



VALIDATION REPORT

BIOMASS BASED STEAM GENERATION PROJECT AT RAICHUR, INDIA

REPORT NO. 2009-0233

REVISION NO. 02

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 03 July 2009		Project No.: PRJC-147847-2009-CCS-IND
Recommended for approval K.V.Raman	Approved by: Michael Lehmann	Organisational unit: Climate Change Services
Client: Shilpa Medicare Limited.		Client ref.: Mr. Sharath Reddy

DET NORSKE VERITAS
 CERTIFICATION AS
 Climate Change Services
 Veritasveien 1,
 1322 HØVIK, Norway
 Tel: +47 67 57 99 00
 Fax: +47 67 57 99 11
 http://www.dnv.com
 Org. No: NO 945 748 931 MVA

Project Name: Biomass based steam generation project at Raichur, India
Country: India
Methodology: AMS I.C
Version: 16
GHG reducing Measure/Technology: Renewable biomass based steam generation.
ER estimate: 35 188 t CO₂e per year over a 10 year fixed crediting period.

Size

- ☐ Large Scale
☒ Small Scale

Validation Phases:

- ☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues

Validation Status

- ☒ Corrective Actions Requested
☒ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected

In summary, it is Det Norske Veritas Certification AS (DNV)'s opinion that the "Biomass based steam generation project at Raichur, India" as described in the PDD version 05 dated 24 March 2010, meets all relevant UNFCCC requirements for the CDM and all host country criteria and correctly applies the baseline and monitoring methodology AMS I.C, version 16. DNV thus requests the registration of the project as a CDM project activity.

Report No.: 2009-0233	Date of this revision: 09 Aug 2010	Rev. No. 02
Report title: Biomass based steam generation project at Raichur, India in India.		
Work carried out by: Mathsy K, Astakala Vidyacharan, Sharmistha Shome		
Work verified by: Andrea Leiroz (applicant) Kakaraparthi Venkata Raman		

Key words:

Validation
 Kyoto Protocol
 Climate change
 Clean development mechanism

- ☒ No distribution without permission from the Client or responsible organisational unit
☐ Limited distribution
☐ Unrestricted distribution



VALIDATION REPORT

Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
INR	Indian Rupees
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MEF	Methane Emission Factor
MoEF	Ministry of Environment and Forests
MP	Monitoring Plan
NGO	Non-governmental Organisation
NVC	Net Calorific Value
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual



VALIDATION REPORT

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY – VALIDATION OPINION	1
2	INTRODUCTION	2
2.1	Objective	2
2.2	Scope	2
3	METHODOLOGY	3
3.1	Desk Review of the Project Design Documentation	3
3.2	Follow-up Interviews with Project Stakeholders	5
3.3	Resolution of Outstanding Issues	6
3.4	Internal Quality Control	8
3.5	Validation Team	8
4	VALIDATION FINDINGS	9
4.1	Participation Requirements	9
4.2	Project Design	9
4.3	Baseline Determination	10
4.4	Additionality	12
4.5	Monitoring	16
4.6	Estimate of GHG Emissions	18
4.7	Environmental Impacts	20
4.8	Comments by Local Stakeholders	20
4.9	Comments by Parties, Stakeholders and NGOs	20

Appendix A: Validation Protocol

Appendix B: Certificates of Competence



VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Biomass based steam generation project at Raichur, 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 and site visit have provided DNV with sufficient evidence to determine the fulfillment of stated criteria.

The project participant is Shilpa Medicare Limited from the host Party, India. The host Party India meets all participation requirements. The DNA of India has confirmed that the project assists in achieving sustainable development and has approved the project and authorized the project participant on 1 February 2010. The project activity has been proposed as an unilateral activity and no Annex I Party has been identified.

The validation has confirmed that the project is eligible as category I.C small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.C, version 16. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable for the selected 10 years fixed crediting period. Moreover, an analysis of the barriers facing the project demonstrates that the project is not a likely baseline scenario.

The project results in the reduction of GHG emissions that are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project. The emission reductions from the project are estimated to be 35 188 tCO₂e per year over the selected 10 year of fixed crediting period. The emission reduction forecast has been checked and 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.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

A local stakeholder consultation process has been carried out by the project participant. DNV published the PDD on the UNFCCC web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. No comments were received during the period.

In summary, it is DNV's opinion that the project, as described in the project design document version 5 dated 24 March 2010, meets all relevant UNFCCC requirements for the CDM, and correctly applies the approved simplified baseline and monitoring methodology AMS-I.C version 16. Hence, DNV requests the registration of the “Biomass based steam generation project at Raichur, India” as a CDM project activity.



VALIDATION REPORT

2 INTRODUCTION

Shilpa Medicare Limited., has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the *Biomass based steam generation project at Raichur, India* project (hereafter called “the project”). This report summarises the findings of the validation of the project, performed 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.

2.1 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) /1/. 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 16 /4/. The validation was based on the recommendations in the Validation and Verification Manual /3/.

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.



VALIDATION REPORT

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.

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ Shilpa Medicare Limited: CDM-PDD for project activity “Biomass based steam generation project at Raichur, India”, version 02 dated 24 April 2009, version 3 dated 21 August 2009, version 4 dated 8 February 2010 and version 5 dated 24 March 2010.
- /2/ Letter of Approval: DNA of India, dated 1 February 2010.
- /3/ CDM Executive Board: “*Validation and Verification Manual*, version 1.2.
- /4/ CDM Executive Board: AMS I.C - Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity, Type I – renewable energy projects, categories I.C - Thermal energy production with or without electricity, version 16, EB51.
- /5/ Combined Consent to Operate from Karnataka State Pollution Control Board (KSPCB) - Consent No. PCB 46 HPI 08/2008-09 453 dated 21 November 2008 mentioning the biomass based boilers.
- /6/ Combined Consent to establish from Karnataka State Pollution Control Board (KSPCB) - Consent No. CFE-EIA/SMCL/EIA-554/2006-2007/213 of 31 October 2006 mentioning the coal based boiler.
- /7/ Boiler certificate from the Karnataka State Boiler Inspection Department vide number ADBG/BLR/CFN-106/08-09 dated 07 February 2009 for the 6 TPH boiler and ADBG/BLR/CFN-107/08-09 dated 07 February 2009 for the 10 TPH boiler.
- /8/ Technical and commercial offer for biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd, the boiler manufacturer, dated 7 August 2007.
- /9/ Purchase order placed with Thermax for the two boilers dated 27 August 2007 (proof for the start date of the project activity).
- /10/ Extracts of the resolution passed in the Board Meeting of Shilpa Medicare Limited held on 26 April 2007 for proving CDM consideration.
- /11/ Environmental clearance from the Ministry of Environment and Forests, Government of India for the expansion of the Bulk Drug unit at Raichur, dated 12 March 2008.
- /12/ Appointment letter for the CDM consultant/Advisory services with Verde Consulting Private Ltd on 04 August 2008.
- /13/ Technical specification and commercial offer from Zenith Thermal Equipment Pvt Ltd for the 6 and 10 TPH coal fired boiler (for the efficiency of boilers of similar specification), dated 07 June 2007.
- /14/ Boiler specifications from Micro Dynamics Pvt. Ltd for the 6 and 10 TPH boiler (for



VALIDATION REPORT

- the efficiency of boilers of similar specification), dated 29 July 2007.
- /15/ Stakeholder consultation: Copy of the invitation letter for comments/suggestions on the project dated 12 January 2009.
 - /16/ Copy of the response from the Gram Panchayat, Chikkasugur, Raichur dated 24 January 2009.
 - /17/ Copy of a quotation from Govindnarayan Industries (rice mill) for the rice husk, dated 03 February 2007.
 - /18/ Copy of a quotation from Raw Impex for the rice husk, dated 05 February 2007.
 - /19/ Copy of a quotation from Govind Enterprises for the imported coal, dated 02 February 2007.
 - /20/ Copy of a quotation from Bhagawandas Corporation for imported coal, dated 06 February 2007.
 - /21/ Commissioning report for the two boilers from Thermax Limited dated 26 November 2008.
 - /22/ Biomass assessment report for Shilpa Medicare Limited by Bhagwat Technologies and energy conservation Pvt. Ltd. dated April 2009.
 - /23/ CDM India, Designated National Authority, Ministry of Environment and Forest http://cdmindia.in/reports_list_details.php?id=Karnataka&reporttype=2
 - /24/ Inter office memo to the Board of Director on the proposal for project activity unit considering CDM revenue to alleviate the barrier, dated 12 April 2007.
 - /25/ CDM consideration for project: Annual Report 2007 - 2008 of Shilpa Medicare Limited.
 - /26/ E-mail correspondence with the technology supplier, Thermax Ltd: Enquiry for CDM consultants, dated 27 September 2007.
 - /27/ CDM Executive Board: "Guidelines on the assessment of investment analysis", version 3.1,
 - /28/ Net calorific value of coal used for investment analysis: India solar : <http://www.indiasolar.com/cal-value.htm>
 - /29/ Shilpa Medicare Limited: Excel sheet: ERs calculation and unit cost of steam generation.
 - /30/ E-mail communication with Verde Consulting Pvt. Limited, CDM consultant, for the estimation of carbon credits, dated 7 March 2008 and the response from the CDM consultant, dated 24 March 2008.
 - /31/ Article on coal price, dated 25 August 2009: <http://business.rediff.com/report/2009/aug/25/coal-india-may-up-prices-by-up-to-rs-175-per-ton.htm>.
Article on coal price, dated 25 September 2009: <http://www.business-standard.com/india/news/coal-india-may-be-allowed-to-raise-prices-by-march/371145/>.
 - /32/ CDM Executive Board: "General guidance on leakage in biomass project activities", version 03, EB47 Annex 28.
 - /33/ E-mail to CDM consultancy proposal, dated 23 April 2008, to Verde Consulting Pvt. Limited and the response to the project proponent, dated 24 July 2008
 - /34/ National Communication of India (<http://www.natcomindia.org/pdfs/chapter2.pdf>) and IPCC 2006 default value on National GHG Inventories
 - /35/ Usage of non coking coal for heat generation: Coal India Limited, Government of



VALIDATION REPORT

India: <http://www.coalindia.in/>

- /36/ CDM EB 50 Annex 15 “Tool to determine the remaining lifetime of equipment”
- /37/ CDM EB: “Guidelines on the demonstration and assessment of prior consideration of the CDM”, version 3

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration:

- The start date of the crediting period of the project has been revised to 1 January 2011.
- The investment analysis (unit cost comparison) has been performed as per the “Guidelines on the assessment of investment analysis” and sensitivity analysis has been performed at which the unit cost of steam from baseline and project activity becomes equal.
- The chronology of the project activity has been included in section B.5 of the PDD.
- The biomass availability assessment study has been fixed ex-ante for 50 km radius as per the EB 47 “General guidance on leakage in biomass project activities”.
- Due to the increase in plant load factor for the project activity boiler from 62.5% to 87.5%, the emission reduction has increased from 25 747 tCO₂ to 35 188 tCO₂ per year (CL 07).
- The PDD has been revised as per methodology, AMS-IC version 16.

