



VALIDATION REPORT

BIOMASS BASED HOT AIR GENERATION AT FERTILIZER UNIT OF TATA CHEMICALS LTD., HALDIA, WEST BENGAL IN INDIA

REPORT No. 2007-1003

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VALIDATION REPORT

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Approved by: Michael Lehmann Technical Director	Organisational unit: Climate Change Services
Client: Tata Chemicals Limited (TCL)	Client ref.: Mr. B. P. Chandramouli

DET NORSKE VERITAS
CERTIFICATION AS

Climate Change Services

Veritasveien 1
N-1322 Hovik
Norway
<http://www.dnv.com>

Summary:

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” project on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV’s opinion that the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” in India, as described in the PDD of 15 January 2008, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.C, version 12. DNV thus requests the registration of the project as a CDM project activity

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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DAP	Di-Ammonium Phosphate
FO	Furnace Oil
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
HSD	High speed diesel
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
LDO	Light Diesel Oil
MoEF	Ministry of Environment and Forests
MP	Monitoring Plan
NGO	Non-governmental Organisation
OC	Operation Control Procedure
ODA	Official Development Assistance
PDD	Project Design Document
PwC	Pricewaterhouse Coopers Pvt. Ltd.
STPP	Sodium Tri-Poly Phosphate
TCL	Tata Chemicals Limited
TPH	Tonnes per hour
UNFCCC	United Nations Framework Convention on Climate Change



1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is India. No Annex-I Party has been identified as yet. India meets the participation criteria for CDM and has approved the project and authorized the project participant. The Indian DNA also confirmed that the project assists in achieving sustainable development.

The project correctly applies AMS-I.C, version 12 “Thermal energy for the user with or without electricity”.

By utilising rice husk instead of fossil fuel for steam generation, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 24 261 tCO₂e per year over the selected 10 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV’s opinion that the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” in India, as described in the PDD of 15 January 2008, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.C, version 12. DNV thus requests the registration of the project as a CDM project activity.”



2 INTRODUCTION

Tata Chemicals Limited has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” project. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Mr Subhendu Biswas	DNV Certification Kolkata	Project manager, CDM validator
Mr Soumik Biswas	DNV Certification Kolkata	CDM validator
Mr C Kumaraswamy	DNV, Certification Bangalore	Technical reviewer
Mr Michael Lehmann	DNV Certification Oslo	Energy sector expert

2.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I C, version 12. The validation team has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /13/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the “Biomass based Hot Air Generation at Fertilizer Unit of Tata Chemicals Ltd., Haldia, West Bengal” project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term clarification may be used where additional information is needed to fully clarify an issue.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i>	<i>Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1 Validation protocol tables



3.1 Review of Documents

The following table outlines the documentation assessed during the validation.

Documents provided by the project proponent that relate directly to the project:

- /1/ TCL: CDM PDD, initial version 2 dated 14 September 2006
- /2/ TCL: CDM PDD, final version 5 dated 15 January 2008
- /3/ DNA of India: Letter of Approval dated 3 April 2007.
- /4/ TCL: Project approval note dated 19 January 2006
- /5/ TCL: Efficiency report on HAG from Radhe Engineering
- /6/ TCL: Quotations and Proposals from suppliers of coal
- /7/ TCL: Quotation and Proposals from suppliers of rice husk
- /8/ TCL: Operational Control Procedure dated 14 June 2007
- /9/ TCL: 'Study on availability of rice husks in a part of south bengal region' by Economic Information Technology dated 27 July 2007
- /10/ TCL: Emission reduction calculation spreadsheets 'CDM calculation_biomass 110108_new.xls'
- /11/ TCL: Consent to operate from West Bengal Pollution Control Board
- /12/ TCL: Minutes of stakeholder consultation meeting on 16 October 2006

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /13/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): Validation and Verification Manual. <http://www.vvmanual.info>
- /14/ CDM Executive Board: AMS-I.C: Thermal energy for the user with or without electricity, version 12
- /15/ CDM Executive Board: Attachment A (Information on Additionality) to Appendix B of the simplified modalities and procedures for small-scale CDM project activities
- /16/ CDM Executive Board: Attachment C (information on leakage in biomass project activities) to Appendix B of the simplified modalities and procedures for small-scale CDM project activities

3.2 Follow-up Interviews

On 12 February 2007, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Tata Chemicals Limited and the project consultants PwC were interviewed. The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
TCL <i>Mr. Murali Samla</i> <i>Mr. B. P. Chandramouli</i> <i>Mr. Avinash K. Singh</i>	<ul style="list-style-type: none"> ➤ Assessment of project additionality and the barriers discussed in the PDD ➤ Validation of emission reduction calculations and data used therein ➤ Review of project design and technology used therein
PwC <i>Dr. Manisha Mukherjee</i>	<ul style="list-style-type: none"> ➤ Review of monitoring and verification procedure of the organisation and management structure of the organisation for the project activity ➤ Review of the stakeholder consultation process ➤ Estimation of leakage

3.3 Resolution of Clarification and Corrective Action Requests

Issues identified in DNV's draft validation report of 25 May 2007 were resolved to DNV's satisfaction during communications between TCL and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, TCL decided to revise the PDD and resubmitted the same as version 5, dated 15 January 2008. After assessing the revised PDD, DNV issued this final validation report and opinion.

3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The validation findings relate to the project design as documented and described in the revised project design document dated 15 January 2008.

4.1 Participation Requirements

The project participant is the private entity Tata Chemicals Limited of India. The project is proposed as a unilateral project and no Annex-I Party has yet been identified. The host Party India meets all the requirements for participating in a CDM project. The Ministry of Environment and Forests, the DNA of India, has approved the project with a letter of approval dated 3 April 2007 which also confirms that the project assists in achieving sustainable development in India.

