



VALIDATION REPORT

26 MW BIOMASS (COGENERATION) BASED POWER GENERATION PROJECT ACTIVITY IN INDIA

REPORT No. 2006-9099

REVISION No. 02

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2006-08-11	Project No.: 20069099
Approved by: Einar Telnes Director	Organisational unit: DNV Certification Ltd, International Climate Change Services
Client: SCM Sugars Limited	Client ref.: Mr. RamaKoteshwara Rao Director

DET NORSKE VERITAS
CERTIFICATION LTD

Palace House
3 Cathedral Street
London SE19DE
United Kingdom

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “26 MW Biomass (Cogeneration) based Power generation Project activity” in India 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 and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

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

In summary, it is DNV’s opinion that the project, as described in the project design document of version 04 dated 28 December 2006 meets all relevant UNFCCC requirements for the CDM all related host country criteria and correctly applies the approved baseline and monitoring methodology ACM0006 version 04. Hence, DNV requests the registration of the “26 MW Biomass (Cogeneration) based Power generation Project activity” as CDM project activity.

Report No.: 2006-9099	Subject Group: Environment	Indexing terms	
Report title: “26 MW Biomass (Cogeneration) based Power generation Project activity” in India		Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
			Market Sector
Work carried out by: Astakala Vidyacharan, Michael Lehmann, K.Venkata Raman		Process Industry	
Work verified by: Chandrashekara Kumaraswamy		<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit <input type="checkbox"/> free distribution within DNV after 3 years <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution	
Date of this revision: 2007-01-16	Rev. No.: 02	Number of pages: 11	
© 2002 Det Norske Veritas AS All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.			



<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION	5-1
1.1 Validation Objective	5-1
1.2 Scope	5-1
1.3 Description of Proposed CDM Project	5-1
2 METHODOLOGY	5-2
2.1 Review of Documents	5-4
2.2 Follow-up Interviews	5-4
2.3 Resolution of Clarification and Corrective Action Requests	5-4
2.4 Internal Quality Control	5-5
3 VALIDATION FINDINGS	5-5
3.1 Participation Requirements	5-5
3.2 Project Design	5-5
3.3 Project Baseline	5-6
3.4 Additionality	5-7
3.5 Monitoring Plan	5-8
3.6 Calculation of GHG Emissions	5-9
3.7 Environmental Impacts	5-9
3.8 Comments by Local Stakeholders	5-9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS.....	5-9
5 VALIDATION OPINION	5-10
REFERENCES.....	5-11
Appendix A Validation Protocol	
Appendix B Competence Certificates	

***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KPTCL	Karnataka Power Transmission Corporation Limited
KREDL	Karnataka Renewable Energy Development Limited
kWh	Kilo Watt hour
MNES	Ministry on Non-Conventional Energy Sources
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
MW	Mega Watt
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
SCMSL	SCM Sugars Limited
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

SCM Sugars Limited has commissioned Det Norske Veritas Certification Ltd (DNV) to validate the “26 MW Biomass (Cogeneration) based Power generation Project activity” (hereafter called “the project”) in India. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

K. Venkata Raman	DNV India	Team Leader, CDM Validator
Astakala Vidyacharan	DNV India	GHG auditor
Michael Lehmann	DNV Norway	Sector Expert
Chandrashekara Kumaraswamy	DNV India	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0006 version 04. The validation team has, based on the recommendations in the Validation and Verification Manual / 4/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 Description of Proposed CDM Project

The project activity is a 26 MW (gross) capacity green field grid connected cogeneration power project. The project was commissioned in June 2004. The project utilises bagasse generated in the captive sugar mill as a main fuel and supplements this with other available biomass residues like cane trash, coconut fronds, wood shavings etc. The project also co-fires coal. The project uses a double extraction cum condensing type turbo generator coupled with a travelling grate technology high pressure boiler capable of firing multiple fuels. The boiler has a steam generation capacity of 100 tones per hour at a pressure of 87 kg/cm² and a temperature of 515⁰C.



The steam requirement for the sugar mill is met from the extracted steam from the turbine of the co-generation plant. The sugar mill has a cane crushing capacity of 3500 TPD, with a total of 340 operative days (310 days of season and 30 days of off season). It will export approximately 123751 MWh during the season and 10974 MWh during the off-season to the Karnataka power transmission corporation limited (KPTCL) grid. All the bagasse (biomass residue) generated in the sugar plant will be utilised along with other biomass, as stated above. The technology used in the project activity is indigenous.

The main objective of the project is to reduce anthropogenic GHG emissions by displacing fossil fuel based power generation in the southern regional grid. The project thereby helps in reducing the power deficit in the Karnataka state, and contributes towards sustainable development.

Total estimated GHG emissions due to the project activity are expected to be on an average 40 246 tonnes of CO₂ per year during ten years of chosen crediting period.

