can kindly assist you.

Yours sincerely,

Rachel Zhang
Deputy Head of Certification Body “climate and energy”

Encl.
Annexure-1_Production schedule
Annexure-2_Project Chronology

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Response to the CDM Executive Board

Question 1

Further clarification is required on how the DOE has validated the barriers and if the barriers to the project activity cannot be further substantiated, an investment analysis may be submitted to demonstrate additionality.

Response by PP

During conceptualization of the project, we identified three critical risks for the project activity. They are

- Technological risk (Technological Barrier) – mainly due to frequency variation and inconsistent availability of waste gas
- Policy risk (other barrier) – mainly due to low selling price and no third party sale
- Investment risk (Investment Barrier)

1. Technological risk (Technological Barrier):

We were mainly skeptical about viability of the project due to performance uncertainties with respect to frequency variation and inconsistent availability of waste gas. This apprehension was due to our unpleasant past experience with similar technology and problems due to grid connected power plant in the project location.

Past experience with similar technology:

Our past experience with a similar system (Line 1 waste gas recovery based TG1 - 2.5 MW and TG2 - 6MW) installed at our project site was not pleasant; we faced persistent technical problems with the waste heat recovery system (i.e. 2.5MW and 6MW).

The major technological problems (technological barriers) faced are

1. Frequency variation
2. In consistent availability of waste gas

Frequency variation:

Stable voltage and frequency are two important factors that contribute to effective functioning of the grid. The standard alternating current frequency in India is 50 hertz[1]. When demand is more and generation is less, the frequency falls below 50 hertz and vice versa.

Permissible frequency variation limit:

Indian Electricity Grid Code (IEGC)[2] as stated that,

[1] Reference: http://cercind.gov.in/230402/grid_frequency.PDF (Page 3, Para 4.6 (b))
[2] Reference: http://www.nldc.in/docs/gridcode.pdf (Page 39, Para 5.2.(l))

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"All regional constituents shall make all possible efforts to ensure that the grid frequency always remains within the 49.0 – 50.5 Hz band, the frequency range within which steam turbines conforming to the IEC specifications can safely operate continuously"

It is to be noted that IEGC prescribed limit for frequency variation is only between 49.0 Hz to 50.5 Hz band. Any deviation from the recommended limit would adversely impact the operation of turbine connected to regional grid resulting in thermal-mechanical shocks to the turbine leading to equipment failure and downtime.

The project activity is located in an industrial area (SIPCOT, Gummidipoondi). The area is a huge electricity demand center where many large and medium scale industrial units operate. The power demand from the industrial units are largely variable and result in sudden fluctuations in power import from the grid. As a result, the grid frequency fluctuates beyond permissible levels. This frequency fluctuation directly impacts the turbines connected to the grid, especially those connected to the same substation. The impact of such fluctuations is much lesser on turbines connected elsewhere in the same grid. However, on evaluating the trend of frequency variation near project location, we observed following facts

As per the SRLDC (State Regulatory Load Dispatch Center - An apex body to ensure integrated operation of the power system in the southern region of India) data, the grid frequency in the area was beyond the limits for significant amount of time:

"The grid frequency of the region remained below 48.5Hz.for 78.9% of time in August 2001, 83.21% of time in September 2001 and 43.4% of time in October, 2001."

Further, it is observed from below table that TNEB (Tamil Nadu Electricity Board – Electricity regulatory body in the state of Tamil Nadu, which forms a part of southern regional grid) is second in over drawls of energy at less than 48.5Hz/ 49Hz.

Over drawls at less than 48.5 Hz/49 Hz (in Million kWh's)

Month	APTRANSCO	KPTCL	KSEB	TNEB
Aug. 2001	11.44	36.26	7.49	45.53
Sep. 2001	12.25	24.63	10.53	25.42
Oct. 2001	2.02	43.72	5.64	39.02
Nov. 2001	7.91	78.26	7.94	19.6
Dec. 2001 (Up to 23rd Dec. 2001)	4.96	44.79	8.32	15.32
Total	38.58	227.66	39.92	144.89

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Further, percentage of total time during which the frequency remained below 49.0 Hz in various region grid are tabulated below:

REGION	**2002-03 (Below 49 Hz)**
Northern	7.45
Western	31.57
Southern	49.47
Eastern & N Eastern	12.33

From the above table it is clear that for the year 2002 – 2003, nearly 50% of the time, the frequency of the southern region grid remained below 49 Hz.