After reviewing the revised PDD version 5 dated 24 March 2010, DNV issued this final validation report and opinion.

3.2 Follow-up Interviews with Project Stakeholders

On 19 June 2009, DNV has performed on-site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives from the project participant, Shilpa Medicare Limited and representatives of First Climate (India) Pvt. Ltd. were interviewed. The main topics of the interviews are summarized below.

	Date	Name	Organization	Topic
/38/	2009-06-19	Sharath Reddy, General Manager (Operations) Seshachalam Unnam, General Manager (Quality)	Shilpa Medicare Limited.	<ul style="list-style-type: none"> • Clarification on technical details of the project. • Confirmation that the project is not a de-bundled component of a larger project activity • Confirmation on non involvement of ODA and • Clarifications on the establishment of baseline, monitoring plan and emission reduction calculations.



VALIDATION REPORT

				<ul style="list-style-type: none"> • Clarifications on cost comparison analysis and the assumptions used for the estimation of the same • Resources, training needs and procedures for operation and maintenance. • Approval status from the DNA of India for the project. • Surplus availability of biomass sources • Training requirements • Clarification on technical details of the project. • Clarifications on the use of coal as the baseline. • Clarifications on cost comparison analysis and the assumptions used for the estimation of the same • Resources, training needs and procedures for operation and maintenance. • Approval status from the DNA of India for the project.
/39/	2009-06-19	Rajib Pramanik, Consultant	First Climate Group	

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 the figure below. The completed validation protocol for the Biomass based steam generation project at Raichur, India is enclosed in Appendix A to this report.



VALIDATION REPORT

Findings established during the validation can either be seen as a non-fulfilment of CDM 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) CDM and/or methodology specific 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.

A request for clarification (CL) 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
<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>

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 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</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 and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL 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



VALIDATION REPORT

3.4 Internal Quality Control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				<i>Desk review</i>	<i>Site visit / Interviews</i>	<i>Reporting</i>	<i>Supervision of work</i>	<i>Technical review</i>	<i>Expert input</i>
CDM validator / technical team leader/Sectoral Working experience	Astakala	Vidyacharan	India	✓	✓	✓	✓		✓
GHG Auditor/ Project Manager.	Shome	Sharmistha	India	✓		✓			
GHG Auditor	Kutty	Mathsy	India	✓	✓	✓			
Technical reviewer (applicant)	Leiroz	Andrea	Brazil					✓	
Technical reviewer	Kakaraparthi	Venkata Raman	India					✓	

The qualification of each individual validation team member is detailed in Appendix B to this report.



VALIDATION REPORT

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 final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation version 5 dated 24 March 2010 /1/.

4.1 Participation Requirements

The project has been proposed as an unilateral project. The project participant is Shilpa Medicare Limited from host Party India. The host Party India fulfils the participation requirements, having ratified the Kyoto Protocol on 26 August 2002 and established National Clean Development Mechanism Authority, Ministry of Environment and Forests as the Designated National Authority (DNA).

The DNA of India has issued a Letter of Approval (LoA) on 1 February 2010 /2/, authorizing Shilpa Medicare Limited as a project participant and confirming that the project assists in achieving sustainable development. The issuance of the Letter of Approval by DNA of India for the proposed project activity has been further verified by DNV from the Ministry of Environment and Forest, CDM India, Designated National Authority's website /23/. No Annex I Party project participant is yet identified.

The validation also did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India.

4.2 Project Design

The project activity involves the installation and operation of a green field biomass based thermal energy generation facility in the new pharmaceutical manufacturing unit of Shilpa Medicare Limited at Raichur in Chicksugur district of Karnataka, India. The geographical coordinates of the project activity are 16°12' N and 77° 20' E.

The total installed steam generation capacity of the project activity is 16 TPH consisting of two numbers of horizontal multi-tubular shell type boilers of 10 TPH and 6 TPH steam generation capacity each at 10.54 kg/cm² pressure. The technical specifications of the boilers have been verified from the technical and commercial offer for biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd. the boiler manufacturer, dated 7 August 2007 /8/ and purchase order placed on Thermax for the two boilers dated 27 August 2007 /9/ and also from the name plate on the equipment during site visit.

The project activity is envisaged to consume 29 959 MT of rice husk annually and generate thermal energy equivalent to 12.35 MW_{th} at a capacity utilization factor of 100%. The steam generated from the biomass based boilers will be used for the process requirement of the pharmaceutical manufacturing facility. No co-firing with fossil fuel is involved and fossil fuel may only be used in the project activity in case of emergency.

The project will result in an estimated reduction of 35 188 tCO₂e per annum over its fixed crediting period of 10 years. The technology applied is deemed current good practice and is not expected to be replaced within the crediting period.



VALIDATION REPORT

The project started with placing of the purchase order for the boiler with Thermax Ltd on 27 August 2007 /9/. This date is the earliest of all activities that involve major investment decisions and meets the requirement criteria defined for start date of the project activity as detailed in section 4.5).

The expected operational lifetime of the project is 25 years and a fixed crediting period of 10 years has been chosen, starting from 1 January 2011 or the date of registration of the project activity, which ever is later. The life time is justified as the default technical lifetime of a boiler is stated to be 25 years as per the “Tool to determine the remaining lifetime of equipment” (EB50 Annex 15) /36/.

In line with paragraph 64 of CDM VVM, version 1.2, DNV considers that the project description is complete and accurate.

4.3 Baseline Determination

The proposed project activity correctly applies the simplified baseline methodology for selected small-scale CDM project activity AMS-IC (version 16) - “Thermal energy production with or without electricity” for Type I – Renewable Energy Projects. The project activity, as stated in section 4.2, is the installation of new biomass based boilers of aggregated total capacity of 16 TPH. The methodology is applicable to the project activity as, the following applicability criteria are fulfilled.

- The project activity involves the generation of thermal energy in the boilers using renewable source such as rice husk. The generated steam shall be used for the captive consumption in the process of the pharmaceutical manufacturing unit of Shilpa Medicare Limited, Raichur, in which the project activity is located. The fuel (rice husk) used in the project activity boilers has been verified from the technical and commercial offer for biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd, the boiler manufacturer, dated 7 August 2007 /7/.
- The project activity involves only the generation of steam and is not a cogeneration unit. This has been confirmed during the site visit.
- It has been verified from the technical specifications of the boilers /7/ /8/ that steam will be generated from the boilers of 10 TPH and 6 TPH capacities at 10.54 kg/ cm² pressure. At this rated steam pressure, the enthalpy of the steam is approximately 664 kcal/kg. Thus, the rated capacity of the project activity is 12.35 MW_{th}, and satisfies the requirement that the thermal capacity of the project activity should not exceed 45 MW_{th}.
- It has been confirmed by the project proponent that only rice husk would be combusted in the project activity for thermal energy generation. Thus, the project activity is not a co-fired system. It has been verified from the inter office memo to the Board of Director on the proposal for project activity, dated 12 April 2007 /24/ that only biomass residue (rice husk) has been considered for the project activity.
- The project activity generates steam which will be used for in house process requirement.
- The project activity is a new installation and no retrofitting, modification or addition of unit in the existing facility is involved as verified from the purchase order /9/ and during the site visit.



VALIDATION REPORT

- The project activity will utilize rice husk in the boiler and no usage of charcoal based biomass is involved. It has been verified that only biomass residue (rice husk) has been considered for the project activity from the Inter office memo to the Board of Director on the proposal for project activity, dated 12 April 2007 /24/.

Thus, inline with CDM VVM, version 1.2, paragraph 76, DNV confirms that the project activity is applicable to the methodology, AMS-IC, version 16.

It has been verified from the consent to establish from Karnataka State Pollution Control Board, dated 31 October 2006, that coal based boiler has been initially considered as source for heat requirement for the new bulk drug manufacturing industry. In view of the fact that the source of steam generation has been mentioned as coal based boiler in the consent to established, a coal based boiler has been accepted as the baseline for the project activity. The baseline emission of the project activity has been calculated as the product of net thermal energy generated by the project activity and the emission factor of coal.

The project boundary includes rice husk storage, boilers and the process unit of pharmaceutical manufacturing facility in which the project activity is located.

Emission sources and gases included in the project boundary are:

	GHGs involved	Description
Baseline emissions	CO ₂	Emissions equivalent to the amount of net thermal energy (steam) supplied by the project activity that would otherwise be generated by the coal based boiler.
Project emissions	CO ₂	Emission from the coal usage during emergency.
Leakage	CO ₂	Leakage due to competing biomass is not applicable as there is surplus biomass available for the project, as verified against Biomass assessment report for Shilpa Medicare Limited by Bhagwat Technologies and energy conservation Pvt. Ltd., dated April 2009 /22/. The distance travelled for the procurement of biomass shall be monitored and in case the procurement is done outside the 50 km radius, reassessment of biomass availability will be conducted by project proponent.

In line with the CDM VVM, version 1.2, paragraph 80, DNV considers that the selected sources and gas are justified for the project activity. No other source of gas resulting to more than 1% of the over all average emission reduction by the project activity is envisaged.



VALIDATION REPORT

4.4 Additionality

The additionality of the project activity has been demonstrated as per the Attachment A to Appendix B of simplified modalities and procedures for small-scale CDM project activities. The project activity demonstrates additionality through investment analysis.

4.4.1 CDM consideration and continued action to secure CDM status:

The start date of the project activity, 27 August 2007 /9/, is the date of earliest action among all activities which involved major investments in the project implementation. The purchase order was placed with Thermax, dated 27 August 2007 /9/ is for both 10 TPH and 6 TPH boilers. It has been confirmed by the project proponent that no separate civil construction agreement has been signed. In view of this, the date of purchase order, 27 August 2007 has been selected as the start date of the project activity.

It is demonstrated that CDM was seriously considered in the decision to proceed with the project activity in compliance with “Guidelines on the demonstration and assessment of prior consideration of the CDM”, version 3 /37/, from the following.

- Inter office memo to the Board of Director on the proposal for project activity unit considering the investment barrier and CDM revenue to alleviate the barrier, dated 12 April 2007 /24/. It has been verified from the Inter office memo that the unit cost of steam generation from biomass (at INR 438 per ton of steam) is higher by INR 72 per ton of steam when compared to steam generation from coal based boiler (INR 366 per ton of steam). This was estimated during the submitting the project activity proposal to the Board of Director of Shilpa Medicare Limited for approval.
- Extracts of the resolution passed in the Board Meeting of Shilpa Medicare Limited to undertake the project activity as CDM project activity held on 26 April 2007 /10/.
- It has also been verified from the Annual Report 2007-2008 of Shilpa Medicare Limited /25/ that CDM revenue has been considered for the biomass fired boiler project activity to make it financially attractive.