2 METHODOLOGY

The validation consists of the following three phases:

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

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual / 4/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

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

The completed validation protocol for the “26 MW Biomass (Cogeneration) based Power generation Project activity” is enclosed in Appendix A to this report.

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

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

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



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	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.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	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.

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The project design document/ 1/ version 02 dated 05 June 2006 submitted initially, a final version 04 dated 28 December 2006, and additional background documents related to the project design and baseline / 3/ were reviewed as a part of validation.

2.2 Follow-up Interviews

During the period of 4-5 August 2006, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of SCM Sugars Limited were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
M/s. SCM Sugars Limited	<ul style="list-style-type: none"> ➤ Determination of project additionality and ascertaining that CDM was considered during the project conceptualisation. ➤ Clarifications on establishment of baseline, monitoring plan and emission reduction calculations. ➤ Resources, training needs and procedures for operation and maintenance. ➤ Monitoring methodology. ➤ Environmental consents
Local fertilisers/cement seller – Koppa village	<ul style="list-style-type: none"> ➤ Impact on his due to project ➤ Community development due to project activity
Village President – Maraliga –neighbouring village	<ul style="list-style-type: none"> ➤ Job opportunities ➤ Impact on local environment & benefits due to project ➤ Availability of biomass in the local region
Milk Union President Hurugalawadi – neighbouring village	<ul style="list-style-type: none"> ➤ Job opportunities ➤ Community reaction to project ➤ Biomass availability
Local administrators	<ul style="list-style-type: none"> ➤ Revenue to local community ➤ Power condition in the local areas due to project
Retd. teacher Abalavadi - Village	<ul style="list-style-type: none"> ➤ Local impression on the project ➤ Job opportunities
Biomass Suppliers	<ul style="list-style-type: none"> ➤ Impact on their business ➤ Indirect job opportunities

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The corrective action requests and clarifications raised by DNV Certification Ltd., presented to the project participants



in DNV's draft validation report of 11 August 2006 (rev. 01) were resolved during communications between the client and DNV.

To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, SCM Sugars Limited decided to revise the PDD and resubmitted the PDD as version 04 on 28 December 2006. After reviewing the revised PDD, DNV issued this final validation report and opinion.

2.4 Internal Quality Control

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

3 VALIDATION FINDINGS

3.1 Participation Requirements

The project is being proposed as a unilateral activity by SCM Sugars Limited. The DNA of India approved the project on 21 November 2005 / 2/. The host country India meets all the participation requirements.

The project is expected to contribute to sustainable development through increased generation of employment for transportation of additional biomass and improvement of infrastructure facilities like electricity distribution and roads in the surrounding communities. The DNA of India has provided the confirmation that the project assists in achieving sustainable development/ 2/.

3.2 Project Design

The project has a rated generation capacity of 26 MW and aims to export any surplus power to Karnataka state electricity grid which forms a part of the southern regional grid of India. The project is connected to KPTCL grid through 66/11KV substation which is situated around 2.5 km from the project site.

The technology used is available in India and no transfer of technology is envisaged. The project consists of 26 MW generation set coupled with a matching travelling grate technology boiler having a steam generation capacity of 100 tones per hour at of 87 kg/cm² pressure and 515⁰C temperature.

The co-generation project meets the steam and power requirements of the sugar mill and exports surplus power to the connected grid. The project results in reduction of GHG emissions by capacity addition to the grid with clean power. The project uses a high pressure configuration boiler, and has a steam consumption ratio of 5.4 kg steam/kWh generation against the normal (with lower pressure steam system) steam consumption of 6.9 kg steam/kWh.



The project implementation commenced on 11 December 2002 with a letter of intent for supply, transportation, erection and commissioning of steam turbine generator issued by SCM Sugars Limited to Bharath heavy electricals limited (BHEL), New Delhi, India.

The expected life time of the project is estimated around 20 years and a fixed crediting period of ten years has been chosen with the starting date of crediting period as 1 July 2004. The project participant applied in April 2003 for a new methodology (NM011-<http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?OpenRound=1&OpenNM=Nm0011&cases=C#NM0011>), which was rejected by the Executive Board. The project then applied the ACM0006 methodology and DNV was requested to validate the project in October 2005. The revised PDD, which applies ACM0006 version 04 was submitted to DNV in June 2006 and was web hosted for public comments. Since the project participant had proposed for a new methodology as early as 2003 and the validation request was signed in October 2005, the project is deemed eligible as a prompt start project.

The commissioning date of the project activity (30 June 2004) has been confirmed by the letter of synchronisation of the plant with KPTCL grid system.

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

3.3 Project Baseline

The project correctly applies the approved baseline methodology ACM 0006 version 04, titled “consolidated baseline methodology for grid –connected electricity generation from biomass residues” as the project activity is grid connected and a biomass residue fired co-generation plant.

The project activity scenario is the installation of a new biomass power generation plant at a site where no power generation occurs in the baseline.