4.2 Project Design

The project undertaken at Tata Chemicals Limited, Haldia unit involves the installation of 4 units of rice husk fired hot air generators. The hot air generated therein is used for final product drying in DAP1, DAP2 and STPP plant. The hot air generation units were furnace oil fired prior to implementation of the project. Due to increasing price of furnace oil the project proponent had to resort to a switch in fuel used therein. The use of coal was the most preferred option as coal was available in abundance and the cost of hot air generation using coal was determined to be the cheapest of all options.

The project involves installation of an indigenously developed hot air generator using rice husk as the primary fuel. Coal will be co-fired depending on the availability of rice husk for the project. TCL expects the availability of rice husk to the extent of about ten months during the year and therefore the project will claim emission reductions only to the extent of rice husk used. The plant will be implemented in a phased manner. The first unit is operational since July 2007.

The average anticipated emission reduction due to the project activity is expected to be 24 261 tonnes of CO₂ equivalent per year.

The project activity is not a debundled component of a larger project activity as there are no other projects proposed by the same project proponents.

The starting date of the project activity has been selected as 19 January 2006 which is the date on which the project was approved. The date has been validated from the approval note (The COO – Fertilizer business unit has approved the project). The lifetime of the project is 20 years from the date of commissioning of the project. The project selects a non-renewable crediting period of 10 years starting from 1 August 2008 or the date of registration of the project as a CDM project, whichever is later.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA.



4.3 Baseline Determination

The project selects the approved small-scale methodology AMS-I.C, version 12. AMS-I.C is applicable to project activities that provide thermal energy for the user from renewable sources with an installed capacity less than 45 MW_{thermal}. Since the project involves hot air generation from rice husk and the installed capacity of the project has been verified to be ~11 MW, the methodology is deemed applicable to the project.

Prior to project implementation, TCL was firing furnace oil (FO) in the Hot Air Generator (HAG) to generate hot air. As described in section 4.2, due to increasing cost of FO, TCL decided to switch the fuel to a cheaper alternative, such as coal (refer to section 4.4 for a comparison of the costs for FO vs. coal). As good quality coal is abundantly available in the region at a cheaper rate that assures a good return, emissions due to combustion of coal in the baseline scenario has been selected as the baseline. Use of natural gas as an alternative has not been considered, as the same is not available in the region. The discussion of the baseline selection has been done in a transparent manner.

4.4 Additionality

The additionality of the project has been established by elaborating barriers due to investment, technology, financial, prevalent practice and other barriers. The project proponent has also provided the approval for the project dated 19 January 2006) /5/ which demonstrates that the project proponent was proposing to switch to coal for hot air generation but opted for biomass based hot air generation instead considering the benefits from CDM during the initiation of the project activity. The dependence of the project on CDM benefits is further elaborated by the fact that of the 4 units in which the HAG was supposed to be installed, only one HAG has been installed presently and the implementation of the other 3 HAGs are yet to be started.

Technology barrier: Due to the lower density of biomass the hopper volume required for firing the biomass in the HAG was required to be higher. Also there is a possibility of clinker formation of the ash generated from rice husk due to low density of the same and of the choking of primary air lines due to use of rice husk, especially in the rainy seasons. Moreover, since the rice-husk used in the project is sourced from the unorganised sector, it is difficult to establish long term contracts with the biomass suppliers. Thus the procurement and consistent supply of biomass is a barrier for the project. The quality of rice husk is also very sensitive to moisture content and seasonal variations. While the consistent supply of biomass may hinder the project in the future due to the unorganised nature of rice husk suppliers, the other barriers mentioned under technology barrier in the PDD does not represent obstacles that would have prevented the implementation of the project altogether. Hence, with the exception of the inconsistent supply of rice husk, DNV is of the opinion that the arguments provided for the other problems though justified may not be a decisive barrier for the project activity.

Investment barrier: In the pre-project scenario, the project proponent used furnace oil for generating hot air. However, due to increase in furnace oil price it was no longer feasible to operate the hot air generator on furnace oil. It has been confirmed during the validation that the project proponent was already in the process of changing the fuel for hot air generation. Quotations were invited from suppliers of coal. This has been validated from proposals invited from the suppliers of coal /6/ /7/. Hence, the project proponent would have invested in retrofitting the HAG to firing solid fuels also in absence of the proposed CDM project activity. The change from coal to biomass did not involve any additional cost and only the operating costs are



different. Consequently, an IRR calculation was not the suitable indicator for the financial analysis of the project. The project proponent thus revised the financial analysis and has provided a unit cost comparison of coal and biomass (736.42 INR/Gcal for coal and 1535.09 INR/Gcal for biomass). The cost of coal and biomass were validated from quotations of two independent suppliers. It has also been demonstrated that unit cost with FO was determined to be at 2136 INR/Gcal. Thus it is observed from the calculations that the unit cost of hot air generation is cheaper with coal than with biomass. The assumptions used for calculating the unit cost, mainly the NCV and the price of coal and biomass have been validated from supplier data and laboratory analysis reports. Hence, as per Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities; the project proponent had a financially more viable alternative to the project activity which would have led to higher emissions.

Prevalent practice barrier: It has been observed from the rice husk availability survey conducted by an independent third party that no major industries in Haldia use rice husk as fuel. Small amount of rice husk is used by small poultry farms, ice factories and the rice mills themselves. However, none of the major industries, where there is a consistent heating requirement, use rice husk as fuel.