The assessment that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation is summarized below:

- E-mail correspondence with the technology supplier, Thermax Ltd, on the enquiry for CDM consultants, dated 27 September 2007 /26/ and e-mail the response from Thermax Ltd, dated 9 October 2007 /26/.
- E-mail communication with Verde Consulting Pvt. Limited, CDM consultant, for the estimation of carbon credits, dated 7 March 2008 /30/ and the response from the CDM consultant, dated 24 March 2008 /30/. E-mail to CDM consultancy proposal, dated 23 April 2008, to Verde Consulting Pvt. Limited and the response to the project proponent, dated 24 July 2008 /33/.
- Agreement signed between the project proponent and Verde Consulting Private Limited, dated 4 August 2008, for CDM advisory services /12/.
- The project activity has been commissioned on 26 November 2008.
- The PDD of the project activity has been webhosted in UNFCCC website for global stakeholder consultation on 10 May 2009.

The above chronology of events demonstrates that a) CDM was a decisive factor for the project activity, b) The gap between the start date of the project activity (27 August 2007) and



VALIDATION REPORT

the email communication with the equipment supplier for the identification of CDM consultants for securing CDM status is two months (9 October 2007). The gap between the start date of the project activity and the agreement for CDM advisory services (on 4 August 2008) is less than one year. Thus, it can be concluded that continuing and real actions were taken to secure CDM status for the project activity in line with the “Guidelines on the demonstration and assessment of prior consideration of the CDM”, version 3 /37/.

4.4.2 Investment barrier:

An investment analysis is applied to demonstrate that the project is not financially attractive and thus faces an investment barrier.

4.4.2.1 Investment analysis: Choice of approach:

In view of the fact that in absence of the proposed project activity, the project proponent would have installed a coal fired boiler of similar capacity, an investment comparison analysis has been conducted as per the “Guidelines on the assessment of investment analysis” version 3.1 /27/ paragraph 16. It is DNV opinion that the approach selected is acceptable and in line with the EB guidance.

4.4.2.2 Investment analysis: Input parameters:

The investment comparison analysis has been performed considering total cost, boiler efficiency, amount of fuel required and the cost of fuel for both the scenarios.

The key financial input parameters have been verified from the following:

- Investment cost of the coal based boiler and project activity boiler: The total cost of coal based boilers at INR 8.463 million (INR 5.068 million for 10 TPH boiler and INR 3.395 million for 6 TPH boiler) has been verified from the Technical and commercial offer from Zenith Thermal Equipment Pvt Ltd dated 07 June 2007 /13/.

The cost of biomass based boilers at INR 10.367 million used in the investment comparison analysis has been sourced from the Technical and commercial offer for the biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd, the boiler manufacturer, dated 7 August 2007 /8/ and also verified from the purchase order placed on Thermax for the two boilers dated 27 August 2007 /9/ at INR 10 million. In line with the “Guidelines on the assessment of investment analysis” version 3.1 /27/, the cost of boilers as per the Technical and commercial offer /8/ has been accepted since this was the value available at the time of investment decision. Furthermore, it has been verified that cost of biomass based boiler has been considered to be INR 10.8 million in the Inter office memo to the Board of Director on the proposal for project activity unit, dated 12 April 2007 /24/, which was the basis for the CDM consideration for the project activity. DNV observes that even on considering the project cost as per the purchase order, the coal based boiler remains the baseline scenario.

- Boiler efficiency: Boiler efficiency of 80% has been considered for the coal based boiler, which is the minimum of the coal based boiler efficiency provided by boiler suppliers. This has been verified from the coal based boiler specifications from Micro Dynamics Pvt Ltd for the 6 and 10 TPH coal fired boiler, dated 29 July 2007 /14/ and technical specification and commercial offer from Zenith Thermal Equipment Pvt Ltd for the 6 and 10 TPH coal fired boiler, dated 07 June 2007 /13/. The efficiency of the boiler provided by the suppliers range from 80% to 84%. The minimum of the coal boiler efficiency of 80% provided by boiler suppliers has been considered on the



VALIDATION REPORT

conservative approach to arrive at the higher unit cost of steam generation by the baseline boiler. However, for the calculation of emission reduction, highest efficiency provided by the boiler manufacturers (84%) has been considered on the conservative basis.

Boiler efficiency of 82% for the biomass based boiler has been verified from the Technical and commercial offer for biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd, the boiler manufacturer, dated 7 August 2007 /8/ and the boiler specifications from Micro Dynamics Pvt Ltd dated 29 July 2007 /14/. It has been verified from these technical specifications that 82% efficiency is the maximum biomass fired boiler efficiency that can be attained and thus has been considered on the conservative approach and lowest possible unit cost of steam generated by the project activity boiler.

- Cost of coal and rice husk: The average cost of coal at INR 1200 per ton has been verified from the quotation from Govind Enterprises for the imported coal, dated 02 February 2007 /19/ and from Bhagawandas Corporation for imported coal, dated 06 February 2007 /20/. It has been further verified from the Inter office memo to the Board of Director on the proposal for project activity unit, dated 12 April 2007 /24/ that cost of INR 1200 per ton of coal has been considered during the conceptualization stage also.

The rice husk cost at INR 1140 per ton used in the financial analysis has been verified from the quotations from Govindnarayan Industries (rice mill) dated 03 February 2007 /17/ and from Raw Impex dated 05 February 2007 /18/. The cost of rice husk, as per the quotations varies from INR 1140/ton to INR 1220/ ton. The lowest cost of rice husk quoted has been considered conservatively for the investment comparison analysis. It has been further verified from the Inter office memo to the Board of Director on the proposal for the project activity unit, dated 12 April 2007 /24/ that cost of INR 1180 per ton of rice husk has been considered during the conceptualization stage.

- Net calorific value (NCV) of coal and rice husk: The net calorific value (NCV) of 3500 kcal/kg for coal has been verified from the supplier quotations /19//20/. The net calorific value of coal has been further verified from the website of India solar /28/ and also from the proposal for project activity unit, dated 12 April 2007 /24/.

A NCV value of 3000 kcal/kg for rice husk has been verified from the supplier quotations /17//18/ and from the website of India solar /28/. This has been also verified from the proposal for project activity unit, dated 12 April 2007 /24/.

All other parameters, such as, operation and maintenance cost at 5% of the investment cost, total capacity of boilers of 16 TPH (as per the name plate capacity), plant load factor of 87.5%, operating hours, total steam generation and the enthalpy of the steam generated by coal based boiler and rice husk based boiler have been considered to be the same for the calculations in the baseline as well as project scenario and does not have any impact on the unit cost comparison between project activity and baseline.

Thus, DNV confirms that the validation of the input parameters has been conducted as per paragraph 110 and 111 of the VVM /3/.

4.4.2.3 Investment analysis: Calculation and conclusion:



VALIDATION REPORT

Based on the verified financial input parameters, the unit cost for the steam generation from coal based boiler is INR 313.28 per ton of steam /29/ while the unit cost of steam generation from biomass based boiler is INR 350.27 per ton /29/. The cost of steam generation from biomass is INR 36.99 per ton of steam higher than cost of steam generation from coal, without considering CDM revenue, and hence not financially viable.

As afore mentioned, it has been verified from the Inter office memo /24/ that the unit cost of steam generation from biomass is higher by INR 72 per ton of steam when compared to steam generation from coal based boiler, as estimated during the submission of proposal for the project activity to the Board of Director. This further demonstrates that the investment comparison analysis in the PDD has been performed in conservative approach and confirms that the project activity in the absence of CDM benefits and compared to the baseline is not financially attractive.

The calculations were verified by DNV and found to be in line with EB's guidance on investment analysis /27/ and VVM /3/. The assumptions used in the calculations were deemed to be correct by DNV.

4.4.2.4 Investment analysis: Sensitivity analysis:

A sensitivity analysis has been preformed for parameters contributing more than 20% to revenues or costs to check the robustness of the financial analysis. Reasonable variations of the project cost, fuel cost and operation and maintenance costs were checked by calculating the variation necessary to reach the baseline's unit cost for the steam generation and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correlation.

Fuel cost: It has been demonstrated that if the price of coal increases by 15.87% or the price of biomass decreases by 14.7%, the unit cost of steam generation from coal reaches the unit cost of steam generation from biomass /29/. It has been verified from the purchase invoice and payment receipts for the biomass that cost of biomass has increased by 56.78% and it has been verified from the article on coal price increase in various websites /31/ that the coal price has increased by 10%. Since the actual variations in the cost of biomass is more and that for coal is less than the sensitivity analysis range, this scenario is unlikely.

Investment cost: It has been demonstrated that if the cost of coal based boiler increases by 46.5% or the cost of biomass based boiler decreases by 37.7%, the unit cost of steam generation from coal reaches the unit cost of steam generation from biomass /29/. The investment cost of INR 10.367 million for the biomass based boiler has been verified from the Technical and commercial offer for biomass based boiler (6 TPH and 10 TPH) from Thermax Ltd, the boiler manufacturer, dated 7 August 2007 /8/. It has been verified from the amended purchase order placed with Thermax for the two boilers dated 27 August 2007 /9/ that the actual cost of the boilers is INR 10 million, which is 3.54% less than the considered boiler cost of INR 10.367 million. Thus, any further decrease in biomass based boiler is not possible. Furthermore, it is unlikely that the cost of coal boiler shall increase and cost of biomass boiler shall remain constant since, any increase in material cost or taxation shall affect the cost of manufacturing of both the boilers.

Operation and maintenance cost: The operation and maintenance cost of the project activity is 5% of the total project cost. The operation and maintenance cost for both coal based boiler and the biomass based boiler (project activity) has been considered to be 5%. Since, the cost is same in both baseline and project activity, this does not have any leverage on the unit cost comparison between project activity and baseline. As per the EB's guidance on investment



VALIDATION REPORT

analysis, sensitivity analysis is to be performed for the parameters, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues. Inline with the guidance the sensitivity analysis for operation and maintenance cost has not been performed.

In conclusion, the investment analysis and sensitivity analysis assessment have shown that the project activity is unlikely to be the most financially attractive option.

Thus, it can be concluded that the project activity faces barrier due to high cost of steam generation from the project activity as described in the section and emission reductions occurring from the project are deemed additional to those that would occur in the absence of the project activity. This demonstrates that the project activity would not be implemented without the CDM. DNV is able to confirm this conclusion.

4.5 Monitoring

The selected monitoring plan is in line with the monitoring methodology AMS-IC version 16 and monitors the following parameters:

- Quantity of the rice husk consumed by the project activity.
- Quantity of fossil fuel consumed in the project activity.
- Net amount of heat generated and supplied by the project activity.

The baseline emission has been calculated as the product of net amount of heat generated by the project activity, taking into account the efficiency of the boiler that would have been used in the baseline, and CO₂ emission factor of coal, which is the baseline fuel.