Impact due to above problems on the turbines is described below:

Impact on Turbine

The frequent frequency variations in the grid results in thermal shocks to the TG system and would impact the operational life time of the project activity. The sustained low frequency operation has following impacts

- The vibration levels of the turbine would be comparatively higher, resulting in wear and tear of the interfaces between the fixed and rotary parts inside the turbine.
- The turbine develops a back pressure, which affects the life of the thrust bearing. Replacement of the thrust bearing can affect the plant production.
- The amount of vacuum required is much more than the standard requirements, which is very difficult to achieve continuously especially in the summer season when the temperature is high. Without the required vacuum, steam expansion pattern inside the turbine get affected and as a result back pressure is created on the rotor. This develops undue stresses on the blades of the rotor, which reduce the life and reliability of the turbine.

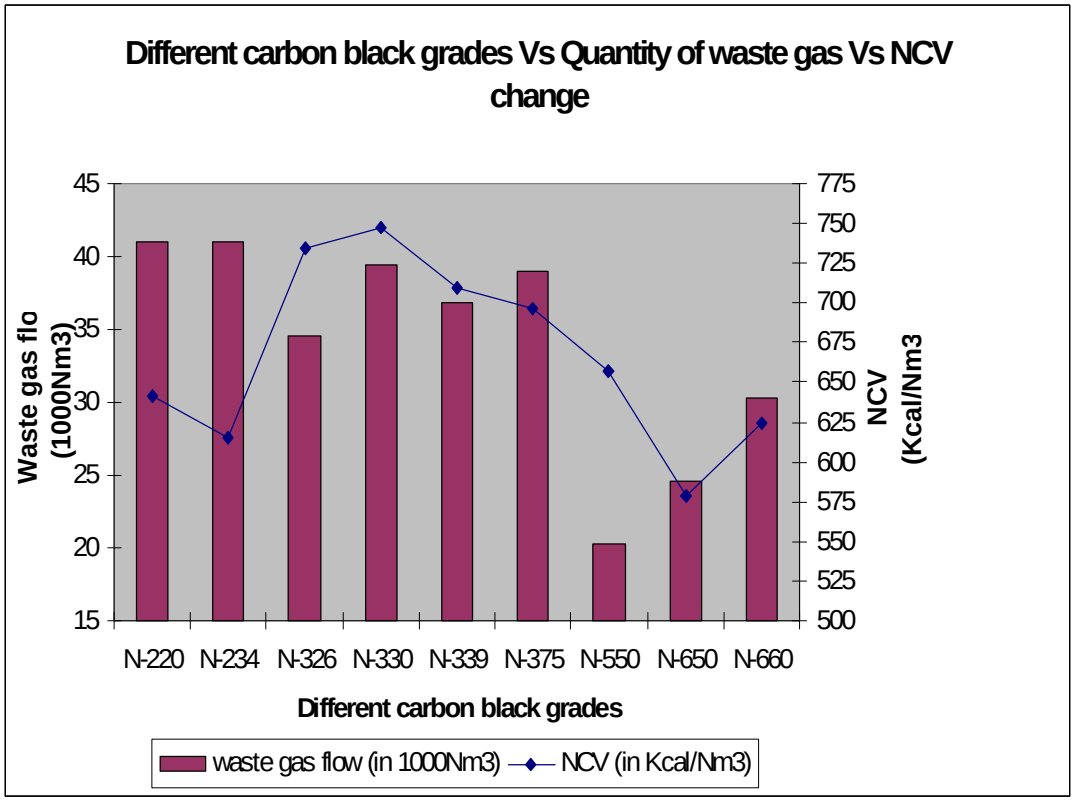
On evaluating above stated statistics and past experience on similar waste gas recovery system, we were more skeptical about the success of grid connected power generation system.

Inconsistent availability of waste gas

HTC produces different grades of carbon black[3] to meet the market requirements. The quality and quantity of waste gas would vary depending upon the grades of carbon black produced. Hence, there will be fluctuation of waste gas in terms of quality and quantity which may affect the downstream equipments.

The Net Calorific Value of the waste gas and its variation with respect to different carbon black grades is provided in the below graph.

[3] Reference: Summary of grade changes for a month.



The huge variation in the waste gas depending upon the grade change proves to be a challenge for effective operation of waste gas based power generation.

As stated in the above graph, the waste gas coming out of carbon black facility has very low calorific value. Hence, the design of boiler for low calorific value waste gas has got some limitations. The low calorific value gas needs a longer time to combust and produces an unstable flame. Hence, conventional oil gas combustion systems with membrane wall boilers cannot be applied for waste gas. Due to flame radiation in the boiler wall, the combustion temperature is further reduced.