Other barriers: Since the biomass suppliers are from an unorganised sector and several small suppliers are involved, procurement of rice husk, as compared to procurement of coal, presents a barrier to the project. Also the quality of rice husk is especially sensitive to seasonal variation and moisture content. However this has already been discussed under technological barrier.

The comparative cost of generation of hot air with coal and rice husk, the prevalent practice in the region and the inconsistent supply and quality of rice husk, as discussed above poses barriers to the project and demonstrate that the project activity is not a business-as-usual scenario. Hence the emission reductions due to the project activity are deemed to be additional.

4.5 Monitoring

The monitoring methodology selected complies with requirements of AMS-IC, version 12.

4.5.1 Parameters determined ex-ante

The CO₂ emission factor and oxidation factor for coal has been fixed on the basis of IPCC 2006 good practice guidelines. The efficiency of the coal based hot air generator is also fixed ex-ante at 95% based on guaranteed efficiency figures provided by the equipment manufacturer /5/.

4.5.2 Parameters monitored ex-post

To calculate the baseline emissions the following parameters will be monitored in the post-project scenario:

- Amount of rice-husk fired in the HAG
- NCV of rice husk
- Efficiency of rice husk fired HAG
- Temperature gained by air in the HAG
- Flow rate of hot air from the HAG
- Density of hot air
- Specific heat of hot air
- Operating hours of HAG



- Parameters required to establish surplus availability of biomass

4.5.3 Management system and quality assurance

Detailed project management and monitoring procedures, including procedures for QA/QC of monitoring reports are described and found to be adequate. Procedures for internal audits, project performance review and corrective actions have been identified and found to be satisfactory.

4.6 Estimate of GHG Emissions

The calculations have been documented in a transparent manner using conservative assumptions. The baseline emissions have been calculated on the basis of consumption of equivalent amount of coal in the baseline which has been displaced by the rice husk in the project scenario. The baseline calculations have been done for the period when only rice husk is used for hot air generation.

While project emissions are also associated with the amount of coal consumed the same is deemed to be zero. This is because, the project provides for estimation of emission reduction associated with the consumption of rice husk only. It is also confirmed that there is no additional electricity consumption due to the project activity..

It has been observed that the emissions due to transportation of coal in the baseline would have been higher than the emissions due to transportation of biomass. These emissions have thus been neglected as a conservative estimate. As per the methodology, since the energy generating equipment has not been transferred from any other facility, leakage calculations have not been accounted for this project. Also, as it has been validated from a third party survey report on the availability of rice husk that there is surplus supply of rice husk in the region /9/, leakage calculations on account of competing use of biomass is not applicable for this project.

In the *post-project* scenario the emission reduction will be calculated from the actual rice husk consumption in the plant, NCV of the rice husk and the efficiency of the HAG. This will also be cross-checked with the monitored hot air generation data.

The emission reductions from the project are real and measurable. Provided the underlying assumptions do not change, the project is likely to reduce 24 261 t CO₂ e per annum during its 10 years crediting period.

4.7 Environmental Impacts

It has been confirmed that the project does not require an environmental impact analysis. The project complies with environmental regulations in India and has obtained necessary licences and environmental clearances. The project is not likely to create any adverse environmental effects.

4.8 Comments by Local Stakeholders

The local community, employees of the organisation, regulatory and statutory authorities, neighbouring industries and equipment suppliers have been identified as relevant stakeholders to the project. The local stakeholders were contacted by the plant authorities through one to one interaction. Comments from the local stakeholders were invited in the form a questionnaire distributed to the individual stakeholders. The project did not receive any adverse comment and hence no mitigation actions were necessary.

Local stakeholder consultation is not required by the Indian DNA.



5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 14 September 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 15 November 2006 to 16 December 2006. No comments were received during this phase of stakeholder consultation. However due to expiry of the methodology version used, the PDD was re-webhosted from 18 January 2008 to 16 February 2008. One comment was received during this period. The comment received is given (in unedited form) in the below text box.

Comment by:	Raghu, CDM Future
Inserted On:	2008-01-19
Subject:	Comments on TCL Project
Comment:	<p>1. It is really surprised to see the logic used in the PDD to select the baseline scenario where in usage of the coal was selected when FO was baseline fuel in the project.</p> <p>2. Also, in the first page of the PDD itself, PP (or consultant) mentioned that due to costly operation, PP switched over to cheaper fuel. This itself indicates the project attractiveness and no need for the CDM funds. This also indicates poor PDD writing and poor quality review. Quality review team should look into these aspects before they post PDD for validation. Please realise the fact that the RIT is no more generous to these kind of mistakes.</p> <p>3. TCL, anyway, considered fuel switch over from costly FO to cheaper fuel like Coal, Rice husk etc. Hence this project can not be a CDM project and EB/DOE should not allow this project to register as CDM project.</p> <p>4. Also, it is not clear why TCL applied for CDM after two years of its start date. Generally, these kind of projects get the money back within two years or even less. To me, this is not a project to be considered for CDM. Consultants should stop encouraging these kind of projects for CDM and accept these kind of projects just for their business sake. DoE should look these aspects clearly.</p> <p>5. Most of the content in A4.2 and B.2 is same. This indicates poor understanding of SSC PDD guidelines and PP's inability to understand the guidelines. DOE should request PP to revise these sections suiting to the actual requirements.</p> <p>5. Why biomass fuel storage is outside project boundary?</p> <p>6. Financial analysis clearly indicates the attractiveness of rice husk as a fuel compared to FO (which is a real baseline fuel and really confused on how coal is considered baseline fuel, even if PP thought of converting to coal). PP</p>



completely misunderstood the concept of the CDM or I would say the consultant completely lost his logic for the project and presented the case here in such a way that may lead to rejection of the project activity.