Emission due to the usage of fossil fuel during emergency has been accounted as project emission. The surplus availability of rice husk in the project region within radius of 50 km has been assessed ex-ante and the reassessment of the availability of rice husk shall be conducted if the biomass is procured outside the 50 km radius.

The steam flow meters and the solid fuel metering instruments will be calibrated once in a year. The steam flow meter of accuracy class 1.5s shall be used in the project activity.

4.5.1 Parameters determined ex-ante

Data available at the time of validation are as follows:

- CO₂ emission factor per unit of energy of the fuel (coal) that would have been used in the baseline plant. For the baseline emission calculations this has been sourced from the National Communication of India in line with the methodology (para 37). For the project emission calculations for use of coal, the CO₂ emission factor has been sourced from the IPCC 2006 default value at the upper limit of the uncertainty at 95% confidence interval in line with the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” /34/.
- Efficiency of plant using fossil fuel (coal) that would have been used in the absence of the project activity. The baseline boiler efficiency of 84% has been considered, which is the highest boiler efficiency provided by the boiler suppliers /13/ /14/. In view of the fact that higher efficient baseline boiler will result in lower amount of coal consumption in baseline scenario and thereby result to lower amount of baseline



VALIDATION REPORT

emission, this has been accepted on conservative approach for emission reduction calculation.

- CO₂ emission factor of truck used for transportation (tCO₂e/Km) has been calculated to be 0.00054 tCO₂e/Km. The mileage of the truck, NCV of diesel and CO₂ emission factor of the diesel has been sourced from IPCC 2006 default value. The density of the diesel has been considered to be 0.84 kg/Lt, as per the data provided by Indian Oil Corporation Limited.
- Surplus availability of biomass (rice husk) in the project region of 50 km radius has been demonstrated to be 33.33% and the same has been verified from the Biomass assessment report for Shilpa Medicare Limited by Bhagwat Technologies and energy conservation Pvt. Ltd. dated April 2009 /22/.
- Specific energy consumption of coal-fired boiler has been calculated to be 0.004286 TJ/ MWh based on the total energy generated, NCV of coal of 3500 kcal/kg as specified by the supplier and the coal consumption by the boiler (considering the efficiency of the boiler as specified by the supplier). The coal shall only be used in the boiler in case of emergencies and in line with the methodology, shall be accounted for as the project emission, considering the total quantity of coal consumed in the project activity.
- Specific energy consumption of biomass residue (rice husk) fired boiler has been calculated to be 0.004390 TJ/MWh based on the total energy generated (sourced from the technical specification) , NCV of rice husk of 3000 kcal/kg (from supplier) and the fuel consumption (calculated using the highest efficiency of the biomass boiler and total energy generated).

All other values will be monitored and determined *ex post*.

DNV has verified the value used against the sources and concluded that the data used are appropriate and conservative. This has been further described in section 4.6 of the report.

4.5.2 Parameters monitored ex-post

The parameters that are to be monitored *ex-post* include:

- Net quantity of thermal energy (heat) supplied by the project activity, taking in account the net amount steam generated by the project activity and enthalpy of the steam generated based on saturated steam condition and its corresponding pressure.
- Quantity of steam generated by the project activity shall be monitored continuously using the steam flow meter and hourly records will be collated into daily steam generation figure.
- The pressure of the steam generated by the project activity shall be monitored continuously and averaged daily.
- Amount of biomass residue (rice husk) consumed by the project activity. Solid fuel metering system shall be used for continuous monitoring and the data shall be collated monthly and shall be cross checked from the biomass procurement record.
- Amount of fossil fuel (coal) consumed by the project activity during emergency. Solid fuel metering system shall be used for continuous monitoring and the data shall be collated monthly and shall be cross checked from the coal procurement record.
- Average round trip distance per trip for transporting rice husk and number of truck trips required to transport rice husk to the project site.



VALIDATION REPORT

The IPCC 2006 default has been used for emission factor and net calorific value of the sub bituminous coal. These default values shall be updated as per the latest IPCC values at the upper limit of the uncertainty at 95% confidence interval.

In view of the above mentioned monitoring procedure for each of *ex-post* monitored parameters, inline with paragraph 123 and 124 of VVM /3/, it can be concluded that monitoring plan is feasible for the project activity design and project proponent shall be able to implement the monitoring plan.

4.5.3 Management system and quality assurance

Maintenance and calibration of steam meter and solid fuel metering system will be carried out annually. All data will be archived in paper/ electronic form until two years after the crediting period. The project proponent is in the process of implementing ISO 14001, which shall ensure avoidance of any fire hazard because of project activity. A FAR 01 has been raised in line with the VVM /3/ and the implementation of ISO 14001 shall be verified during the first verification period.

Plant head has been appointed as the overall responsible for the proposed project activity and is responsible for the checking the information consistency. Internal audits will be conducted once every six months to check for any discrepancies and necessary corrective action will be taken.

4.6 Estimate of GHG Emissions

The calculations and formulae as addressed in the simplified baseline and monitoring methodology AMS-IC, version 16, have been applied. All aspects related to the direct and indirect GHG emissions as relevant to the project activity have been addressed and are presented in a transparent manner, in line with the approved methodology. No other source of emission more than 1% of the overall expected average annual emissions reduction is envisaged from the project activity.

4.6.1 Baseline emission:

As per the applied methodology, AMS-IC, version 16, the baseline emission of the project has been calculated as the product of the net quantity of steam generated by the project activity and CO₂ emission factor of coal divided by the efficiency of the boiler when fired with coal. It has been verified from the consent to establish from Karnataka State Pollution Control Board, dated 31 October 2006 /6/, that coal based boiler has been considered for the new bulk drug manufacturing industry. In view of the fact that the source of steam generation has been mentioned as coal based boiler in the consent to established, coal based boiler has been accepted as the baseline for the project activity.

The efficiency of the baseline coal fired boiler has been considered to be 84%, which is the highest boiler efficiency provided by the boiler suppliers /13//14/ and thus has been considered for the calculation of baseline emission on the conservative approach. The higher efficient baseline boiler shall result to lower amount of coal (baseline fuel) consumption and thereby result to lower amount of baseline emission. Default value from the National Communication of India /34/ has been used for the emission factor of non coking coal and the same shall be updated as per the revision done in the same. It has been verified from the website of Coal India Limited, Government of India /35/, that non coking coal is used in the boilers in industries for the heat generation and thus, emission factor of the non coking coal



VALIDATION REPORT

has been accepted. Further, it has been verified from the coal suppliers' quotations that E grade coal would have been used in the boiler in absence of the project activity. The total steam generated by the project activity has been estimated to be 110 880 ton/year considering the plant load factor of 87.5%. The pressure of the steam, as per the technical specification of the project activity boiler, is 10.54 kg/ cm² (g) and thus, the total thermal energy (heat) generated per year is calculated to be 308.508 TJ/year.

4.6.2 Project emission:

The project activity, in case of emergency, shall use coal in boilers. The emission due to the usage of coal during the emergency shall be accounted as project emission.

Option B of the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" shall be followed to calculate the emission due to coal usage. The net calorific value and the weight average CO₂ emission factor of the coal has been sourced from IPCC 2006 default value and same shall be updated in line with any revision made in IPCC values. It is envisaged that no coal will be consumed in the project activity and thus, for the ex-ante estimation purpose, no project emission from the same has been considered. Any consumption of coal during emergency shall be monitored and shall be accounted.

No emission from the electricity consumption has been considered since similar auxiliary drives would have been used in the baseline case. The rice husk used in the project activity does not require any processing or treatment and thus no project emission from this is considered.

4.6.3 Leakage:

There are no leakages are envisaged due to biomass (rice husk) cultivation for the project as the required biomass is dependant on suppliers alone and project does not have any rice husk growing activity for the project.

The project activity shall utilize only rice husk for the steam generation. The assessment of leakage and the biomass availability survey has been carried for the region of 50 km of radius from the project site. It has been verified from the Biomass assessment report by Bhagwat Technologies and energy conservation Pvt. Ltd. dated April 2009 /22/ that the total rice husk generation in the region is 154.13 kT and the total rice husk consumption, including the project activity, in the region is 110 kT. Thus, the total surplus availability of rice husk, after deducting the quantity of biomass that is utilized, including the project activity, in the region is 33.33 % of the quantity of biomass that is utilized including the project activity. The source of data for the biomass assessment survey is based on the primary field survey and data sourced from the sources such as i) Karnataka at a Glance, ii) Raichur district at a Glance, iii) Bellary district at a Glance, iv) Gulbarga district at a Glance. In line with the EB 47 "General guidance on leakage in biomass project activities" the surplus availability of rice husk (biomass) has been assessed ex-ante for the radius of 50 km. In case the rice husk is procured from out side 50 km radius, reassessment of the availability of biomass shall be conducted.

Thus, DNV confirms that the validation of biomass surplus availability is inline with the VVM /3/.

The estimated round trip distance travelled by the trucks for the transportation of biomass has been considered to be 100 km (considering 50 km radius). As per the methodology, AMS-I.C, version 16, "If biomass residues are transported over a distance of more than 200 kilometers



VALIDATION REPORT

due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected.” Thus, in line with the methodology, leakage due to the transportation of biomass has not been considered. The round trip distance travelled for the biomass transportation shall be monitored and in case of exceeding 200 km, the same shall be accounted as leakage.

The estimated amount of GHG emission reductions from the project is calculated to be 351 880 tCO₂e during the selected fixed 10-year crediting period, resulting in estimated average annual emission reductions of 35 188 tCO₂e.

The baseline and project emissions estimate can be replicated using data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

In summary, the GHG calculations are complete and transparently documented by the spreadsheet /29/ and data accuracy has been verified.

4.7 Environmental Impacts

The proposed project activity contributes to generation of green thermal energy and is expected to benefit the economic development of the region. Thus, the project activity is expected to have only beneficial impacts and no adverse impacts are foreseen. There is no legislative mandate for carrying out an environmental impact assessment study, as biomass power projects are exempt from such requirement. The project has obtained the ‘consent to Operate’ from Karnataka State pollution control board /6/. The project activity is in compliance with all current, applicable legislations.

4.8 Comments by Local Stakeholders

The local stakeholders identified are the local community, Karnataka State Pollution Control Board, the employees of the company. Letter of consent from the identified stakeholders have been provided for verification /16/. The project has not received any adverse comments. The invitation letter /15/ for comments was submitted to DNV. DNV considers that the local stakeholder consultation process is adequate for the proposed project activity.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD version 02 of 24 April 2009 was made publicly available on the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/FG0YEJ4Y65FW2V86SF9TOTJBP0JGY8/view.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 13 May 2009 to 11 June 2009.