The alternatives considered for the determination of baseline scenario include alternatives for power, biomass and heat. Scenario 4 of ACM 0006 has been adopted for establishing the baseline scenarios:

Power generation scenario:

Option P2: Installation of power plant, fired with the same type of biomass but with a lower efficiency of electrical generation (an efficiency that is common practice in the relevant industry sector)

Option P4: The generation of power in existing and/or new grid-connected power plants.

Heat generation scenario:

Option H2: The installation of co-generation power plant, fired with the same type of biomass but with a different efficiency of heat generation (an efficiency that is common practice in relevant industry sector)

Biomass use scenario:

Option B2: The biomass would have been used for heat and/or electricity generation at the project site.



The baseline considered is in line with the methodology and is that in the absence of the project activity a new biomass based co-generation plant (reference plant) would be installed at the same site with the same thermal capacity but with a lower efficiency than the project plant. This is deemed acceptable as the common practice in the sugar mills of Karnataka region is to have boilers operating at lower pressures up to 45 kg/cm², as against the project activity of boiler operating at 85 kg/cm² pressure. In the absence of the project plant, the power generated by the project would otherwise have been generated by using the reference plant and partly drawn from power plants in grid. The heat generated by the project plant would in the absence of the project activity be generated in the reference plant.

The selection of reference plant has been done in line with the methodology. The efficiency ($\epsilon_{el, \text{reference plant}}$) of reference plant with same thermal firing capacity and with specific steam consumption of 6.9 kg/kWh power generation is established to be 0.3013 kWh/kg of bagasse fired, which is equivalent to 0.11405 MWh_{el}/MWh_{biomass}, (calculated as per the methodology), based on the supplier's information.

The baseline emission factor for the southern regional grid is established *ex-ante* based on approved methodology ACM002 using a combined margin approach. The weighted average of the "operating margin" and the "build margin" emission coefficient for southern regional grid of India has been estimated to be 0.8451 kg CO_{2e} / kWh. The "operating margin" emission factor has been estimated based on the "simple OM" approach as the low cost / must run plants constitute less than 50% of the generation of southern regional grid. For OM calculation the vintage data for the years 2002~2003, 2003~2004 and 2004~2005 has been used and operating margin emission factor is evaluated to be 1.06958 t CO₂/ MWh. For the build margin, the 20% most recently installed plants have been accounted for, in terms of electricity generation. The build margin emission factor has been evaluated to be 0.6205 t CO₂/MWh. The completeness of the set of power plants as well as the correctness of the reported fuel consumption and electricity generation data has been verified. All data has been sourced from data published by the central electricity authority (CEA).

3.4 Additionality

Additionality has been addressed through the use of "The tool for the demonstration and assessment of additionality", Version 02, dated 28 Nov 2005.

STEP 0: Incentive from CDM was seriously considered in the decision to proceed with the project activity. This has been evidenced through:

- a) Official communication letter dated 01 February 2002 between Chief executive and the Executive director of SCM Sugars Limited.
- b) Submission of a new methodology to UNFCCC- Methodology Panel (request NM011) for approval during April 2003. The new methodology was not accepted and was graded C.

Alternatives to the project: The project activity has only one alternative, which is installation of a new co-generation power plant of lower efficiency using same quantity of biomass. The alternative identified is in compliance with all prevailing laws and there is no legal compulsion or mandatory requirement for the implementation of the project.



Investment analysis: Not opted by the project.

Barrier Analysis: The project demonstrates additionality through the existence of prevailing practice, investment and technological barriers.

DNV could verify through the letter of confirmation from Karnataka renewable energy development limited (KREDL), a nodal agency for MNES in state of Karnataka stating that the project is the first of its kind with a high pressure rating of 87 kg/cm^2 to be implemented in the state. This also confirms that the project is first of its kind in the relevant sugar industries sector in the Karnataka state. It was confirmed that the low penetration of the technology, coupled with the high investment costs compared to the conventional pressure systems also represented technological risks and barriers to the project activity. Additional costs towards training of the operational and maintenance personnel are also barriers faced by SCMSL. These risks are deemed appropriate only to the proposed project activity and not to the baseline scenario.

The IRR for the project investment was verified to be 13.54% without CDM revenues, which improves to 17.55% with CDM revenues.

Common practice analysis: DNV was able to verify through official website of MNES and KREDL and also through the letter of confirmation from KREDL that the project with a higher pressure rating of 87 kg/cm^2 is first of its kind in state of Karnataka and only the third in India at the time the project was conceptualised.

The approval and registration of the project as a CDM activity will cover for uncertainties, in addition to encourage the adoption of cleaner technologies. In conclusion, it is deemed likely that the project activity would not have been implemented in the absence of the CDM.

3.5 Monitoring Plan

The project applies the approved consolidated monitoring methodology ACM0006 version 04, "Consolidated monitoring methodology for grid-connected electricity generation from biomass residues". The project also applies ACM0002 ("Consolidated baseline methodology for grid-connected electricity generation from renewable sources") for calculation of southern grid emission factor.