7. Leakage section of the PDD is completely missing the detailed analysis. PP should demonstrate how the project activity ensures the non shifting of other biomass fuel users to fossil fuels when the coal is cheaper in the region. PP should also provide detailed analysis of surplus biomass availability and scenarios of rice husk usage in the absence of project activity. PDD just mentioned that in the absence of project rice husk would have not used for any other purpose. If that is case, what would have happened to rice husk. Is it dumped for decay or millers perform uncontrolled combustion? DOE should check these aspects carefully.

7. Why NCV is used for calculations in place of GCV?

8. PP also not followed guidelines to reproduce the tables as per SSC-PDD guidelines. Really frustrating to read PDD of very poor quality. My sincere request to consultants not to make mockery of CDM process and register projects with poor quality and poor eligibility.

9. PP should also provide calculation procedure to estimate emissions due to coal usage when biomass is not available though PP claims its abundant availability. Seems consultant firm is new to CDM business and writing PDD for the first time. These kind of general mistakes even after registration of more than 900 projects are not acceptable.

10. DOE should check the authenticity of CDM revenue consideration document considering the fact that PP switched over from costly fuel to cheaper fuel.

10. Why PP took more than a year to upload PDD for validation after stakeholder meeting? DOE should check the reasons for the same. DOE should also check why stakeholders signatures were not taken on the minutes of the meeting.

How DNV has considered the comment received in its validation:

DNV has assessed the comments in detail during the validation.

It has been confirmed by DNV that although the project proponent did use furnace oil in the pre-project scenario, the project proponent was already in the process of changing the fuel for hot air generation. Use of furnace oil cannot be considered as the baseline since due to increase in furnace oil price it was no longer feasible to operate the hot air generator on furnace oil. It has been validated from proposals invited from suppliers of coal that the project proponent was already in the process of switching to coal and in the absence of the project activity the project proponent would have proceeded with coal since coal was the least cost option available. Thus use of coal for hot air generation has been selected as the baseline.



It is to be noted that though the decision to implement the project was taken in 2006, only one of the four units has been implemented till date. The entire project is yet to be commissioned and is only likely to become completely operational from August 2008. Thus the project will be operational with biomass only after the registration of the project as a CDM project activity.

It should also be noted that both section A.4.2 and B.2 deals with project category and justification of the choice of project category. Thus it is possible that some text in these two sections will be of repetitive nature. DNV has assessed whether the sections contain the information asked for and it was found to be adequate. However, it is not within DNV's purview to revise the PDD since this is not within the DOE's scope of work.

There is no biomass storage facility within the plant where biomass maybe stored for more than one year. Since there are no emissions from the biomass storage, it was not necessary to include the biomass storage in the project boundary.

As already explained, the project is not for switching over the fuel from FO to biomass, but opting for biomass from the base case coal. Due to increasing cost of FO, the project proponent decided to switch the fuel to a cheaper alternative. The natural choice was coal, as good quality of coal is abundantly available in the region at a cheaper rate. Tata Chemicals Limited (TCL) has decided to switch to the cheaper option and therefore decided to procure and install a hot air generator which can be run by a solid fuel. It has been validated that coal was the economically attractive option than biomass and in the absence of the project coal would have been used in the plant. Since baseline scenario refers to the scenario which would have been there in the absence of the project activity, selection of coal based HAG as baseline is justified.

As per guidance on leakage calculation for projects using biomass, a biomass availability survey has been conducted by the project proponent which demonstrates that the biomass used in the project is available in excess and will thus not result in leakage emissions due to competitive use of biomass. Thus leakage calculation was not necessary. The emission reduction calculations have been checked and found to be correct. Emission reductions have been claimed for the period when only biomass is used.

As mentioned earlier, the PDD was web-hosted earlier and has been web-hosted again due to expiry of methodology version initially used. The stakeholder consultation documents have been checked and a signed list of attendees was presented during the validation.

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APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirement for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	CL-2 OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	CL-2 OK	Table 2, Section A.3
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	CL-3 CL-4 CL-5 CL-6 OK	Table 2, Section B.2.1
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall	Decision 17/CP.7, CDM Modalities and	OK	Public funding has not been employed for this project.

Requirement	Reference	Conclusion	Cross Reference/Comment
provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Procedures Appendix B, § 2		
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	Designated National Authority of India is The Ministry of Environment and Forests.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	The host country India has ratified the Kyoto Protocol on 26 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	Annex – I Party is yet to be identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	Annex – I Party is yet to be identified.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	CAR-1 OK	The project applies SSC PDD version-02. PDD needs to be recast as per version 3 dated 22 December 2006
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D