No comments were received

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion
About Parties		
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
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. 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, CDM Modalities and Procedures §40a	OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall 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.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. 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
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the	Kyoto Protocol Art. 12.5c,	OK

Requirement	Reference	Conclusion
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.	CDM Modalities and Procedures §43	
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About small-scale project activities (if applicable)		
13. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech 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
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
15. 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
About stakeholder involvement		
16. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
17. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project	CDM Modalities and Procedures §40	OK

Requirement	Reference	Conclusion
design document and comments have been made publicly available.		
Other		
18. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
19. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
20. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
21. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
22. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR/I	Yes, the project is located in Chicksugur, District. Raichur, Karnataka, India. The co-ordinates of the project activity 16°12' N longitude: 77°20' E. The project proponent needs to include details on the physical location to include the near-by landmarks like railways, etc.	CL	OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR/I	The project's system boundary includes the biomass handling facility, biomass fired boiler system (6tph and 10tph), common steam header and piping to the process units. It also includes the Shilpa Medicare Unit consuming the steam generated in the project activity.		OK
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR/I	The project is being developed as a unilateral		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			project with the host country being India. Shilpa Medicare Limited is the project participant from host Party.		
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR/I	The DNA approval letter along with the authorisation to the participating project participants from the DNA of India needs to be provided.	CAR-I	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR/I	The host Party, India has ratified to the Kyoto protocol and established a DNA, the National Clean development Mechanism Authority, Ministry of Environment and Forests and ratified the Kyoto Protocol on 26 August 2002. The voluntary participation in the project needs to be confirmed against DNA approval letters.	CAR-I	OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR/I	The project activity does not involve any funding from Annex I Party.		OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect	/1/	DR/I	Yes, the project design engineering reflects		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
current good practices?			current good practice.		
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR/I	The project uses technology that has been prevalent in India.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	The project proponent is required to demonstrate the provisions made for meeting the training and maintenance needs for the project activity.	CL-2	OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR/I	No, the host country LoA needs to be provided for verification.	CAR-1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR/I	Apart from generating employment during the construction and creating market for rice husk, the project does not create any other benefits.		OK
A.5. Small scale project activity <i>It is assessed whether the project qualifies as small-scale CDM project activity</i>					
A.5.1. 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/	DR/I	Yes, the project qualifies as a small scale CDM project activity, since the installed capacity of the project is less than 45MW thermal and thus in line with type I of the		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			simplified modalities and procedures for small-scale CDM project activities respectively.		
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	/1/	DR/I	The project activity is not a de-bundled component of a larger project activity since the project participants have not registered another project using the same technology within 1 km radius of the project during the past two years.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/	DR/I	The project correctly applies the simplified baseline methodology AMS I.C version 14, proposed for the small-scale project activity under category 1, renewable energy projects.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR/I	Yes, the selected baseline methodology, AMS IC, is applicable to the project activity as it involves the generation of steam utilising the renewable source i.e. biomass – rice husk. The project has a generation capacity of 11.45MW _{thermal} , which is well within the limit of 45MW _{thermal} as per the methodology. The project displaces a part of	CL-3	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>the electricity which would otherwise have been supplied by fossil fuel based generating units.</p> <p>The project proponent is to confirm if he intends to use only rice husk as the biomass or any other types of biomass residues will also be used in the project activity.</p> <p>Furthermore, the PDD is not clear w.r.t if the PP intends to co-fire. Pls confirm</p> <p>Also, the PP shall provide the manufacturer's technical specification for the boiler supplied for the project activity</p>		
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR/I	The baseline scenario has been defined to be coal based steam generation.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR/I	<p>The project proponent has discussed the following 2 alternatives to the project activity:</p> <ul style="list-style-type: none"> • Coal based thermal energy generation • Project activity without the CDM revenues. <p>It needs to be further elaborated as to why the other possible options like residual fuel oil is not considered in the baseline alternatives</p>	CL-4	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			discussion. Also it needs to be clearly explained what type and grade of coal has been considered as the baseline scenario.		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR/I	Yes the baseline scenario has been determined in line with the methodology.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR/I	The clarification raised in section B.2.2 need to be addressed.	CL-4	OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR/I	Yes.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR/I	Some additional data as mentioned in section B.3 below are to be provided.	CL-5	OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR/I	Yes.		OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR/I	The project proponent uses “Non-binding best practice examples to demonstrate additionality for SSC project activities” which is the best practice guideline on	CL-5	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>proving additionality for the project activity. The tool however, for the small scale project activity remains the “<i>Attachment A to Appendix B</i>”. The project proponent is required to make reference to the same.</p> <p>The additionality for the project activity is discussed based on the investment barrier. The PP has carried out an investment comparison analysis for the alternatives identified for the project activity.</p> <p>The alternatives discussed include:</p> <ul style="list-style-type: none"> • Coal based thermal energy generation • Project activity without the CDM revenues. <p>As discussed in section B.2.2, the alternative discussion is not complete.</p> <p>The project proponent has chosen “unit cost of generation of steam” for carrying out a comparison analysis. It is seen that the unit cost of generation for steam is INR 278.05 per tonne of steam for coal based generation as opposed to the INR 326.96 per tonne of steam for biomass based generation. Hence it is concluded that the coal based steam generation would have been the obvious choice and that biomass based steam generation is the less attractive option for the project developer.</p> <p>The assumptions used for the same have been justified, Efficiency of Boiler verified</p>		

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>against the specifications as supplied by the manufacturer for coal based boiler – Zenith Thermal equipment Pvt Ltd while that for the biomass boiler from Micro Dynamics Ltd.</p> <p>However, the PP is required to clarify the following:</p> <ul style="list-style-type: none"> • The investment cost for both coal based and biomass based thermal energy generation not included in the estimation of unit cost of generation. The same needs to be confirmed. • The NCV and the unit cost for coal and rice husk are to be confirmed. Currently it is not clear what grade of coal has been considered for the unit cost estimation. • During site visit it was confirmed that the Shilpa Medicare at Unit I based its thermal energy requirement on coal and other firewood. The PP is required to confirm what grade of coal is being used there and the cost per tonne of coal. Furthermore, the Annual Report – 2007-2008 shows that the unit cost of coal used in the unit was 3730 per tonne of coal. <p>The PP has also carried out a sensitivity analysis by considering a 10% variation in the coal price and the biomass prices. It is noticed that the unit cost of biomass based steam generation is always higher than the</p>		

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			coal based steam generation. A sensitivity analysis to be conducted to see at what point the unit cost of steam generation reached the biomass based steam generation		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR/I	Same as above	CL-5	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR/I	Same as above.	CL-5	OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/	DR/I	<p>The start date of the project activity (date of purchase order for the boiler) is 27 August 2007, which is before the date of validation.</p> <p>The Annual report 2007-08 for Shilpa Medicare shows that the project proponent considered CDM for the biomass based steam generation.</p> <p>DNV was able to confirm against the minutes of the meeting (MoM) by the Board members of Shilpa Medicare Limited of 26 April 2007 that the project proponent considered CDM prior to the starting date of the project activity.</p> <p>However, from the MoM or the Annual report, it is not evident that CDM was the deciding factor in going ahead with the project activity.</p> <p>Furthermore, the PP is required to provide</p>	CL-6	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			the DPR for the biomass based steam generation project (or if already included in the DPR of the new Unit itself). Also, it is seen that CDM was considered in April 2007 and the purchase order was placed in August 2007. However, no action for CDM was taken until August 2008, when the consultant was hired. The PP is required to include the events or progress on the CDM project front in this time gap.		
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	<p>The calculation for project emissions is in line with the approved methodology and has been documented in a complete and transparent manner.</p> <p>The project emissions include the emissions due to fossil fuel consumption (used for start ups and emergency situations).</p>		OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR/I	The project proponent is required to elaborate and justify on the exclusion of the emissions due to electricity consumption in the project activity.	CL-7	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR/I	See comment above.	CL-7	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	<p>The baseline emissions have been estimated in a conservative manner. The efficiency of the baseline unit for thermal energy generation is based on the highest efficiency value provided by 2 of the manufacturer for units with similar specifications. DNV was able to verify the same against the manufacturer specifications provided for 6TPH and 10TPH boilers from Zenith Thermal equipment Pvt Ltd, which shows efficiency of 82% ± 2% and from Micro Dynamics Pvt Ltd, which shows an efficiency of 80% ± 2%. Hence the PP has considered an efficiency of 82% for calculation of baseline estimation.</p> <p>The following details need to be confirmed though:</p> <ul style="list-style-type: none"> • The BE is estimated only considering the operation of the 10 TPH boiler. However the total project capacity is stated to be 16 TPH. Pls confirm why only 10 TPH has been considered and correct accordingly. It 	CL7	

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			is also to be stated as to what the steam requirement for the unit is. Is the requirement only 4 TPH (original coal fired boiler capacity as seen from the PCB clearance). Is the 6 TPH boiler a standby?		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR/I	Yes.		OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR/I	Yes.		OK
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	<p>The leakage due to the use of biomass. The plant does not involve any transfer of the energy generating equipment from another activity. The project takes into account the leakage effect due to the competing use of biomass and the transportation of biomass from the source to the project site.</p> <p>The leakage emissions for the project activity due to the transportation of the biomass to the project site has been stated to be negligible since the same is less than 10%. However, the same is to be justified through data.</p>	CL7	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Furthermore, it is seen that the data is surplus biomass availability study is not based on a survey but a published data in District at a glance 2007-2008. The same is to be provided to DNV for verification.		
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR/I	Yes.		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR/I	Yes.		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR/I	Yes. The project activity is likely to reduce about 25,747 t CO ₂ e annually. The PP is however, required to clarify the issues identified above w.r.t the emission reduction calculation.		OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The monitoring plan has been documented in line with the approved methodology AMS I.C.		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of	/1/	DR/I	The data will be maintained for a period of two years after the end of the crediting		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?			period.		
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR/I	The monitoring of project emissions include parameters like, amount of fossil fuel used in the project activity ($FC_{i,y}$). However, w.r.t the emission factor and the NCV of the fossil fuel used, currently only the details for coal: <i>sub-bituminous coal</i> has been defined. It is to be confirmed what values for the same would be taken in case other type and grade coal or other fuel type is used.	CL-8	OK
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR/I	Yes		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR/I	The fossil fuel used in the project activity is stated to be taken from purchase receipts. However it is to be confirmed how the purchase receipts are sufficient and why the same is not monitored based on the amount used directly. The QA/QC procedures mention the use of meters and the yearly calibration. Description to be clear and detailed.	CL-8	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR/I	See above.	CL-8	OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	These procedures are to be defined.	CL-2	OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR/I	Yes.		OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR/I	These procedures are to be defined.	CL-2	OK
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	These procedures are to be defined. The calibration for the equipments has been defined to be annual calibration. The calibration certificates are to be provided as well.	CL-2	OK
B.9.9. 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/	DR/I	These procedures are to be defined.	CL-2	OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions	/1/	DR/I	The monitoring includes parameters like: <ul style="list-style-type: none"> Net enthalpy of the steam generated from 		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
during the crediting period?			the project activity (TJ) based on <ul style="list-style-type: none"> The temperature, pressure and the total quantity of steam produced by the project activity. 		
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR/I	Yes		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR/I	Yes.		OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR/I	See above.		OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	See above.		OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR/I	Yes.		OK
B.10.7. Is the registration, <i>monitoring, measurement and reporting</i> procedure defined?	/1/	DR/I	These procedures are to be defined.	CL-2	OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	These procedures are to be defined. The calibration for the equipments has been defined to be annual calibration. The calibration certificates are to be provided as	CL-2	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			well.		
B.10.9. 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/	DR/I	These procedures are to be defined.	CL-2	OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR/I	<p>The project proponent is not required to estimate the leakage effects due to competing use of biomass usage since, the latest version of the guidance only requires evaluating the surplus biomass availability <i>ex-ante</i>. The same is to be revised in the PDD.</p> <p>Furthermore, the emissions due to transportation of biomass outside the project boundary are stated to be non-significant. However, the same is to be justified with data and also, the same needs to be monitored to confirm that the same is negligible</p>	CL-9	OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR/I	Yes.		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR/I	Not applicable.		OK
B.12. Monitoring of Sustainable Development Indicators/					