The proposed monitoring methodology adopted is applicable and justified as the project activity is a green field co-generation project using bagasse (biomass residue) as a main fuel and is grid connected.

The monitoring plan adequately addresses all necessary parameters for monitoring and reporting of emission reductions due to the project activity.

The monitoring plan adequately addresses all the necessary parameters required for the estimation of emission reductions and all such critical data are either measured or calculated and archived for a period of two years after the crediting period.

Emission factor for southern grid is calculated ex-ante using the combined margin approach as referred in ACM0002.



The monitoring plan provides for monitoring leakages caused by transportation of biomass. The parameters associated with leakage determination have been verified with data from the transporters.

Calibration and maintenance of process instrumentation including electricity meters are also in line with the approved monitoring methodology and are governed by established procedures of organisation.

Documentation have been reviewed and revised to cover issues such as internal audit, performance review, and corrective actions pertaining to co-generation activity.

While the senior general manager (co-gen.) is responsible for project management, the CDM team responsible for recording and maintenance of the data monitored.

3.6 Calculation of GHG Emissions

The calculation of GHG emissions has been done as per ACM0006, version 4. All aspects related to direct and indirect emissions have been addressed in a transparent manner.

Direct online emissions are restricted to the use of coal in the boiler, when used as a supplementary fuel and transportation of biomass which occurs from within 250 km radius of the co-generation plant. The emissions due to usage of coal and transportation of biomass will be estimated ex-post and deducted as project emissions.

The project is expected to result in reduction of 40 246 of t CO₂ per year during the chosen fixed ten years crediting period.

DNV has verified all the factors and calculations and confirm the reasonableness of the forecasted emission reductions.

3.7 Environmental Impacts

Though there are no mandatory requirements to conduct an environmental impact study for such projects, SCM Sugars Limited has initiated EIA and no adverse environmental impacts are foreseen due to the project activity. SCM Sugars Limited has also obtained the relevant air and water consents from the State Pollution Control Boards for its continued activity.

3.8 Comments by Local Stakeholders

While a formal stakeholder process is not mandatory for this type of projects under Indian environmental regulations, SCM sugars limited has identified local community, statutory and regulatory bodies, own employees as key stakeholders. Through meetings and direct interactions stakeholders were consulted on socio-economic impacts of project activity.

Interactions with stakeholders were evidenced and it has been confirmed that no adverse comments were received.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 02 of 05 June 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were



through the CDM website invited to provide comments during a 30 days period from 14 June 2006 to 13 July 2006. No comments were received during the period.

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “26 MW Biomass (Cogeneration) based Power generation Project activity” in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The project has been proposed as a unilateral activity by SCM Sugars Limited. India as a host country fulfils the relevant participation criteria for the CDM and has approved its voluntary participation in the project. The DNA of India confirmed that the project assists in achieving sustainable development through its letter dated 21 November 2005.

The project correctly applies ACM0006 version 04 “Consolidated baseline methodology for grid connected electricity generation from biomass residues”.

The validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards India.

By using high configuration boiler technology, project generates additional electricity with same thermal firing capacity as baseline scenario, which will displace equivalent grid electricity.

The project results in reductions of CH₄/CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 40 246 t CO_{2e} per year over the selected 10 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.

In summary, it is DNV’s opinion that the “26 MW Biomass (Cogeneration) based Power generation Project activity” in India, as described in the PDD version 04 28 December 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0006. DNV thus requests the registration of the project as a CDM project activity.



REFERENCES

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

- / 1/ SCM Sugars Limited CDM PDD “26 MW Biomass (Cogeneration) based Power generation Project activity” in India version 02 dated 5 June 2006 and version 04 dated 28 December 2006.
- / 2/ DNA of India, Host country approval letter dated 21 November 2005
- / 3/ Detailed baseline calculation excel sheet

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

- / 4/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- / 5/ ACM0006 Approved methodology version 04 –“ consolidated baseline methodology for grid connected electricity generation from biomass residues”
- / 6/ IPCC: *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. 2000

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- | | | |
|------|---|---|
| / 7/ | Mr. K. Ramakoteswara Rao, Executive Director, | SCM Sugars Limited |
| | Mr. S. Basavaiah | Chief Executive SCM Sugars Limited |
| | Mr. Dharma Lingam | Sr. General Manager SCM Sugars Limited |

- o0o -

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK	Written approval from the DNA of India dated 21 November 2005. The project is proposed as a unilateral project.
5. 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	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. 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	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	The project is proposed as a unilateral project.

