VALIDATION REPORT

Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project

REPORT NO. 2008-0531

REVISION NO. 01

DET NORSKE VERITAS

VALIDATION REPORT

DET NORSKE VERITAS
CERTIFICATION AS

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Approved by: C Kumaraswamy	Organisational unit: Climate Change Services
Client: Matola Gas Company	Client ref.: Mr. Charles Parsons

Project Name: Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project
Country: Mozambique
Methodology: ACM0009
Version: 03
GHG reducing Measure/Technology: Fuel switch from Coal to Natural Gas
ER estimate: 37 153 tCO_2e **per year**
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 DNV's opinion that the *Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project* in Mozambique, as described in the PDD of 24 September 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0009. DNV thus requests the registration of the project as a CDM project activity.

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Report title:
Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project in Mozambique

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Abbreviations

CAR	Corrective Action Request
CM	Cimentos Do Mozambique
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CM	Cimentos do Mozambique
CO_2e	Carbon dioxide equivalent
CPI	Center for the Promotion of Investment
DNV	Det Norske Veritas Certification AS
DNA	Designated National Authority
DPR	Detailed Project Report
EB	Executive Board
EPC	Engineering, Procurement and Construction
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
GWh	Giga Watt Hour
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilo Watt hour
LNG	Liquid Natural Gas
MGC	Matola Gas Company
MW	Mega Watt
MICOA	Ministério para a Coordenação da Acção Ambiental
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
O&M	Operation and Maintenance
PDD	Project Design Document
SEC	Specific Energy Consumption
UEM	University of Eduardo Mondlane
UNFCCC	United Nations Framework Convention on Climate Change

TABLE OF CONTENTS

VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "Cementos Do Mozambique – Matola Gas Company Fuel Switch Project" in Mozambique. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is Mozambique and the participating Annex I Party is Norway. Mozambique and Norway fulfils the participation criteria and have approved the project and authorized the project participants. The DNA from Mozambique also confirmed that the project assists in achieving sustainable development.

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

The project correctly applies the consolidated baseline and monitoring methodology ACM0009, version 3.

By switching from diesel and coal to natural gas, the project results in reductions of CO_2 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 37 153 tCO_2e/year during a seven years renewable 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.

The monitoring methodology ACM0009 has been applied correctly. The monitoring plan has been established, and the project participants have demonstrated that they are able to implement the monitoring plan.

Stakeholders' comments were invited by letters from the cement plant. No negative comments were received for the project. Public stakeholders' inputs have also been invited via the DNV and UNFCCC web-site.

In summary, it is DNV's opinion that the project, as described in the project design document of 24 September 2009, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0009, version 3. Hence, DNV requests the registration of the "Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project" as a CDM project activity.

2 INTRODUCTION

Matola Gas Company has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the "Cimentos Do Mozambique – Matola Gas Company Fuel Switch Project" in Mozambique (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 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). 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 ACM0009 Version 3 /3/.

The validation was based on the recommendations in the Validation and Verification Manual /2/.

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

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

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/ Matola Gas Company, Cimentos Do Mozambique: Project Design Document - "Matola Gas Company Fuel Switch Project", version 1.0 of 27 November 2007, version 2.0 of 28 October 2008, version 2.3 of 6 April 2009, version 2.5 of 28 May 2009, version 2.7 of 14 July 2009, version 2.8 of 13 August 2009 and version 2.9 of 24 September 2009.

/2/ CDM Executive Board: *Validation and Verification Manual*. Version 01

/3/ CDM Executive Board: *ACM0009, version 3, Consolidated methodology for industrial fuel switching from coal or petroleum fuels to natural gas*, 28 July 2006.

/4/ Ministério para a Coordenação da Acção Ambiental (MICOA): Letter of Approval, dated 31 August 2008.

/5/ Coal purchase receipt from Gentrade CC, 3 August 2007

/6/ Coal purchase receipt from Gentrade CC, 27 April 2007.

/7/ Coal delivery receipts for April 2007 from Gentrade CC.