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR/I	Monitoring of the sustainable development indicators are not warranted by the legislation in India.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR/I	See above.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR/I	See above.		OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR/I	Yes. The authority and responsibility have been clearly described		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR/I	The procedures for training of monitoring personnel are to be defined.	CL-2	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can	/1/	DR/I	These procedures are to be defined.	CL-2	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
cause unintended emissions?					
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR/I	Same as above.	CL-2	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR/I	Same as above	CL-2	OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR/I	The start date of the project activity has been defined as the date of the purchase order, 27 August 2007, placed by Shilpa Medicare with Thermax Ltd. The operational lifetime has been confirmed to be 25 years.		OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR/I	The start date of the crediting period has been defined to be 01 July 2009, and the same needs to be revised.	CL-10	OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1. For Small-scale projects					
D.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR/I	No. The laws in India do not require a carrying out an EIA assessment for projects of this scale.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR/I	Yes. DNV was able to confirm all the legal clearance for the project including the consent to establish (COE), consent to operate and the boiler certificates. The PP is however, requested to provide the communication with the pollution control board further to the COE w.r.t change of the plan from coal based boiler to the biomass based boiler. Furthermore, the PP is required to confirm the exact steam requirement of the plant and the reason why the PP switched from a 4 TPH boiler to a 10 + 6 TPH boiler.	CL-11	OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	The project does not create any adverse environmental effects.		OK
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR/I	There are no negative environmental impacts from the project activity. However the handling of ash generated from the project activity needs to be confirmed, along with the evidences for the same.	CL-11	OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR/I	The project developer has contacted the relevant stakeholders to include the pollution control boards, employees and the local community.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	The PP sent out invitation letters to the stakeholders. The invitation to the Gram Panchayat was provided to DNV. The other invitations to be provided to DNV. The PP is also requested to provide all the documented evidence for having contacted the employees and the comments received.	CL-12	OK
E.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/	DR/I	The laws in India do not require a stakeholder consultation process.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR/I	The comments received from the local community representative – the Gram Panchayat was presented to DNV.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR/I	No negative comments received.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2009-0233, rev. 02

Table 2b: Additional requirements checklist for VVM.

A.1. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/1/	DR/I	The LOA is yet to be received from either Party.	CAR-1	OK
A.2. Project design					
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR/I	Yes, the PDD has described the CDM project activity in great detail, with all relevant elements in a transparent and accurate way. However, the PP is required to justify the switch from the 4TPH boiler initially planned to the 10+6 TPH boiler.	CL-7	OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/	DR/I	The construction has already begun at the start of the validation, which was verified on-site. DNV was able to check against the commissioning report from Thermax Limited (the boiler supplier) that the boilers were installed and commissioned on 19 November 2008 for the 6 TPH boiler and 20 November 2008 for the 10 TPH boiler.		OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR/I	The project is considered as a small scale project with emissions higher than 15000 tCO ₂ e annually. An on-site visit was carried out on 19 June 2009.		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR/I	The CDM project activity involves installation of 2 new biomass based steam generations boilers at the project site.		OK
A.3. Project emissions not addressed by the methodology					

* MoV = Means of Verification, DR= Document Review, I= Interview
 CDM Validation Protocol – Report No. 2009-0233, rev. 02

A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/	DR/I	The validation did not identify other project emission or leakage sources which could contribute more than 1% and not mentioned by the methodology. The methodology has sufficiently identified all sources of project emissions and these have been taken into account for the project emission calculations.		OK
A.4. Documentation of baseline emissions					
<ul style="list-style-type: none"> a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 	/1/	DR/I	<ul style="list-style-type: none"> i. Document sources of assumptions and data used in the calculations have properly referenced and stated in the PDD. ii. Documentation used in determining the baseline emissions are correctly quoted and interpreted and have further been provided for review. iii. Refer to (a) iv. Yes. v. The methodology has been correctly applied to identify the baseline scenario. However, some additional documented evidences have been requested as a part of the validation. 	CL-7	OK
A.5. Documentation of the calculations					
<ul style="list-style-type: none"> a. All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced b. All documentation is correctly quoted and 	/1/	DR/I	<ul style="list-style-type: none"> a) Assumptions and data used are listed in the PDD, clearly referenced and relevant. b) The PP is required to present the DPR for the project activity. c) Values used in the calculations are 		OK