Further, the combustor (a refractory-lined Furnace) has to be kept hot to provide the proper temperature, to provide the turbulence, intimate mixing of the waste gas and combustion air. Adequate combustor volume also had to be provided for the necessary residence time to complete the oxidation of the combustible components. Since volume of waste gas changes with respect to grade, it is difficult to maintain adequate combustor volume consistently to provide necessary residence time.

Further, Low Calorific value gas means more volume of waste gases and higher power consumption for the fan.

The above stated operational difficulty is a challenge for operation of waste gas recovery based power generation system in carbon black waste gas. This low calorific value and inconsistent

availability are the two inherent operational problems that would continue during the operation of the project activity.

Although Hi-Tech Carbon (HTC) had taken steps to avoid these operational difficulties, complete elimination of above stated problems is not possible.

Considering the above reasons, we had apprehension about setting up a new carbon black waste gas recovery system.

Occurrence of failure (Risk of Technological failure):

The occurrence of failure in the line 1 TG system posed to be a technological risk during conceptualization of project activity. The risk in the process founds to be significantly higher especially in our carbon black manufacturing process coupled with technology failure (similar TG system) identified to be critical risk (barrier) for implementation of the project activity.

2. Policy risk (Other barriers):

Low selling price

It may be noted that sale of power to the state grid is the source of revenue for the project activity. The success of the project activity entirely depends on the power purchase tariff, any variation in the cost per unit would directly affect the viability of the project. At the time of conceptualization of the project activity, HTC received a price of INR 3.01/kWh and annual escalation of 5% for the surplus power exported to grid from an existing system. Considering the various factors, the price offered by TNEB found to be competitive. The terms specified in existing PPA is considered as basis for estimation of commercial operation of the project. However, the tariff for a project is considered final only when the power purchase agreement is signed, which happens mostly during the commissioning stage.

Thus any policy change during implementation stage would impact the viability of the project activity. This uncertainty raised doubts on the long term viability of the project activity.

It may be noted; unfortunately the possibility of tariff change had occurred. TNEB offered the selling price of INR 2.32/kWh with escalation of 2.5% per year only for the surplus power exported to grid, from the project activity. Although, HTC requested TNEB to pay INR 3.10/kWh for the power exported from the project activity. TNEB denied even the price of INR 3.01/KWH offered for the power exported from TG 1 & TG 2. TNEB informed HTC that only upon any increase in HT tariff rate on energy for industrial services due to tariff revision from the present rate of INR 3.50/kWh. In such a case, 80% of the increase in tariff over and above the present rate of INR 3.50/kWh will be added to the TNEB's offer of INR 2.32/kWh.

No third party sale

As per Electricity Act, 2003 accorded by Ministry of power encouraged the State Electricity Regulatory Commission (SERC) to allow the distribution licensee and generation companies in

power trading[4], which would encourage more private sector participation. But, the Tamil Nadu Electricity Board does not allow third party sale[5] for power generating company.

Only the distribution and trading companies are allowed to do a thirty party sale. HTC being an electricity generating company, could either sell it to TNEB or wheel the power using TNEB distribution network to sister concerns. There will be a deduction of 15% as wheeling charge in terms of kWh. It means for every 100 units of power fed into the grid, 15 units of power will be deducted from the total units as wheeling charges. Hence, wheeling of power is not an attractive option compared to third party sale.

The above stated policy restriction, force HTC to loose its competitive edge over other counter-parts in other states, where third party sale is permitted[6].

3. Investment Risk (Investment barrier):

Investment risk can be derived by observing the CDM decisions opted by other following carbon black manufacturers exporting power to the grid .

- Phillips Carbon Black Ltd.[7]
- Continental Carbon India Limited[8]
- Cabot India Limited[9]

Prohibitive nature of the risks (Barriers)

As an established organization, though we tolerate certain risks while making investment decisions, they are generally limited to predictable external factors or controllable internal factors. The impacts of the same may be restricted to reduced profitability. However, technological, policy, investment risks/ barriers stated above, are threatening the basic feasibility of the investment and are not entertained in the business as usual scenario unless it is the core business. Since, our core business is carbon black production. Investment on business other than core business (which faces the risk discussed above), would require a contingency fund for implementing the project. For this project activity, the prospect of CDM revenues was considered right from the initial stages and was looked upon as contingency fund that could offset the likely negative impacts from the risks perceived. In the absence of the carbon credit revenues, it is highly unlikely that we would have implemented this project activity against such critical risk (barrier) factors.