/8/ Coal Quantity Consumption Sheet, Cimentos do Mozambique, 13 February 2008

/9/ Cimentos do Mocambique: Monthly statistical reports on coal and raw meal consumption Aug 06 – Apr 07 and Dec 2004, Dec 2005 and Dec 2006.

/10/ Pillard Combustion Equipment & Control Systems: Quotation for delivery of kiln burner to Cimentos de Mozambique, dated 16 March 2007.

/11/ Matola Gas Company: Capital expenditure estimate November 2006.

/12/ Coal analysis report from Cimpor tec, dated 9 April 2007.

/13/ Cimentos de Mozambique: letter to DNV "Financial assumptions for Cimentos fuel switch", dated 2 September 2008.

/14/ Gas supply agreement between Matola Gas Company SARL and Cimentos de Mozambique, signed 3 July 2007.

/15/ Certificate of calibration for the Sasol Petroleum Ternane Limitada, issued by EffecTech on 15 April 2008 and Re-certificate certificate issued by TÜV Rheinland on 19&20 November 2007.

/16/ Cimentos de Mozambique: "Cimentos NPV, v2.xls", spreadsheet containing the NPV calculations, dated November 2008, version 2.6 dated 3 June 2009 and version 2.7 dated 14 July 2009.

/17/ Letter from the plant manager of CM to MGC, dated 11 September 2008.

/18/ E-mail conversation between Randall Spalding-Fecher of Econ Pöyry and Ailton Rego of the Ministry of Energy in Mozambique, dated October 2008.

/19/ U.S: Geological Survey: 2006 Minerals yearbook Mozambique, published October 2007.

/20/ CIMPOR Tec: Coal analysis reports March and April 2007.

/21/ Centro Tecnico e de Desenvolvimento industrial: Balanco Termico ao Forno, Fabrica sa Matola, dated August 2001.

/22/ Sasol Petroleum Ternane Limitada: Laboratory report of natural gas quality measurements in August 2008.

/23/ Republica de Mocambique, Ministerio Para a Coordenacao da Accao Ambiental. Environmental Licence for the proposed project, issued 6 April 2007.

/24/ Conselho Executivo da Cidade da Matola: Construction licence for the proposed project from the Executive Council of the City of Matola, issued 6 November 2007.

/25/ Direccao Municipal de Planeamneto Urbano e Ambiente: Approval for gas supply to the project, dated 21 May 2007.

/26/ Direccao de Construcao e Urbanizacao: Construction Licence for the gas supply system to the project, dated 2007.

/27/ Cimentos de Mozambique: Map of the project site with gas pipeline.

/28/ "The mineral industry of Mozambique" (2002) by Thomas R. Yager. (http://minerals.usgs.gov/minerals/pubs/country/2000/mzmyb00.pdf)

/29/ Cimentos de Mozambque: Invitation letter to stakeholder's consultation, dated 30 October 2007.

/30/ E-mail conversations between Randall Spalding-Fecher of Econ Pöyry and representatives of Holcim, Cimpor and Pretoria Portland Cement dated August – September 2008.

/31/ Interview notes from interview of William Herbst, Procurement Manager of Lichtenberg Cement Works, Lafarge Cement, interviewed by Randall Spalding-Fecher of Econ Pöyry on 5 September 2008.

/32/ CIA World Factbook:
https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html

/33/ Cement kiln references: http://en.wikipedia.org/wiki/Cement_kiln
http://cementamericas.com/mag/cement_kiln_burning_systems/

/34/ SAP transcripts from Cimentos de Mozambique, dated November 2005, November 2006 and November 2007.

/35/ U.S. Department of Labor, Bureau of Labor Statistics: Producer Price Index 1998 – 2008

/36/ Historic coal price index: http://indexmundi.com/commodities/?commodity=coal-south-african&months=120

/37/ DNV: Request for deviation called "Use of weighted average share baseline emission factor and NCV in ACM0009", submitted on 10 February 2009 and approved at EB 46.

/38/ Minutes of meeting of the Board of Directors of Matola Gas Company S.a.r.l, dated 30 May 2007.