Requirement	Reference	Conclusion	Cross Reference/Comment
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD has been made available for stakeholders' comment on the validator's website for 30 days period. No comments were received.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/ /2/	DR/I	The total installed capacity of the 4 numbers of HAG is ~11 MW _{th} which is lower than the ceiling of 45 MW _{th} for category - I small scale project activities		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/ /2/	DR/I	The project is not a debundled component as there are no other projects registered by the same project proponent within 1 km of the proposed small scale activity using the same technology.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/ /2/	DR/I	The project involves installation of 4 number biomass fired hot air generator units for providing thermal energy to the DAP and STPP plants. Thus the project qualifies as renewable energy based project activity under category I C of small scale project activities.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/ /2/	DR/I	The project is situated in the Haldia unit of Tata Chemicals Limited in West Bengal, India.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/ /2/	DR/I	The project boundary includes the hot air generator units where the biomass is consumed, the biomass storage area in the plant and the process units where in the energy is utilised.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/ /2/	DR/I	The project involves installation of 4 numbers of HAG's of RF3800 model. The output of the HAG's is 3268000 kcal/hr as provided under E.1.2 and A.4.2 of the PDD. The energy required in the STPP plant, as provided in the IRR calculation, is much more than the output of the model detailed therein. Clarification is requested as to how the energy requirement in STPP will be catered to with this model of HAG unit. The efficiency of the HAG is taken to be 95% with biomass firing. Basis of this efficiency level needs to be provided.	CL1	OK
A.2.4. Will the project result in technology transfer to the host country?	/1/ /2/	DR/I	The project will not result in any technology transfer to India.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions	/1/ /2/	DR/I	The existing personnel of the plant has been trained as a part of the technical up-gradation of the plant. The training needs of the operating and maintenance personnel are covered in the existing		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
for meeting training and maintenance needs?			QMS of the organisation.		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /2/	DR/I	The project results in emission reduction along with development of the surrounding neighbouring areas from where the biomass is sourced. The project also contributes in preventing uncontrolled burning of the biomass residue and ill effects associated with decay of these materials which otherwise do not have any usage in the absence of the project.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/ /2/	DR/I	No adverse environmental or social effects are envisaged due to the project activity.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /2/	DR/I	Clarification is requested on the status of host county approval for the project activity.	CL-2	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/ /2/	DR/I	Yes.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/ /2/	DR/I	The project applies the simplified baseline methodology AMS I C version 12.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/ /2/	DR/I	The methodology is applicable to the project as it is demonstrated that <ul style="list-style-type: none"> - The project involves displacement of coal with biomass material as fuel for hot air generation used in process and - The total installed capacity of the co-fired HAG is lower than the ceiling of 45 MW_{th} for category I small scale projects. 		OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due	/1/ /2/	DR/I	In IRR determination the efficiency of coal based HAG generator is taken to be lower than a biomass	CL-3	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?			<p>fired generator. Clarification is requested on the basis of this difference in efficiency of the coal based and biomass based system.</p> <p>The project involves switch in fossil fuel used for hot air generation from the existing FO based system to biomass. The baseline option of the project is coal. In assessment of financial barrier for the project, IRR is presented wherein the benefit of biomass over coal is presented. However since the change from coal to biomass do not involve any additional cost and only the operating cost would be different, IRR calculation is not the suitable indicator for the financial analysis of the project. The project proponent is requested to provide the comparative cost of hot air generation of biomass vis-à-vis coal to establish the financial implications of the project activity.</p> <p>The project investment as provided in the IRR is around 6.94 cr. INR against the 1.73 cr. INR as mentioned in the application for NOC to the state pollution control board. Clarification is requested on the difference in investment figures and evidence against the proposed investment. (CL 4)</p> <p>The barrier due to prevailing practice argues that utilization of rice husk for thermal energy generation is not prevalent in Haldia. Clarification is requested on the basis of this argument along with survey of related industries in the region with fuel sources used therein. (CL 5)</p>	<p>CAR-2</p> <p>CL-4</p> <p>CL-5</p> <p>CL-6</p>	

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			The project design document does not provide any information as to the impact of CDM benefits on the project and how it helps in overcoming the barriers related to the project activity.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/ /2/	DR/I	The baseline for the project is use of coal for hot air generation which is available abundantly. The baseline has been selected on the basis of the cost of hot air generation which is lowest for coal. Thus selection of the baseline has been done transparently.		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/ /2/	DR/I	The national and sectoral policies related to use of renewable resource for energy generation has been assessed to determine the baseline for the project.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/ /2/	DR/I	Basis of cost of coal and biomass needs to be clarified for assessing the correctness of baseline fuel determination.	CL7	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/ /2/	DR/I	Please refer to B.2.2.		OK
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/ /2/	DR/I	The start date of project activity is 19 January 2006, which is the date of approval of the project activity. One rice husk based HAG started operation in March 2007. The operational lifetime		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			of the project is 20 years.		
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/ /2/	DR	The project opts for a fixed crediting period of 10 years duration starting from the date of registration of the project activity or 1 August 2008, whichever is later.		OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/ /2/	DR/I	The project applies the monitoring methodology AMS I C which is applicable to the project		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/ /2/	DR/I	The monitoring methodology is applicable to the project as it is demonstrated that. - The project involves replacement of FO with biomass material for hot air generation used in process and - The total installed capacity of the co-fired HAG's is lower than the ceiling of 45 Mw _{th} for category I small scale projects		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/ /2/	DR/I	Yes.		OK