Requirement	Reference	Conclusion	Cross Reference / Comment
not counted towards the financial obligations of these Parties.			
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Indian DNA for the CDM is the National Clean Development Mechanism Authority under the Ministry of Environment & Forests
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	India ratified the protocol on 26 th August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	Annex I Party has not been identified yet	The project is proposed as a unilateral project
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	As Above	The project is proposed as a unilateral project
12. 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	Table 2, Section G
13. 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	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	Approved Methodology ACM0006 has been applied.	Table 2, Section B.1.1 and D.1.1

Requirement	Reference	Conclusion	Cross Reference / Comment
15. 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, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	OK	The PDD was be made publicly available on www.dnv.com/certification/climatechange and Parties, stakeholders and NGOs will through the CDM website be invited to provide comments during the 30 day period from 14 June 2006 to 13 July 2006. No comment was received.
17. 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	Table 2, Section B.2
18. 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	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	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 (geographical) boundaries clearly defined?	/ 1/ / 7/	DR I	The project activity – 26 MW biomass co-generation power project at SCM sugars Limited is a green field project started along with sugar plant located within the existing premises at SCM Sugars Limited at Koppa, Mandya District, Karnataka state, India, at a latitude of 12°42' N and longitude of 76°59' E.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/ 1/ / 7/	DR I	The projects system boundaries are restricted to the source of biomass, co-generation plant and its auxiliaries. However the transportation of biomass and grid to which the generated power is being evacuated is not clearly addressed and included in the project boundary.	CL1	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.2. 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.2.1. Does the project design engineering reflect current good practices?	/ 1/	DR	Yes. The project design and engineering reflects good practice through the installation and operation of a high efficiency boiler at 87 kg/cm ² with enhanced thermal efficiency.		OK
A.2.2. 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/ / 7/	DR I	The project uses a high pressure configuration boiler which increases thermal efficiency when compared to baseline scenario.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/ 1/	DR	It is unlikely that the project technology will be substituted by other more efficient technologies during the crediting period of the project activity.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/ 1/	DR	The project will require minimal additional training and maintenance efforts, as the technology is commonly used in the sector.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/ 1/	DR	Although the project documentation does not detail provisions for training and maintenance, for reasons indicated in A.2.4. it is considered acceptable.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/ 1/	DR	Though as per the Ministry of Environment & Forests, Government of India, there is no requirement stipulated for an Environment Impact Assessment for such developmental projects within an industrial facility, SCM sugars has conducted an EIA to the project facility along with the main sugar plant.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/ 1/	DR	DNA of India has approved the project with letter dated 21 November 2005.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/ 1/	DR	Yes, the project is in line with Government of India's indicators for sustainable development for CDM projects, also has an approval of DNA of India.		OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/ 1/ / 7/	DR I	Yes the project is likely to reduce GHG emissions through the avoidance of coal consumption apart from encouraging use of better technologies.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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. Is the baseline methodology previously approved by the CDM Executive Board?	/ 1/	DR	The project applies the approved baseline methodology ACM0006/ Version 04 - "Consolidated baseline methodology for grid-connected electricity generation from biomass residues".		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/ 1/	DR	<p>The project is a biomass residue fired co-generation activity, using Bagasse as predominant fuel, installed as a green field project. The project adopts high pressure boiler resulting in enhanced energy efficiency than other conventional boilers used in the sector.</p> <p>The project activity fulfils the following applicability criteria as stipulated in ACM 0006:</p> <ul style="list-style-type: none"> - The project uses bagasse, which is termed biomass residue as a predominant fuel along with other biomass available in the region like wood chips, cane thrashes, wood shavings, and coconut fronds. The project also co-fires coal as an alternate 		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			fuel. - the implementation of the project does not result in an increase of the processing capacity of raw input or in other substantial changes in this process - The biomass residue used by the project facility is not stored for more than one year.		
B.2. Baseline Determination <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/ 1/	DR	The project activity is a green field co-generation power project located in an agro-industrial plant generating bagasse (biomass residue) as a waste, where no power generation occurs prior to project activity.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/ 1/	DR	It is assumed that in absence of project activity, new biomass power plant i.e. reference plant would be installed at the same site and same thermal firing capacity but with a lower electric efficiency as the project plant. However the assumption is not conservative as how other options mentioned in methodology for green field power projects (scenarios 1, 2, 3) are not applicable for	CL-2	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			baseline scenario.		
B.2.3. Has the baseline been established on a project-specific basis?	/ 1/	DR	Yes, baseline used has been already approved by the CDM Executive Board and is applicable to this project. However details on calculation of "reference plant" chosen need to be furnished.	CL3	OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/ 1/	DR	National policies appear to favour co-generation and energy efficiency improvements projects.		OK