As we substantiated the barriers to the project activity, an investment analysis is not carried out to demonstrate additionality.

Response by DOE

The barriers applicable to the project activity have been validated as per the 'Tool for the demonstration and assessment of additionality', as follows:

[4] Reference: http://eprint.iitd.ac.in/dspace/bitstream/2074/1345/1/thakurimp2004.pdf (Page 7, under the heading "Trading: a new policy perspective")
[5] Reference: http://www.sipcot.com/policies_tn_6.htm
[6] Reference: http://www.indiabuildinginfo.com/virtual-clean/kredl/kredl.htm (under the heading "The policy environment")
[7] Source: http://cdm.unfccc.int/Projects/DB/DNV-CUK1142432021.53/view.html
[8] Source: https://cdm.unfccc.int/Projects/Validation/DB/IHSBYVLIDZASMJN0F58C37ABVZFW2Y/view.html
[9] Source: http://cdm.unfccc.int/Projects/Validation/DB/06XDIBWSD4SVTXROICM184KAW2CR6B/view.html

1. Technological barrier: Risk of technological failure – the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the project activity. It has been found that the failure of the waste gas based power generation plant in the SIPCOT industrial area, Gummidipoondi, where the project activity is located is much higher because of the frequency variations observed in the past and also due to the varying waste gas properties (quantity and quality).
2. Investment barrier: for alternatives undertaken and operated by private entities – similar activities have only been implemented with grants or other non-commercial finance terms. In light of the same it has been found that out of the ten Carbon Black Manufacturing units operating in the country only four have waste gas based power generation system exporting to the grid (including the project activity). All these projects have applied for CDM as validated from the indicated UNFCCC web-links.
3. Other barrier: These are related to low selling price to Tamil Nadu Electricity Board (TNEB) and no third party sale allowed.

The evidences provided in support of the above which are also publicly available are as follows:

- Statistical data of frequency variation from the Central Electricity Authority (CEA);
- Written documentation about frequency variation as given in Indian Electricity Grid Code (IEGC);
- Information on relevant market data regarding tariffs and rules;
- Relevant regulatory information on captive power plants and export of power.

Also, the carbon black grade changes have been observed earlier during validation audit through the log books, utility daily reports and monthly production schedule. The production schedule indicates as many as 15 grades of Carbon Black. As grade is changed feed stock consumption and steam production by the process changes due to the variation of waste gas composition and volume. A sample production schedule is being submitted as Annexure-1.

In light of the above, the barriers presented have been found to be prohibitive and the project activity has been proved to be additional.

Investment analysis for the project activity has not been carried out as ex-ante quantification of the losses due to the above presented barriers would not be possible.

Question 2

The PP/DOE are requested to provide explanation for the delay in submitting the project for validation if the CDM revenues were considered essential to invest in the project activity in line with the requirements of (EB 41, Annex 46, para 5 (b)).

Response by PP

The following chronological sequence of events describes the stages in the project implementation and CDM process underwent by HTC. The reason for time delay between submission of

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project activity for validation and time of consideration of CDM revenues during project conceptualization is evident from below[10]:

Activity	Date	Reference
Introduction of CDM Concept to Unit Head by AVP Marketing.	23/01/2003	Correspondence copy
Project proposal to Chairman and his approval indicating CDM consideration.	11/03/2003	Copy of original Chairman approval and the CDM consideration by CREC note
Purchase orders are placed for line 2 carbon black system (Boiler 2 and TG 3) to start the implementation of the project activity.	17/07/2003	Copy of equipment purchase order verified by DoE
Unit head requested Alexandria Carbon Black Co. Egypt (ACB – a sister concern of Hi-Tech Carbon) to provide details about their CDM project.	16/10/2003	Copy of correspondence between ACB, and HTC
ACB explained about their project activity and their initiation for CDM revenues. Further, importance of CDM methodology and ACB's decision to develop a new methodology for carbon black waste heat recovery were communicated to HTC. It was decided that the CDM process can be commenced once the new methodology proposed by ACB is approved.	11/12/2003	Copy of correspondence between ACB and HTC
VP Manufacturing & Technical has been requested to take up CDM execution from Unit head.	09/01/2004	Copy of correspondence
Line 2 based WHR system was commissioned.	19/02/2004	Copy of log book for first day of operation as verified by DOE.
Unit Head left the organization.	29/02/2004	Copy of final settlement proof
VP manufacturing and Technical requested ACB to frequently update about the methodology approval process and any significant steps carried out by ACB.	15/03/2004	Copy of correspondence between ACB and HTC