<p>interpreted.</p> <p>c. All values used can be deemed reasonable in the context of the project activity</p> <p>d. The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.</p>			<p>deemed reasonable</p> <p>d) The methodology is correctly applied to calculate emission reductions and can be replicated with data provided.</p>		
A.6. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?	/1/	DR/I	<p>The application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.</p> <p>However, the PP is required to present more clarity with respect to the QA/QC for the project activity</p>	CL-2	OK
A.7. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/	DR/I	Please refer to B.3.4.	CL-6	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 01 The DNA approval letter along with the authorisation to the participating project participants from the DNA of India needs to be provided.	A.2.2 A.2.3 A.4.1	PP has applied for the HCA. The same is still awaited.	The letter of approval from DNA of India, dated 1 February 2010 has been provided. CAR 01 is closed.
CAR 02 The PDD needs to be revised as per the revised methodology AMS IC.		The PDD has been revised.	The PDD has been revised as per the methodology AMS-IC version 16. The PDD was webhosted with AMS –IC version 14. OK. CAR 2 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 01 The project proponent needs to include details on the physical location to include the near-by landmarks like railways, etc.	A.1.1	Physical location of the project activity has been incorporated in detail in the Section A.4.1.4. of the revised PDD version 03.	The PDD has been updated to include more details about the physical location of the project site. OK. CL 1 is closed.
CL 02 The project proponent is required to make provisions for meeting the training and maintenance needs for the project activity. Emergencies like fire in storage area can cause unintended emission. The emergency preparedness in such situation needs to be elaborated. The MP does not describe procedures for calibration of instruments to be used. Procedures for calibration must be defined to ensure later verification of CERS though records of calibrations of various instruments have been provided as evidences (The calibration certificates are to be provided as well). The procedures for maintenance of monitoring equipment, monitoring, measurements and reporting, for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation), for dealing with possible monitoring data.	A.3.3	The project proponent has given Thermax the operation and maintenance contract for the boiler who are also the OEM for the boiler. OEM will be imparting training to the plant personnel during the operational phase of the project. The organisation is in the process of implementation of environment management system (ISO 14001) and fire hazard is one of the areas which would be covered under the same. The plant has already considered fire hazard as one of the aspects during design stage of the plant. All the measuring equipment will be calibrated on an annual frequency as per manufacturer's specifications and procedures. The same has been included in the revised PDD. The data acquisition for the project would be done through a dedicated data management system called EffiMax 300. The data would be maintained both in hard as well as soft version for a period of 2 years beyond the end of crediting period.	The boiler supplier, Thermax would provide the required training for the plant personnel. The required management procedures will be incorporated as part of the ISO implementation at the plant. This needs to be checked during the verification stage to ensure that the project activity is included in the scope of the ISO implementation. The procedures and incorporation of the project activity within the scope of ISO implementation needs to be checked at the first verification (refer to FAR 01). Furthermore, the PP has defined the calibration to be in line with the manufacturer specification, however, not less than one year. OK. CL 2 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 03</p> <ul style="list-style-type: none"> - The project proponent is to confirm if he intends to use only rice husk as the biomass or any other types of biomass residues will also be used in the project activity. - Furthermore, the PDD is not clear with respect to if the PP intends to co-fire. - Also, the PP shall provide the manufacturer's technical specification for the boiler supplied for the project activity. 	B.1.2	<ul style="list-style-type: none"> - The project proponent intends to use rice husk only in the boiler system. This is based on the projection of availability of surplus biomass (rice husk) in the region. Since rice husk is obtained from a seasonal crop, its availability may vary from one season to the other and therefore in non season PP will have to purchase rice husk at much higher rate. Even during the lean period the amount of rice husk available would be adequate to run the project plant. - There will not be any co-firing of fossil fuel in the boiler. The same has been incorporated in the revised PDD version 04. - The technical specifications of the boiler is provided. 	<ul style="list-style-type: none"> - Currently the PP only plans on utilising rice husk for the steam generation, since the same is available in abundance. It has been clarified that during the lean season the project activity will continue to use the rice husk. Thus, not usage of fossil fuel combustion in the boiler is involved. - The PDD now clearly states that the plant does not intend to co-fire fossil fuel. - The technical specifications of the boiler have been provided. - The total thermal output of the project activity has been calculated to be 12.35 MWth at 100% capacity utilization factor. <p>OK. CL 03 is closed.</p>
<p>CL 04</p> <ul style="list-style-type: none"> - It needs to be further elaborated as to why the other possible options like residual fuel oil or diesel have not been considered in the baseline alternatives discussion. 	B.2.2 B.2.4	<ul style="list-style-type: none"> • PP had not consider the RFO or Diesel as a fuel option because of there exorbitant price, which is evident from Annexure II in the 	<p>It has been verified from the consent to establish from Karnataka State Pollution Control Board, dated 31 October 2006, that coal based boiler has been considered for the new bulk drug manufacturing industry.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>- Also it needs to be clearly explained what type and grade of coal has been considered as the baseline scenario.</p>		<p>Consent for Establishment under the Air and Water Act issued on 31st Oct, 2006 (No. CFE-EIA/SMCL/EIA-554/2006-2007/213 where they have mentioned a coal based boiler for the upcoming project. Only the other option they have considered was biomass which is currently being undertaken as CDM project activity.</p> <ul style="list-style-type: none"> As per the coal quotation the type of coal was "E Grade" Indian coal, which is a non-coking coal. The use of coal in unit 1 was only to tide over emergency scenario and PP had been using imported coal in Unit I in such exigency. 	<p>In view of the fact that steam generation has been mentioned as coal based boiler given in the consent to established, coal based boiler has been accepted as the baseline for the project activity. Further, it is evident from the consent to establish that in absence of the project activity, coal based boiler would have been installed.</p> <p>It has been verified from the coal quotation during February 2007 that E grade coal would have been used in the baseline coal based boiler. Further it has been verified from the Coal India Limited website that non coking coal is used for heat generation.</p> <p>OK. CL 04 is closed.</p>
<p>CL 05 <i>Additionality:</i></p> <ul style="list-style-type: none"> The project proponent uses "Non-binding best practice examples to demonstrate additionality for SSC project activities" which is the best practice guideline on proving additionality for the project activity. The tool however, for the small 	<p>B.3.1 B.2.6 B.3.4 B.3.2</p>	<ul style="list-style-type: none"> The reference has now been corrected in the revised PDD. 	<p>The PDD has now been revised.</p> <p>Investment comparison analysis has been revised to include all the required parameters. The investment cost of the coal based boilers has been verified from the technical offer from Zenith thermal equipment Pvt Ltd. The investment cost of</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>scale project activity remains the “Attachment A to Appendix B”. The project proponent is required to make reference to the same.</p> <ul style="list-style-type: none"> The investment cost for both coal based and biomass based thermal energy generation not included in the estimation of unit cost of generation. The same needs to be confirmed. The NCV and the unit cost for coal and rice husk are to be confirmed. Currently it is not clear what grade of coal has been considered 		<ul style="list-style-type: none"> The investment cost for both coal based and biomass based thermal energy generation has been considered in Unit cost of energy generation calculation. The values considered were supplied by the Boiler suppliers at the time of decision making and same has been supported by the proposal from Zenith Thermal Equipment Pvt Ltd for the 6 and 10 TPH coal fired boilers, and proposal from Thermax Limited for the 6 and 10 TPH husk fired boilers. The O&M cost had been considered as 5% of the total investment cost as per communication from the boiler manufacturers. The unit cost of steam generation calculation has been revised to take into account the O&M cost and the investment cost associated with the generation of steam. The Unit cost calculation sheet is being provided. The unit cost of rice husk and coal are taken from quotation received from suppliers of rice husk and coal 	<p>the biomass boiler has been verified from the techno commercial offer to Shilpa Medicare by Thermax Limited, dated 7 August 2007. The cost considered has also been assess from the inter office memo on proposal for co generation unit submitted to Board of Director, dated 12 April 2007. Efficiency of the coal based boiler has been considered to be 80% conservatively, which is the minimum value for coal based system, and 82% efficiency of the biomass boiler has been considered which the maximum value for biomass based system provided by the supplier. This has been verified from the technical specifications supplied by boiler supplier at the time of decision making and same value can be found in the techno commercial offer of Thermax Limited, Micro Dynamics Pvt. Ltd. and Zenith Thermal Equipment Pvt. Ltd.</p> <p>The cost of coal and biomass has been considered from the supplier quotation in Feb 2007 and also from the inter office memo on proposal for project activity unit submitted to Board of Director, dated 12 April 2007. The cost of biomass has been considered to be INR 1140/ ton which is the most conservative value among the supplier quotation and is also lower than the cost considered in the proposal for cogeneration</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion									
<p>for the unit cost estimation.</p> <ul style="list-style-type: none">During site visit it was confirmed that the Shilpa Medicare at Unit I based its thermal energy requirement on coal and other firewood. The PP is required to confirm what grade of coal is being used there and the cost per tonne of coal. Furthermore, the Annual Report – 2007-2008 shows that the unit cost of coal used in the unit was 3730 per tonne of coal.A sensitivity analysis to be conducted to see at what point the unit cost of steam generation reached the biomass based		<p>is being provided. PP would have use E-Grade non coking Indian coal in the baseline scenario. PP had used Imported coal in Unit – I in exigency, that’s why the amount was so less and the price was high. This is evident from the following fuel consumption figures for the unit during the financial periods 2006~2007 and 2007~2008. The figures confirm that the coal used therein was insignificant to the total fuel requirement (around 0.8%) and was only used as start-up fuel:</p> <table><tr><th>Year</th><th>Coal ton</th><th>Woodchip ton</th></tr><tr><td>2006-2007</td><td>33.845</td><td>4148.369</td></tr><tr><td>2007-2008</td><td>Nil</td><td>2883</td></tr></table> <p>*Data from annual report 2007-08</p> <p>The project activity however is being implemented in Unit II at Chicksugur which is a new location.</p> <ul style="list-style-type: none">Sensitivity analysis has been conducted on the effect of rise in price of coal on the unit of steam and it is confirmed that even at higher limits of 10% rise in price	Year	Coal ton	Woodchip ton	2006-2007	33.845	4148.369	2007-2008	Nil	2883	<p>unit. The parameters of the investment analysis has been supported by the evidence and revised excel sheet has been provided. NCV of the biomass has been verified from the supplier quotation and also has been verified from the Indiasolar.com website which is a publicly available data source.</p> <p>It has been verified from the annual report of 2006 – 2007 that 33.845 ton of imported coal has been used in emergency, which is around 0.8% of the total fuel requirement. In view of this fact, coal cost as per the supplier quotation has been considered. This has also been verified from the proposal for project activity unit submitted to Board of Director, dated 12 April 2007.</p> <p>Sensitivity analysis of the required parameters: investment cost of biomass boiler and coal boiler, cost of biomass and cost of coal has been performed till the variation where the unit cost of steam generation from biomass equals to the unit cost of steam generation from coal fired boiler.</p> <p>OK. CL 5 is closed.</p>
Year	Coal ton	Woodchip ton										
2006-2007	33.845	4148.369										
2007-2008	Nil	2883										