B.2.5. Is the baseline determination compatible with the available data?	/ 1/	DR	Reference database used for the determination of baseline emission factor and verifiable data sources for the same need to be provided in case of reference plant.	CL3	OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/ 1/	DR	As per B.2.2	CL2	OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/ 1/	DR	PDD addresses additionality through the use of 'the tool for the demonstration and assessment of additionality. Step 0: Evidence exists that the project proponents considered CDM seriously while planning for the project in December 2002. Step 1: It has been clarified that there is no mandatory requirement for SCM sugars under all applicable laws in the region of operation to implement the project. Step2: Barrier analysis.	CL4	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>Investment barrier:</p> <p>It has been argued that it is costly to implement high pressure configuration co-generation plants. It is also argued that convincing banks on financial assistant was a difficult proposition. Further clarity is required in this regard.</p> <p>The argument is weak without support of a comparison on investment for low pressure and high pressure configuration co-generation plants.</p> <p>An approved IRR analysis for the implementation of project with and without CDM revenues need to be provided.</p> <p>Technological barrier:</p> <p>It has been argued that co-generation plant with high configuration technology is not common in this type of industries at the time of project implementation.</p> <p>The evidence to demonstrate this need to be provided in accordance with tool of additionality, as risk due to high pressure configuration technology needs further elaboration.</p> <p>Common practice barrier:</p> <p>It has been argued that co-generation using high pressure boiler with higher thermal efficiency is not a prevailing practice in Karnataka state.</p> <p><u>Impact of CDM project registration</u></p> <p>It has been argued that successful implementation of the project technology</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			needs CDM funds to strengthen process control and cover uncertainties to overcome existing barriers.		
B.2.8. Have the major risks to the baseline been identified?	/ 1/	DR	There is no major risk identified to the baseline.		OK
B.2.9. Is all literature and sources clearly referenced?	/ 1/	DR	Yes. Sources for all the data have been referenced.		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 reasonable?	/ 1/	DR	Yes. Start date of the project is 11 December 2002 with an expected life time of 20 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/ 1/	DR	A fixed crediting period of 10 years has been chosen, starting from 1 July 2004.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/ 1/	DR	The project applies the approved monitoring methodology ACM0006 called "Consolidated monitoring methodology for grid-connected electricity generation from biomass residues".		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/ 1/	DR	The project activity fulfils the following applicability criteria as stipulated in ACM 0006, as the project is a grid-connected and <i>biomass residue</i> fired co-generation project activity implemented as a green field project using high efficiency power generation system.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/ 1/	DR	Yes. All the parameters stipulated in monitoring methodology have been considered and included in the monitoring plan.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/ 1/	DR	Yes.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. 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	While all data collected is archived electronically/paper, it is not clear whether the same will be retained for at least for 2 years after the end of the last crediting period.	CL-5	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/ 1/	DR	Yes.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/ 1/	DR	Yes.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/ 1/	DR	Yes.		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/ 1/	DR	Yes.		OK
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/ 1/	DR	There is no leakage attributable to the project as all the biomass used in the project would also have been used to generate heat with low generation efficiency in the reference plant. It has been confirmed that no biomass residue has been diverted for the other purpose.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/ 1/	DR	Yes, While all data collected is archived electronically, it is not clear whether the same will be retained for at least for 2 years after the end of the last crediting period	CL5	OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/ 1/	DR	Yes.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/ 1/	DR	Yes.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/ 1/		Yes.		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/ 1/	DR	DNA of India does not require monitoring sustainable development indicators. No monitoring provisions / guidelines are included in Interim Guidelines for CDM projects.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/ 1/ / 7/	DR I	The authority and responsibility for project management has not been clearly described.	CAR1	OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/ 1/ / 7/	DR I	The PDD addresses the formation of a special group who will have assigned responsibilities for monitoring of all the parameters. Evidence of this team is not available.	CAR1	OK
D.6.3. Are procedures identified for training of monitoring personnel?	/ 1/ / 7/	DR I	Procedures for training of monitoring personnel need to be elaborated.	CAR1	OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/ 1/	DR	Emergencies like fire in storage area can cause unintended emission. The emergency preparedness in such situation needs to be elaborated.	CL6	OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/ 1/	DR	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.	CL7	OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/ 1/	DR	A procedure for maintenance of monitoring equipments needs to be elaborated.	CAR1	OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/ 1/	DR	Yes.		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process	/ 1/	DR	Yes.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
performance documentation)					
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/ 1/	DR	As in D.6.2	CAR1	OK
D.6.10. Are procedures identified for review of reported results/data?	/ 1/	DR	Procedures for internal audits have not been established.	CAR2	OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/ 1/	DR	Procedures for performance reviews have not been established.	CAR2	OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/ 1/	DR	No. procedures for performance reviews for verification data need to be formalised.	CAR2	OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/ 1/	DR	No.	CAR2	OK
E. Calculation of GHG Emissions by Source					
<i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>					
E.1. Project GHG Emissions					
<i>The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/ 1/	DR	Yes. All direct and indirect GHG emissions like emissions due to transportation of biomass and due to usage of fossil fuels like coal have been captured.		OK