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* MoV = Means of Verification, DR= Document Review, I= Interview
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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			Clarification is also requested whether a direct or an indirect method will be used for efficiency measurement and whether it will be conducted by an external agency or assessed in-house.		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/ /2/	DR/I	Since use of coal is the baseline for the project, coal consumption in the HAG within the crediting period would not account as project emissions. Hence there are no relevant GHG indicators for the project.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/ /2/	DR/I	As per the methodology, provisions have been made for measuring the coal usage in the project activity in the crediting period.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/ /2/	DR/I	Yes.		OK
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/ /2/	DR/I	Leakage associated with biomass transport is considered to be negligible as there would be requirement of transportation of coal in the baseline as well. The comparison of the emissions associated with transport of coal vis. a vis. biomass needs to be presented for assessing the requirement of monitoring of leakage emission due to transportation of biomass. Parameters required for demonstrating surplus availability of biomass annually has been	CAR-4	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			incorporated in the monitoring plan.		
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /2/	DR/I	The monitoring plan provides for measurement of amount of hot air generated in the plant. The flow and inlet / outlet temperatures of the hot air flow are measured for calculation of energy produced in the hot air units.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/ /2/	DR/I	CO ₂ is the only relevant baseline GHG indicator.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/ /2/	DR/I	Yes.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/ /2/	DR/I	Yes.		OK
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/ /2/	DR/I	Clarification is requested on the management system for collection, archiving, review of parameters required for determination of emission reduction associated with the project.	CL-9	OK
D.5.2. Is the authority and responsibility for	/1/	DR/I	Please refer to D.5.1	CL-9	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
registration monitoring measurement and reporting clearly described?	/2/				
D.5.3. Are procedures identified for training of monitoring personnel?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/ /2/	DR/I	Clarification is requested on the calibration frequency of the measuring instruments, maintenance schedule of the equipment in the project boundary	CL-9	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/ /2/	DR/I	The management system for internal review of the data and procedures for data adjustment needs to be clarified in the project.	CL-9	OK
D.5.11. Are procedures identified for project performance reviews?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5.12. Are procedures identified for corrective actions?	/1/ /2/	DR/I	Please refer to D.5.1	CL-9	OK
E. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/ /2/	DR/I	There are no direct or indirect emissions due to use of biomass material in hot air generators. Since use of coal is the baseline for the project emissions associated with use of coal for co-firing has not been accounted in project emissions. This is justified.		OK
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/ /2/	DR/I	There are no leakages associated with the project as there is no transfer of equipment from the project boundary.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	/1/ /2/	DR/I	Leakage associated with biomass transport is considered to be negligible as there would be requirement of transportation of coal in the baseline as well. The comparative of the emissions associated with transport of coal vis. a vis. biomass needs to be presented for assessing the same.	CAR-4	OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	/1/ /2/	DR/I	In line with the EB guidance for assessment of leakage associated with competing use of biomass, excess availability has to established using either published literature, official report of some form of survey in the area from where the project sources biomass material.	CAR-5	OK
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	/1/ /2/	DR/I	Same as E.2.3	CAR-5	OK
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/ /2/	DR/I	The baseline emissions associated with generation of hot air is clearly identified in the design document		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/ /2/	DR/I	Yes.		OK
E.3.3. Have all relevant greenhouse gases and	/1/	DR/I	CO ₂ is the only relevant gas in the project. All		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
sources been evaluated?	/2/		other sources of emissions are not considered to make the estimates conservative in nature.		
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/ /2/	DR/I	The algorithm for determination of amount of coal that would have been used for generation of equivalent amount of hot air as provided in section E.1.2.4 does not match with that provided in section B.2 of the PDD.	CAR-6	OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/ /2/	DR/I	The equation used for determination of heat content of hot air in the project, as provided in section E.1.2.4, does not match dimensionally. It needs to be clarified where parameters like hot air temperature, flow of hot air is used in emission reduction calculations as equations as presented in the PDD do not use these parameters	CAR-7	OK
E.3.6. Have conservative assumptions been used?	/1/ /2/	DR/I	Clarification is requested on the basis of the efficiency of the coal based hot air generator unit and how is it conservative in nature.	CL-10	OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/ /2/	DR/I	The baseline emissions are only computed for a period of 10 months per year due to the uncertainty in availability of biomass the year round.		OK
E.4. Emission Reductions Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/ /2/	DR/I	Details worksheet for emission reduction calculation needs to be provided for evaluation of completeness of emission reduction calculation.	CAR-8	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			The total output of the HAG's, calorific value of the baseline fuel and biomass material as used in emission reduction calculation do not match with the values provided in the comparative cost analysis calculation.		
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/ /2/	DR/I	Being a renewable energy generation project EIA is not required in the project activity.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/1/ /2/	DR/I	The project has applied for host country approval, status of the same needs to be confirmed.	CL1	OK
F.1.3. Will the project create any adverse environmental effects?	/1/ /2/	DR/I	There are no adverse effects on the environment due to the project activity.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/ /2/	DR/I	Yes.		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/ /2/	DR/I	The local community, employees of the organisation, regulatory and statutory authorities and equipment suppliers have been identified as relevant stakeholders to the project.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /2/	DR/I	The stakeholders have been contacted by the plant authorities through an one to one interaction and		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			also a public meeting at Haldia.		
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /2/	DR/I	Stakeholder consultation is not mandated by the DNA of India.		OK
G.1.4. Is a summary of the comments received provided?	/1/ /2/	DR/I	A summary of stakeholder comments have been provided in the PDD. The project did not receive any adverse comment.		OK
G.1.5. Has due account been taken of any comments received?	/1/ /2/	DR/I	Since no adverse comments have been received during the stakeholder consultation process, no mitigating action was necessary.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>The project applies SSC PDD version-2. PDD needs to be recast as per version-3 dated 22 December 2006</p>	Table I	<p>The version of the PDD has been changed accordingly</p>	<p>OK. The PDD has been re-written in version 3 of the CDM-SSC-PDD format.</p> <p>CAR is closed.</p>
<p>CAR 2</p> <p>The project involves switch in fossil fuel used for hot air generation from the existing FO based system to biomass. The baseline option of the project is coal. In assessment of financial barrier for the project, IRR is presented wherein the benefit of biomass over coal is presented. However since the change from coal to biomass do not involve any additional cost and only the operating cost would be different, IRR calculation is not the suitable indicator for the financial analysis of the project. The project proponent is requested to provide the comparative cost of hot air generation of biomass vis-à-vis coal to establish the financial implications of the project activity.</p>	B.2.1	<p>As requested, the comparative cost of hot air generation of biomass vis-à-vis coal is presented to establish the financial implications of the project activity. The base case has been used as the prevailing biomass prices at the time of making investment decision and the prevailing coal costs. A sensitivity analysis has been done for a reasonable range of coal price and biomass price on Rs/GJ basis to see whether coal turns out to be cheaper than biomass. The historical information has been used to carry out the sensitivity analysis. The detailed calculation and all the supporting documents have been presented to the validator. It has been demonstrated that the coal is economically more attractive and the availability of coal is guaranteed, because of uninterrupted and plenty availability from an organized sector.</p>	<p>OK. Since the change from coal to biomass does not involve any additional cost and only the operating cost would be different, IRR calculation was not the suitable indicator for the financial analysis of the project. The project proponent has thus revised the calculations and has provided a unit cost comparison of coal and biomass. It has been observed from the calculations that the unit cost of hot air generation is cheaper with coal than with biomass. The assumptions used for calculating the unit cost, mainly the NCV and the price of coal and biomass have been validated from supplier data and laboratory analysis report.</p> <p>CAR is closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		Therefore using coal as a fuel is both more economically attractive and business as usual scenario.	
<p>CAR 3</p> <p>The calorific value of biomass used in the project plant needs to be measured and not calculated as provided in the monitoring plan. The exact point of measurement of hot air temperature needs to be specified in the monitoring plan to assess the suitability of the same.</p>	D.2.1	The calorific value will be measured in a quarterly frequency and the same has been incorporated in the PDD. The exact point of measurement of hot air temperature is at the outlet of the generator and the same is included in the updated PDD.	<p>OK. The relevant changes have been incorporated in the PDD.</p> <p>CAR is closed.</p>
<p>CAR 4</p> <p>Leakage associated with biomass transport is considered to be negligible as there would be requirement of transportation of coal in the baseline as well. The comparative of the emissions associated with transport of coal vis. a vis. biomass needs to be presented for assessing the same.</p>	E.2.2	The comparative analysis and supportive documents have been presented to the validator. The analysis shows that the differential of the emissions associated with biomass transportation vis a vis coal is not significant and thus the same is negated in the project activity.	<p>OK. The calculations for the difference in emissions from biomass and coal transportation have been checked. It has been observed that the emissions due to transportation of coal are higher than the emissions due to transportation of biomass. These emissions have thus been neglected as a conservative estimate.</p> <p>CAR is closed.</p>
<p>CAR 5</p> <p>In line with the EB guidance for assessment of leakage associated with competing use of biomass, excess availability has to established using either published literature, official report of some form of survey in the area</p>	E.2.3	A survey has been conducted to demonstrate the availability of surplus biomass in the specified 200 km region. It is demonstrated that the amount of surplus biomass available in the region is at least 25% more than that required	OK. A biomass availability survey conducted by a third party has been presented to the validator. The survey establishes that the rice husk used as fuel in the project activity is in excess and will thus not lead to any leakage