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
steam generation.		the unit cost of coal the cost of steam would still be lower than that based on biomass. On extrapolation it is observed that only corresponding to an increase in coal price @ 26.8% or a decrease in biomass price @22.8% will make the unit cost of steam generation same from both coal and biomass provided the cost of second fuel (biomass and coal respectively) would remain unchanged. But the coal and biomass quotation received at the time of decision making and in August 2009 shows an increase of coal price only by 10.4% and biomass price by 56.78%. Thus it can't be a likely scenario that in future biomass based steam generation will become a more economical option for PP.	
CL 06: <ul style="list-style-type: none"> DNV was able to confirm against the minutes of the meeting (MoM) by the Board members of Shilpa Medicare Limited of 26 April 2007 that the project proponent considered CDM prior to the starting date of the project activity. 	B.3.4	<ul style="list-style-type: none"> The extracts of meeting have been forwarded for demonstration of CDM consideration in the project. The MOM only registers the outcome of the deliberation at the board level but the seriousness of CDM revenue in the project is demonstrated through the note put 	<p>The minutes of meeting 26 April 2007 has been provided to DNV.</p> <p>It has been verified from the inter office memo to the Board of Director of Shilpa Medicare Limited, dated 12 April 2007 that a comparison of the cost of steam generation from coal boiler and rice husk</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>However, from the MoM it is not evident that CDM was the deciding factor in going ahead with the project activity.</p> <ul style="list-style-type: none"> Furthermore, the PP is required to provide the DPR for the biomass based steam generation project (or if already included in the DPR of the new Unit itself). Also, it is seen that CDM was considered in April 2007 and the purchase order was placed in August 2007. However, no action for CDM was taken until August 2008, when the consultant was hired. The PP is required to include the events or progress on the CDM project front in this time gap. 		<p>for approval. The note clearly demonstrates that the project is not attractive without CDM revenue as compared to the alternative scenario. copy of the note put up for approval to the board along with the cost comparison is presented to the validator.</p> <ul style="list-style-type: none"> The project proponent did not undertake any DPR preparation for the project as it did not require an elaborate project consultancy. All the activities/communication done by the PP to secure CDM has been updated in the Section B.5 of the revised PDD version 03. E-mail communications are being provided for sl. no. 6, 9,11,12,13 & 14 as mentioned in page 18, section B.5 of PDD. Supportive against point number 8 s not available with the PP for objective demonstration and is thus removed from the trail. 	<p>boiler has been conducted. It has been verified from the inter office memo that cost of steam generation from coal is INR 366/ton and from rice husk based boiler, it is INR 438/tonof steam and based on the same, CDM revenue was considered for the project activity, which is not viable without CDM revenue. Thus, it has been concluded that CDM was seriously considered before going ahead with the project activity.</p> <p>It has been clarified that the project activity does not have a DPR.</p> <p>The chronology of the events has been included in section B.5 of the PDD. The evidence for the same has been provided to DNV. It has been verified that the gap between start date of the project, 27 August 2007 and agreement signed with CDM consultant for CDM project consultation, 4 August 2008, is less than 2 year. Thus, as per the “Guidelines on the demonstration and assessment of prior consideration of the CDM” version 3, it has been concluded that continuous and real actions has been taken to secure CDM status for the project activity. Other email communications and evidences have been provided.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			OK. CL 6 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 07: Emission reduction calculation: <u>Project emission:</u> The project proponent is required to elaborate and justify on the exclusion of the emissions due to electricity consumption in the project activity.</p> <p><u>Baseline emission:</u> The BE is estimated only considering the operation of the 10 TPH boiler. However the total project capacity is stated to be 16 TPH. PP is requested to confirm why only 10 TPH has been considered and correct accordingly.</p> <p>Furthermore, the PP is required to confirm the exact steam requirement of the plant and the reason why the PP switched from a 4 TPH boiler to a 10 + 6 TPH boiler.</p>	<p>B.4.2 B.4.3 B.5.1 B.6.1</p>	<ul style="list-style-type: none"> • <u>Project Emission:</u> Equipments installed due to the project activity would anyway have been installed in the baseline coal based steam generation unit. So, there will be no extra GHG emission due to the project activity and thus it has not been considered in the PDD. • <u>Baseline Emission:</u> The BE was estimated considering the present steam requirement (which is 10TPH) of the process plant. The projected future steam demand of the process plant considering capacity enhancement would be around 14 TPH. Thus the version 03 of the PDD has been updated by considering 14TPH steam generation. Revised spreadsheet with emission reduction calculation has been provided to the validator The project is implemented in Unit II. The steam requirement of the process will be around 10TPH. This may go up to 14 TPH in future 	<p>The electricity consumed in the project activity is expected to be same as the amount that would have been used in the baseline scenario and hence it is deemed conservative that this is excluded for the calculation purposes.</p> <p>The PDD has been revised to calculate the baseline emissions assuming that the plant would run at 14 TPH capacity. The revised excel sheet has been provided. Due to the increase in estimated plant load factor from 62.5% to 87.5%, the emission reduction has increased from 25 747 tCO₂ to 35 188 tCO₂ per year.</p> <p>The project activity is implemented in a entirely new facility, unit II and is a ggreen field project activity. It has been verified</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p><u>Leakage:</u> The leakage emissions for the project activity due to the transportation of the biomass to the project site has been stated to be negligible since the same is less than 10%. However, the same is to be justified through data.</p>		<p>due to capacity expansion. Initially the consent was taken for a 4TPH boiler. Later, the PP decided to opt for 10 + 6TPH boiler system in order to account for future expansion and for maintaining operational flexibility during turn down conditions. Therefore, the consent was revised to include 10+6TPH boilers.</p> <p>The allotment of consent for (10+6) TPH boiler system is demonstrated through the combined consent order number PCB 46 HPI 08/2008-09/453 dated 21 November 2008 is enclosed herewith</p> <p>Letter ref number SML100%EOU/42/08-09 to PCB on submission of additional fee against the additional capacity is also enclosed herewith.</p> <ul style="list-style-type: none"> • <u>Leakage:</u> As per EB 51 para 46 (d) “leakage from biomass transportation is to be considered only for cases where biomass is transported over a distance of 200 km or more.” So, for ex ante estimation, 	<p>during the site visit that there was no existing boiler at the plant facility. The total steam requirement of the facility is 10 TPH and which may increase up to 14 TPH in future if there is any capacity expansion of the facility. Keeping in view the steam requirement, operational flexibility, 16 TPH of boiler capacity has been opted. The clearance from Karnataka Pollution Control Board for 16TPH boiler and expansion of capacity, dated 21 November 2008, has been provided to DNV.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>Furthermore, it is seen that the data of surplus biomass availability study is not based on a survey but a published data in District at a glance 2007-2008. The same is to be provided to DNV for verification.</p>		<p>leakage emission has been considered zero, based on the biomass surplus availability report, which proves biomass is available in plenty within a distance of 200 Km radius around the project site. However, for ex post calculation, emission due to biomass transportation would be monitored and only be considered if the average distance for biomass transportation is greater than 200 Km.</p> <ul style="list-style-type: none"> Scanned copy of District at a glance 2007-2008 is being provided to show the excess availability of paddy (rice) husk. 	<p>The PDD has been revised to AMS IC version 16. As per the methodology, in case the biomass residue is transferred within 200 km of radius, the leakage due to the same can be neglected. The reassessment of the biomass availability shall be conducted in the biomass residue is transported from outside 200 km radius. The distance covered for the biomass residue transport shall be monitored during the crediting period.</p> <p>The biomass assessment report has been provided to DNV.</p> <p>OK. CL 07 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 08:</p> <ul style="list-style-type: none"> W.r.t the emission factor and the NCV of the fossil fuel used, currently only the details for coal: <i>sub-bituminous coal</i> has been defined. It is to be confirmed what values for the same would be taken in case other type and grade coal or other fuel type is used. The fossil fuel used in the project activity is stated to be taken from purchase receipts. However it is to be confirmed how the purchase receipts are sufficient and why the same is not monitored based on the amount used directly. 	<p>B.9.2 B.9.3</p>	<ul style="list-style-type: none"> The PP does not plan to use fossil fuels. However a provision has been kept in the PDD to account for emissions from fossil fuel usage if at all during a future point in time due to exigency. In line with the guidance “Tool to Calculate Project and Leakage emissions from fossil fuel combustion” the emission factor and NCV are taken from NATCOM communications of host country and it is confirmed that this would be only type of coal used in the project boundary. Weigh Bridge at plant will directly measures the amount of coal (if any) procured. The same can be crosschecked with the purchase invoices for QA/QC checks. 	<ul style="list-style-type: none"> The PP has confirmed that they would use only non-coking Indian coal and the NCV values as stated in the NATCOM communications from India has been considered. Further it has been verified from the Coal India Limited website that non coking coal is used for heat generation. The PDD has now been revised to clearly state that the fossil fuel used if any shall be monitored through the weigh bridge installed at the plant. <p>OK. CL 08 is closed.</p>
<p>CL 09</p> <p>The project proponent is not required to estimate the leakage effects due to competing use of biomass usage since the latest version of the guidance only requires evaluating the</p>	<p>B.11.1</p>	<ul style="list-style-type: none"> The ex-ante evaluation of surplus biomass availability has been revised in the section B.6.2 of the revised PDD Version 03. 	<p>The PDD has been revised in line with the guidance for evaluating surplus biomass availability.</p> <p>The PDD has been revised to AMS IC</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>surplus biomass availability <i>ex-ante</i>. The same is to be revised in the PDD.</p> <p>Furthermore, the emissions due to transportation of biomass outside the project boundary are stated to be non-significant. However, the same is to justified with data and also, the same needs to be monitored to confirm that the same is negligible</p>		<ul style="list-style-type: none"> • Provision for ex-post monitoring of leakage emissions due to transportation of biomass outside the project boundary has been incorporated in the section B.7.1. of the revised PDD Version 03.Distance will be estimated from supplier data- actual distance traveled by the transportation media (truck etc.). • Leakage due to ash disposal has not been considered keeping in mind the fact that ash disposal will be the same in baseline as well as in the project scenario. 	<p>version 16. As per the methodology, in case the biomass residue is transferred within 200 km of radius, the leakage due to the same can be neglected. The reassessment of the biomass availability shall be conducted in the biomass residue is transported from outside 200 km radius. The distance covered for the biomass residue transport shall be monitored during the crediting period.</p> <p>The biomass assessment report has been provided to DNV.</p> <p>OK. CL 09 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 10 The start date of the crediting period has been defined to be 01 July 2009, and the same needs to be revised.	C.1.2	Same has been taken care in the revised PDD version 04.	The start date of the crediting period has been revised adequately. OK. CL 10 is closed.
CL 11 The PP is requested to provide the communication with the pollution control board further to the COE w.r.t change of the plan from coal based boiler to the biomass based boiler. Furthermore, the handling of the ash generated from the project activity needs to be confirmed, along with the evidences for the same.	D.1.1	<ul style="list-style-type: none"> Communication with the pollution control board further to the COE w.r.t change of the plan from coal based boiler to the biomass based boiler, Letter no.: SML100%EOU/42/08-09 dated 03rd November, 2008 is being provided. The company has installed ash handling system consisting of following. The ash is collected from the following points. <ol style="list-style-type: none"> 1) Boiler back chamber 2) Air preheater 3) Multicyclone dust collector. 4) Pulse set bag filter The ash from all these points is collected through the rotary valves by concealed screw conveyer and is transferred to a silo by the bucket elevator & collected in the truck through the conveyer for disposal to brick 	Letter to the pollution control board and the clearance from the pollution control board has been provided to DNV. The ash generated is collected and used in the brick industry. It has been demonstrated that coal based boiler would have been used in the baseline scenario. OK. CL 11 is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>industry.</p> <ul style="list-style-type: none"> Leakage due to ash disposal has not been considered keeping in mind the fact that ash disposal will be the same in baseline as well as in the project scenario. 	
<p>CL 12:</p> <p>The PP sent out invitation letters to the stakeholders. The invitation to the Gram Panchayat was provided to DNV. The other invitations to be provided to DNV.</p> <p>The PP is also requested to provide all the documented evidence for having contacted the employees and the comments received.</p>	E.1.2	<p>Stakeholder consultation invitation letter to the employees of SML was displayed on the notice board at SML project. The copy of the same is being provided.</p> <p>The reply from the employees of SML is also being provided.</p>	<p>Notice for invitation of the comments, dated 12 January 2009, has been provided to DNV.</p> <p>OK. CL 12 is closed.</p>
<p>FAR 01</p> <p>The procedures and incorporation of the project activity within the scope of ISO implementation needs to be checked at the first verification.</p>		<p>The project proponent has given Thermax the operation and maintenance contract for the boiler who are also the OEM for the boiler. OEM will be imparting training to the plant personnel during the operational phase of the project. The organisation is in the process of implementation of environment management system (ISO 14001) and fire hazard is one of the areas which would be covered under the same. The plant has already considered fire hazard as one of the aspects during design stage of the plant.</p>	<p>It has been addressed in the PDD that the operation and maintenance procedure will be conducted as per ISO 14001 procedure as implemented by the organisation. This needs to be checked during the first verification period.</p> <p>OK.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		The data acquisition for the project would be done through a dedicated data management system called EffiMax 300.	

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Mathsy Kutty

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<i>GHG Auditor:</i>	<i>Yes</i>				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>	Jan 2009				
<i>Hydro power</i>	Jan 2009				
<i>Renewables</i>				Jan 2009	Jan 2009
<i>Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>				Jan 2009	Jan 2009
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
<i>Landfill gas</i>					
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Renewables</i>		Sept 2009			Jan 2009
<i>Other renewable</i>		Sept 2009			
<i>Biomass</i>	Jan 2009	Jan 2009	Nov 2009		Jan 2009
<i>Grid connection of isolated system</i>		Sept 2009			
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>		Sept 2009			
<i>Efficiency of thermal power plants</i>		Sept 2009			
<i>Coal mine methane</i>					
<i>Fuel switch</i>		Sept 2009			
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>	Jul 2009	Jul 2009	Nov 2009		
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>		Sept 2009			
<i>CO₂ recovery</i>		Sept 2009			
<i>Transport</i>					
<i>Non-renewable biomass</i>		Sept 2009			Aug 2009
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 1 September 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Sharmistha Shome

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Knowledge</i>	<i>Sector Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Hydro power</i>					
<i>Renewables Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 4 November 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Service



CERTIFICATE OF COMPETENCE

Andrea Leiroz

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas		Sept 2009			
Hydro power	Jan 2009	Jan 2009			
Renewables Wind power		Sept 2009			July 2009
Other renewable		Sept 2009			
Biomass	Jan 2009				June 2010
Grid connection of isolated system		Sept 2009			
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management	Jan 2009	Jan 2009			
Waste / wastewater treatment		Sept 2009			
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal		Sept 2009			
CO ₂ recovery					
Transport					
Non-renewable biomass		Sept 2009			
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 June 2010

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas	Jan 2009				
Hydro power	Jan 2009	Sept 2009			
Renewables	Jan 2009	Jan 2009			Jan 2009
Other renewable		Sept 2009			
Biomass	Jan 2009				Aug 2009
Grid connection of isolated system		Sept 2009			
Cement					Aug 2009
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009		Jan 2009	Aug 2009
Efficiency of thermal power plants		Sept 2009		Jan 2009	Aug 2009
Coal mine methane					
Fuel switch		Sept 2009		Jan 2009	Aug 2009
Manure management					
Waste / wastewater treatment	Jan 2009				
Energy efficiency	Jan 2009	Jan 2009		Jan 2009	Aug 2009
N ₂ O		Sept 2009			
HFCs	Jan 2009	Jan 2009	Nov 2009		Aug 2009
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery		Sept 2009		Jan 2009	Aug 2009
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 1 September 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services