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

Page A-5-16

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/ 1/	DR	Yes.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/ 1/	DR	Yes.		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/ 1/	DR	Yes.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/ 1/	DR	Only CO2 is considered as relevant GHG. However PDD does not mention about option on CH4 emissions as required by methodology.	CAR-3	OK
E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/ 1/	DR	There is no leakage attributable to the project as all the biomass used in the project would also have been used to generate heat with low generation efficiency in the reference plant. It has been confirmed that no biomass residue has been diverted for the other purpose.		OK
E.3. Baseline Emissions <i>The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational	/ 1/	DR	As in B.2.2	CL2	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
characteristics and baseline indicators been chosen as reference for baseline emissions?					
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/ 1/	DR	Yes.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/ 1/	DR	Detail excel sheet on calculations need to be provided.	CL8	OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/ 1/	DR	As in E.3.3	CL8	OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/ 1/	DR	As in E.3.3	CL8	OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/ 1/	DR	As in E.3.3	CL8	OK
E.4.Emission Reductions <i>Validation of ex-ante estimated emission reductions.</i>					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/ 1/	DR	Yes. The project is expected to abate CO ₂ emissions to the extent of 40 246 tonnes CO ₂ e per year, over the selected 10 years crediting period.		OK
F. 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>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/ 1/		Yes. However according to the MoEF, no EIA is required for such kind of projects.		OK
F.1.2. Are there any Host Party requirements for an	/ 1/	DR	There is no legislation for such projects,		OK

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

Page A-5-18

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
Environmental Impact Assessment (EIA), and if yes, is an EIA approved?			hence not applicable.		
F.1.3. Will the project create any adverse environmental effects?	/ 1/	DR	No, The project does not create any adverse environmental or social effects		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/ 1/	DR	Not applicable		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/ 1/	DR	As in F.1.1 and F.1.3		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/ 1/	DR	Yes. As in F.1.1		OK
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/ 1/	DR	Identified stakeholders are statutory bodies, employees, and surround village people.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/ 1/	DR	Medium of communication used for inviting stakeholders is not clearly described.	CL9	
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/ 1/	DR	Not required for this type of projects.		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/ 1/	DR	Documented summary of stakeholders comments evidenced.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/ 1/	DR	How due account of comments been taken is not clearly described.	CL9	