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
from where the project sources biomass material.		in the project plant.	emissions due to competitive use of biomass. CAR is closed.
CAR 6 The algorithm for determination of amount of coal that would have been used for generation of equivalent amount of hot air as provided in section E.1.2.4 does not match with that provided in section B.2 of the PDD.	E.3.4	This has been corrected accordingly and updated in the revised PDD.	OK. The relevant corrections have been incorporated in the PDD. CAR is closed.
CAR 7 The equation used for determination of heat content of hot air in the project, as provided in section E.1.2.4, does not match dimensionally. It needs to be clarified where parameters like hot air temperature, flow of hot air is used in emission reduction calculations as equations as presented in the PDD do not use these parameters	E.3.5	Necessary correction incorporated in the revised PDD. The efficiency of the hot air generator is taken as 95% as confirmed from technology provider. <i>Ex-post</i> determination of efficiency of HAG will require monitoring of hot air temperature and flow.	OK. The equations used for calculating baseline emissions have been corrected. CAR is closed.
CAR 8 Details worksheet for emission reduction calculation needs to be provided for evaluation of completeness of emission reduction calculation. The total output of the HAG's, calorific value of the baseline fuel and biomass material as used in emission reduction calculation do not	E.4.1	The detail worksheet has been provided separately. The data as used in calculation has been aligned with that presented as supportive.	OK. The calculations provided have been checked and the emission reduction calculations have been found to be correct. The emission reduction calculations have been based on a 10 month period in which only biomass is used for hot air generation.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
match with the supportive provided.			CL is closed.
<p>CL 1</p> <p>The project involves installation of 4 numbers of HAG's of RF3800 model. The output of the HAG's is 3268000 kcal/hr as provided under E.1.2 and A.4.2 of the PDD. The energy required in the STPP plant, as provided in the IRR calculation, is much more than the output of the model detailed therein. Clarification is requested as to how the energy requirement in STPP will be catered to with this model of HAG unit.</p> <p>The efficiency of the HAG is taken to be 95% with biomass firing. Basis of this efficiency level needs to be provided.</p>	A.2.3	<p>The HAG that will be catering the hot air for STPP plant has not yet been procured. The capacity will be taken care of during the tendering process of the same.</p> <p>The efficiency of HAG firing with biomass has been provided by the supplier. The document from supplier (part of the technical details, as provided by the supplier) as backup of the guaranteed efficiency has been submitted to the validator.</p>	<p>OK. Since the HAG catering to the STPP plant has not been procured yet, the capacity of the HAG will be taken care of during the procurement of the same. Also the biomass firing efficiency of 95% has been validated from the technical details provided by the HAG supplier.</p> <p>CL is closed.</p>
<p>CL 2</p> <p>Clarification is requested on the status of host county approval for the project activity.</p>	A.3.3	The project has been accorded HCA approval by the MoEF. The same is has been submitted to the validator.	<p>OK. The project has been approved by the DNA of India with a letter of approval dated 3 April 2007.</p> <p>CL is closed.</p>
<p>CL 3</p> <p>In IRR determination the efficiency of coal based HAG generator is taken to be lower than a biomass fired generator. Clarification is requested on the basis of this difference in efficiency of the coal based and biomass based system.</p>	B.2.1	The efficiency of the coal fired HAG and the biomass based HAG has been corrected according to the guaranteed efficiency figures provided by the supplier. The efficiency of both coal based and biomass based HAG has been assumed to be 95%.	<p>OK. The guaranteed efficiency figures from the supplier have been used. This is deemed conservative.</p> <p>CL is closed.</p>
CL 4	B.2.1	Since only one unit has been installed	OK. Since the other units are yet to