[10] Reference: Chronological events list and reference documents are provided in the attachment

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VP Manufacturing and Technical has recommended to take up the Carbon Credit scheme along with Line 3. Since, the concept is relatively new and requires more time and inputs from HTC side. Further, he suggested to collect information regarding carbon credit from various consultants.	16/04/2004	Copy of correspondence
VP Manufacturing and Technical floated enquiries to University of Aberdeen for consultancy services to obtain carbon credits.	30/04/2004	Copy of correspondence
ACB proposed NM107 methodology to UNFCCC. Refer Meth Panel meeting report	May 2004	UNFCCC website
ACB informed VP manufacturing and technical of HTC about their progress in methodology development.	09/08/2004	Copy of correspondence
Finalization of purchase orders for line 3 carbon black unit.	Feb – July 2005	Copy of equipment purchase order.
ACB informed VP manufacturing and Technical of HTC about their submission of methodology (NM0107) to UNFCCC	11/04/2005	Copy of correspondence
VP Manufacturing and Technical enquiring M/s Cemtrex for their expertise in obtaining carbon credit and also expressing his doubt regarding methodology availability and HTC does not have expertise	21/09/2005	Copy of correspondence
ACB informed HTC about their submission of revised methodology (NM0107 rev) to UNFCCC	11/10/2005	Copy of correspondence
VP Manufacturing and Technical was enquiring another party (Carbon credex) for CDM advisory and methodology availability.	27/03/2006	Copy of correspondence
VP Manufacturing and Technical (coordinator of HTC for CDM) left the organisation.	28/06/2006	Copy of correspondence
The AM0032 methodology proposed by ACB got approved by UNFCCC	28/07/2006	UNFCCC website[11]

[11] http://cdm.unfccc.int/methodologies/view?ref=AM0032

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ACB communicated the approval of AM0032 by UNFCCC to HTC. Further, communicated the implementation of CDM project by Indo Gulf Fertilizer (a sister concern of HTC) in India.	17/08/2006	Copy of correspondence
HTC requested Indo Gulf fertilizer (IGF) to provide details about their CDM project and consultants.	20/08/2006	Copy of correspondence
IGF provides details of CDM consultant to HTC. Further, HTC had identified and get convinced about Indian consultant for CDM.	20/09/2006	Copy of correspondence
Our new Unit Head exchanged correspondence with the Indian Consultant for CDM Advisory.	06/11/2006	Copy of correspondence
HTC appointed the CDM consultant, who was handling the IGF CDM project for claiming carbon credit revenues	12/04/2007	Copy of the agreement verified by DOE
Local Stakeholder consultation meeting at HTC Gummidipoondi was conducted	25/05/2007	Copy of photos taken during local stake holder meeting
ACM0012 methodology was approved by UNFCCC	22-24 June, 2007	UNFCCC website[12]
CDM Meeting with Indian DNA (MoEF) was attended.	28/06/2007	Copy of correspondence from Designated National Authority (DNA)
The Designated Operational Entity was appointed for validation of project activity	11/07/2007	Copy of the agreement verified by DOE
PDD web hosted for Global stakeholder process	1st Sept, 07 to 30th Sept, 07	UNFCCC website[13]
Line 3 based WHR system has got commissioned	18/09/2007	Copy of log book for first day of operation as verified by DOE.
The host country approval for the project activity	27/06/2008	Copy of Host country Approval (DNA)

[12] http://cdm.unfccc.int/EB/archives/meetings_07.html#032
[13] http://cdm.unfccc.int/Projects/Validation/DB/KARLQIPR5RUXQBOPT28AVUL8AL2Q1K/view.html

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Our line 1 turbine (TG1 and TG 2) has got failed due to technological problems during 1999-2002. While conceiving the project idea for line 2 there was apprehension due to past experience.

Our company conceptualized CDM concept during early 2003. Considering technological failure of turbines in line 1, our unit head felt that additional revenue option through CDM will encourage the initiation of the project activity. During October, 2003, Unit head came to know about similar activity carried out by ACB (sister concern of HTC). The communication from During the month of December 2003, ACB briefed us about their project activity and importance of methodology for registering a project in UNFCCC. Further, ACB indicated us that methodology suitable for their waste heat recovery project is not available and their decision to propose a new methodology. During 2003 to 2005, ACB updated us about approval status of the methodology.