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

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>The authority and responsibility for project management has not been clearly described. The PDD addresses the formation of a special group who will have assigned responsibilities for monitoring of all the parameters. Evidence of this team is not available.</p> <p>Procedures for training of monitoring personnel need to be elaborated.</p> <p>A procedure for maintenance of monitoring equipments needs to be elaborated.</p> <p>Procedures need to be identified for dealing with possible monitoring data adjustments and uncertainties.</p>	<p>D.6.1 D.6.2 D.6.3 D.6.6 D.6.9</p>	<p>The plant has formed the CDM team to monitor the pertinent parameters in the plant. Evidence of the same is enclosed along with this report.</p> <p>The plant personnel are trained to operate the boiler and turbines and certificate proof is enclosed.</p>	<p>The complimentary information provided has been reviewed and accepted.</p> <p>This CAR 1 is closed.</p>
<p>CAR 2</p> <p>Procedures for internal audits have not been established.</p> <p>Procedures for performance reviews have not been established.</p> <p>Procedures for performance reviews and corrective actions for verification data need to be formalised.</p>	<p>D.6.10 D.6.11 D.6.12 D.6.13</p>	<p>All the mentioned procedures and methods are in practice but were not documented during the initial days of plant operation. Plant has streamlined all the procedures and are presently formalised and documented. The procedures for the same are attached.</p>	<p>The complimentary information provided has been reviewed and accepted.</p> <p>This CAR 2 is closed.</p>
<p>CAR 3</p> <p>Only CO₂ is considered as relevant GHG. However PDD does not mention about option</p>	<p>E.1.5</p>	<p>The methane emissions are not included in the project emissions due to neither biomass being burnt in</p>	<p>The complimentary information provided has been reviewed and accepted.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
on CH ₄ emissions as required by methodology.		uncontrolled combustion nor left to decay. In addition to this, the biomass is not stored for more than 2 months. Relevant explanation is included in revised PDD.	This CAR 3 is closed.
<p>CL1</p> <p>The projects system boundaries are restricted to the source of biomass, co-generation plant and its auxiliaries. However the transportation of biomass and grid to which the generated power is being evacuated is not clearly addressed and included in the project boundary.</p>	A.1.2	The Plant uses different type of fuels in the boiler since last two years. The fuels are basically agricultural wastes and Bagasse. The agricultural wastes and canes are procured locally and from some parts of Kerala. As SCMSL sells most of the sugar produced to Kerala, the trucks will come from Kerala to pick up the sugar bags. In order to avoid the empty transportation of trucks from Kerala, the trucks carry some biomass material and it is supplied to Plant. The transportation of biomass has been considered as project emissions and as the value is be calculated ex-post as per requirement of methodology. Also, the grid to which power is evacuated also included in the boundary. The same is incorporated in the revised PDD.	<p>The revised PDD has been reviewed and accepted.</p> <p>This CL 1 is closed.</p>
<p>CL2</p> <p>It is assumed that in absence of project activity, new biomass power plant i.e. reference plant would be installed at the same site and same thermal firing capacity but with a lower electric efficiency as the project plant.</p>	B.2.2 B.2.6 E.3.1	Relevant assumptions and applicability has been included in revised PDD.	<p>Revised PDD has been reviewed and accepted.</p> <p>This CL 2 is closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
However the assumption is not conservative as how other options mentioned in methodology for green field power projects (scenarios 1, 2, 3) are not applicable for baseline scenario.			
CL3 Reference database used for the determination of baseline emission factor and verifiable data sources for the same need to be provided in case of reference plant.	B.2.3 B.2.5	All relevant data sources have been included in revised PDD.	All the data and data sources used in arriving at baseline factors have been verified and accepted. This CL 3 is closed.
CL4 Investment barrier: It has been argued that it is costly to implement high pressure configuration co-generation plants. It is also argued that convincing banks on financial assistance was a difficult proposition. Further clarity is required in this regard. The argument is weak without support of a comparison on investment for low pressure and high pressure configuration co-generation plants. An approved IRR analysis for the implementation of project with and without CDM revenues need to be provided. Technological barrier: It has been argued that co-generation plant with high configuration technology is not common in this type of industries at the time of project implementation. The evidence to demonstrate this need to be	B.2.7	The high pressure configuration technology will generate more power with same biomass as against low pressure system. This needs additional installed capacity which leads to additional cost. From the day LOI has been signed by the project proponent with boiler and turbine manufacturers, PP initiated dialogues with various financial institutions for the financial assistance to implement the project activity. However, most of the financial institutions were apprehensive about releasing funds to the project proponent (PP) as technology was relatively new (second in the country) and had low penetration in the market. In addition to this, neither did SCMSL have any prior experience in the Sugar Industry nor were able to project required feasible rate of the return (project has IRR of only 13.54 %) to the conviction of the	The complementary information provided has been reviewed and accepted. IRR calculations furnished have been reviewed and accepted. This CL 4 is closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>provided in accordance with tool of additionality, as risk due to high pressure configuration technology needs further elaboration.</p>		<p>authorities of the financial Institutions. It took nearly one year to convince the financial Institutions to release the loan. Meanwhile, PP had obtained some unsecured loans with high risks which were required after availing Term loans from the approached banks for finance. This indicates the financial barrier the PP had faced during inception of the project activity in settling money to the boiler and turbine vendors, civil works, employees' wages and salary wages for contract labours etc for smooth completion of the project activity. As the project proponent considered CDM revenues, it has created some uncertainties within the bankers about the sustainability of the project. But SCMSL have demonstrated that the project is not wholly depend on CDM revenues, but CDM revenues are considered to improve the return on investment of the project. The IRR calculation is enclosed along with the report.</p> <p>The high pressure cogeneration configuration is very new during the construction of the project activity. More over SCMSL is the first project activity in Karnataka and it is in top 4 project activities in India which have implemented high pressure</p>	

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		cogeneration systems. As the technology is new, SCMSL faced difficulties in getting qualified personnel, spare parts etc.	
CL 5 While all data collected is archived electronically/paper, it is not clear whether the same will be retained for at least for 2 years after the end of the last crediting period.	D.2.1 D.4.1	All monitoring parameters / data collected is archived electronically/ paper and will be retained for 2 years after the end of the last crediting period. Included in revised PDD.	The complimentary information provided has been accepted. This CL 5 is closed.
CL 6 Emergencies like fire in storage area can cause unintended emission. The emergency preparedness in such situation needs to be elaborated.	D.6.4	It is general practice in the plant that biomass material should not be allowed to store more than the requirement in the plant for one month or so. This is also mainly due to the availability of limited working capital for the same. All necessary precautionary measures are taken in terms of providing fire hydrant system and adequate fire extinguishers to handle the emergency situations. The procedure for emergency preparedness plan in the plant for critical equipments is already developed and is attached.	The complimentary information provided has been reviewed and accepted. This CL 6 is closed.
CL 7 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.	D.6.5	The procedures for the calibration of instruments are already developed and are in place in the plant. The same is attached for the reference.	The complimentary information has been reviewed and accepted. This CL 7 is closed.
CL 8 Detail excel sheet on calculations need to be provided.	E.3.3 E.3.4 E.3.5	Detailed excel sheet calculation have been done and the same is enclosed along with report	The complimentary information has been reviewed and accepted.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
	E.3.6		This CL 8 is closed.
CL 9 Medium of communication used for inviting stakeholders is not clearly described. How due account of comments been taken is not clearly described.	G.1.1 G.1.5	Stakeholder meeting has been conducted on 10 th December 2002. Relevant documents are provided DOE reference.	The complimentary information has been reviewed and accepted. This CL 9 is closed.

-o0o-

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Michael Lehmann

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

Astakala Vidyacharan

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

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director