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
The project investment as provided in the IRR is around 6.94 cr. INR against the 1.73 cr. INR as mentioned in the application for NOC to the state pollution control board. Clarification is requested on the difference in investment figures and evidence against the proposed investment		so far, the cost mentioned in the application for NOC is for one unit only. The three other units will be installed subsequently. Therefore these will be covered by other application to pollution control board, as and when required. The total cost has been worked out as around 6.94 cr. By considering the investment cost for all four units.	come up, the project cost has been evaluated on the basis of the unit already procured. Thus the project cost for the 4 units has been calculated to be INR 6.94 crore based on the price of one unit. CL is closed.
CL 5 The barrier due to prevailing practice argues that utilization of rice husk for thermal energy generation is not prevalent in Haldia. Clarification is requested on the basis of this argument along with survey of related industries in the region with fuel sources used therein.	B.2.1	A survey has been carried out for investigating the availability of biomass by M/s Economic Information Technology Limited. This report also endorsed the fact that no major industries in Haldia utilises the rice husk for the generation of thermal energy.	OK. A biomass availability survey conducted by a third party has been presented to the validator. The survey establishes that the use of rice husk as fuel is not a common practice in Haldia. and used in the project activity is in excess and will thus not lead to any leakage emissions due to competitive use of biomass. CL is closed.
CL 6 The project design document does not provide any information as to the impact of CDM benefits on the project and how it helps in overcoming the barriers related to the project activity.	B.2.1	The impact of CDM registration has been incorporated in the PDD.	OK. The benefits accrued from CDM will help the unit to sustain the continued use of biomass for HAG instead of the cheaper option coal. CL is closed.
CL 7	B.2.5	The data available on price of coal and	OK. The prices of coal and biomass

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
Basis of cost of coal and biomass needs to be clarified for assessing the correctness of baseline fuel determination.		biomass from quotation collected from different vendors have served as the basis of cost of coal and biomass. The supporting documents have been provided to the validator and included in the PDD as well.	have been validated from the quotations of the different vendors of the same. These quotations have served as the basis for the cost of coal and biomass used in the unit price calculations. CL is closed.
CL 8 The monitoring plan provides for monitoring of amount of coal co-fired along with Biomass for energy generation in HAG unit. The coal procurement data will be used for the same as there is no other facility for metering of coal used at the HAG unit. Clarification is requested as to whether all the coal procured at the plant is only for use at the HAG units. The efficiency of the hot air generator will be monitored on an annual frequency as mentioned in the monitoring plan. Clarification is requested whether a direct or a indirect method will be used for efficiency measurement and whether it will be conducted by an external agency or assessed in-house.	D.2.1	The data for the coal that will be procured for using in the HAG unit will be kept separately. The efficiency of the hot air generator will be monitored on an annual frequency as mentioned in the monitoring plan. It will be assessed in-house. The parameters required for determination of efficiency have been incorporated in the PDD.	OK. A direct method will be employed for calculation of the efficiency of the hot air generator. The data for coal used in the HAG unit, if any, will be archived separately. CL is closed.
CL 9 Clarification is requested on the management system for collection, archiving, review of	D.5	It has been incorporated in the OCP and copy of the same has been provided to the validator.	OK. The collection and archiving of the project related data will be covered under the existing quality and environmental management system of

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
parameters required for determination of emission reduction associated with the project.			the unit. A separate operation control procedure has been developed for the monitoring and archiving all project related parameters. CL is closed.
CL 10 Clarification is requested on the basis of the efficiency of the coal based hot air generator unit and how is it conservative in nature.	E.3.6	The efficiency of the coal based system has been guaranteed as 95% by the supplier	OK. The guaranteed efficiency figures from the supplier have been used. This is deemed conservative. CL is closed.

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	Yes
CDM Verifier:	Yes	JI Verifier:	Yes
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1,2,3 & 9		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0030	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0031	Yes
ACM0004, ACM0012	Yes	AM0032	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0035	Yes
ACM0007	Yes	AM0038	Yes
ACM0008	Yes	AM0041	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0034	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0043	
AM0009, AM0037	Yes	AM0046	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	AM0047	
AM0014	Yes	AMS-II.A-F, AM0044	Yes
AM0017	Yes	AMS-III.A	Yes
AM0018	Yes	AMS-III.E, AMS-III.F	Yes
AM0020	Yes	AM0023	Yes
AM0021, AM0028, AM0034, AM0051	Yes	AM0024	Yes

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Subhendu Biswas

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJi-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 10		

Høvik, 22 December 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

Soumik Biswas

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJi-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 30 October 2007

Michael Lehmann
Technical Director, International Climate Change Services