Meanwhile, HTC underwent frequent management restructuring. During 2004, Unit head of HTC Gummidipoondi had left the organization. Our Vice President (Manufacturing & Technical) took over the responsibility from Unit head for initiating the CDM process. Further, he decided to take up this concept with external consultant and enquired with overseas consultant about the CDM process. From February to July 2005, we were in the process of finalizing the order for Boiler and Turbine (line 3). Subsequently, our Vice President (Manufacturing & Technical) left our company in the month of June 2006. The details pertaining to various officials involved in the CDM process and their period of service at HTC is tabulated below

Designation	***Period of Service at HTC***	***Remarks***
Unit Head	Left in Feb 2004	Copy of settlement proof is provided as a part of annexure 1.
VP Manufacturing & Technical	Joined in Jan 2004 and left in June 06	Copy of settlement proof is provided as a part of annexure 1.

After the approval of AM0032 methodology, ACB communicated us the approval and also intimated us about the CDM project carried out by IGF (a sister concern of HTC). During interaction with IGF, we came to know about their action in CDM and information about the consultants handling their CDM project. Based on their reference, our new Unit Head of HTC decided to proceed with Indian Consultant and exchanged correspondence during November 2006.

After discussion and negotiation, HTC engaged with Indian consultant during April 2007. As Approved consolidated methodology ACM 0012 based on AM 0032 and ACM 0004 has got approved, our consultant suggested preparing the project design document using the same methodology. The continuous effort and real action to secure CDM is explained in the following table.

Year	**Activity**
March 2003	CDM consideration
2003 -2005	We understand from our sister concern (ACB) that methodology fitting waste gas generation project was not available and they are developing the same. We had continuous communication with them about the progress of the methodology.

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	We also communicated with overseas consultants to take through CDM process and requested for quote (correspondence dated 30th april 2004 with university of Aberdeen).
2006	ACB `s methodology AM 0032 has got approved by UNFCCC. ACB communicate to us about CDM project carrying out by Indogulf fertilizer (IGF). We immediately interacted with Indian CDM consultant and after negotiation we engaged them for facilitating the CDM process.
2007	We appointed Indian CDM consultant. As AM0032 and ACM0004 methodology was consolidated and ACM0012 has got approved. We developed the PDD by using the same with assistance from Indian CDM consultant.

Although, there is a significant time delay between project start date and submission for validation due to unavailability of methodology, management restructuring, selection of consultant. It is to be noted that our company was exploring continuing and real actions were taken to secure CDM status for the project in parallel with its implementation by communicating with sister concerns and external consultants, we have made continuous efforts to seek CDM funds in spite of problems due to time delayed in approval of methodology and management restructuring.

Response by DOE

As per the requirements of EB 41, Annex 46, Para 5 (b), for the demonstration of continuing and real actions towards securing CDM status for the project apart from the chronology presented earlier, the PP has provided further detailed chronology and associated supporting documents as follows:

1. Communications with Alexandria Carbon Black (ACB) a company of the Aditya Birla Group regarding CDM and development of a new methodology (AM0032) from October 2003 to August 2006. The methodology AM0032 was approved in July 2006;
2. Communications with overseas CDM consultants in April 2004, September 2005 and March 2006
3. Communications with Indo Gulf Fertilisers (IGF) another company of the Aditya Birla Group for hiring of an Indian CDM consultant in August and September 2006;
4. Communications with the Indian CDM consultant in November 2006 introduced by their group company (IGF)
5. Contract with CDM consultant in April 2007;
6. The methodology AM0032 was subsequently consolidated with other methodologies to form ACM0012 in June 2007

In light of the above the following points can be concluded

- In HTC, the management restructuring coupled with delay in methodology approval proposed by their sister concern (ACB) was found to be the reason for delay in submitting the project for validation

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- Further, it is observed that HTC has seriously considered CDM for the project activity and continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.

The complete chronology depicting the same is being submitted as Annexure-2.

Question 3

The quantity of waste gas used for energy generation should be monitored hourly and the NCV of the waste gas should also be monitored.

Response by PP

We would monitor the quantity of waste gas for energy generation on hourly basis and the NCV of waste gas on monthly basis. The same is updated in the revised PDD and submitted to DoE

Response by DOE

The PP has submitted the revised PDD wherein the monitoring frequency of waste gas quantity used for energy generation is updated to hourly basis. Also, the NCV of the waste gas has been included in the data to be monitored. Further, as 'Situation 2' is adopted for the calculation of f_{WG} therefore NCV_{WG} was not included in the monitoring plan earlier.