/39/ Ministério para a Coordenação da Acção Ambiental (MICOA) (DNA od Mozambique): Letter of approval for the proposed project, dated 31 August 2008.

/40/ Det Kongelige Miljøverndepartement (DNA of Norway): Letter of approval, dated 22 July 2008.

/41/ Confidential agreement between Matola Gas Company and a client different from CM, stating the agreed delivered gas price.

/42/ World Trade Organization: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

/43/ Southern African Development Community: http://www.sadc.int/index/browse/page/147

/44/ Cimentos de Mocambique: *Key assumptions used in assessment studies for the installation of furnace in Dondo*. Internal note dated 17 August 2007, and translation dated August 2008.

The main changes between the PDD version 1.0 /1/, published for the global stakeholder's consultation and version 2.9 submitted for registration are:

- A weighted average of diesel and coal is used in the calculations of the baseline emissions, in accordance to the EB's ruling of the request for deviation submitted for the project on 10 February 2009 and approved at EB 46 /37/.
- Carbon Limits A/S has been included as a project participant
- The investment barrier has been removed from Section B.4
- An annual increase in the coal and gas prices has been included in the financial analysis
- The expected CER price has been changed in the financial analysis
- An error in the investment costs has been corrected
- The sensitivity analysis has been amended
- The monitoring plan has been amended
- *Ex-post* monitoring of the density of the natural gas has been added

3.2 Follow-up Interviews with Project Stakeholders

DNV carried out a site visit to the Cimentos de Mozambique cement plant on 11 - 13 February 2008. The following persons were interviewed:

Date	Name	Organization	Topic
February 2008	Randall Spalding - Fecher	Consultant	▪ Project design ▪ Environmental impacts & permits ▪ Consultations with local stakeholders ▪ Evidence to demonstrate the additionality of the project ▪ Authorities and responsibilities & procedures for monitoring and reporting and provisions for quality assurance /quality control of monitoring reports
	Johannes du Toit	Matola Gas Company	
	Jose Machado	CM Development manager	
	Lucio Beltras	CM Plant Manager	
	Carlos Macie	Matola Gas Operations Engineer	

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed 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 "Cementos Do Mozambique – Matola Gas Company Fuel Switch Project" is enclosed in Appendix A to this 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***
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.*

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
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.	*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 c**orrective 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 and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the CAR or CL 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

3.4 Internal Quality Control

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

3.5 Validation Team

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

				Type of involvement					
Role/Qualification	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Rama-chandran	Ramesh	India	X			X		
GHG auditor	Sharma	Shivraj	India	X		X			
GHG auditor	Molin	Peter	Norway			X			
GHG auditor	Haupt	Frederick Stephanus	South Africa		X				
GHG auditor	Brinks	Hendrik	Norway			X			
GHG auditor	Folkestad	Tonje	Norway			X			
Sector expert	Biswas	Soumik	India						X
Technical reviewer	Lehmann	Michael	Norway					X	

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 2.9, dated 24 September 2009)

4.1 Participation Requirements

The private entity Matola Gas Company SARL is the project participant from Mozambique. The host party Mozambique meets all the relevant participation requirements. Mozambique has ratified the Kyoto protocol on 18 January 2005. The Designated National Authority of Mozambique is Ministério para a Coordenação da Acção Ambiental (MICOA). A second project participant is Carbon Limits AS, authorized by the Annex I Party Norway.

The LoA from Mozambique was issued by MICOA on 31 August 2008 /4/. The LoA from Norway was issued by the Royal Ministry of the Environment on 22 July 2008 /40/. Both LoAs were provided to DNV for validation by the project proponent.

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

4.2 Project Design

The purpose of the project is to switch from coal to natural gas as fuel of a rotary kiln at the Cimentos do Mozambique (CM) clinker manufacturing plant outside Maputo, Mozambique. The plant is the largest cement plant in Mozambique, and produces around 240 000 tonnes clinker and 400 000 tonnes cement annually. The plant is owned by the Portuguese cement company CIMPOR Cementos do Portugal.

The project participant from Mozambique, Matola Gas Company SARL (MGC) is a joint venture between the Mozambican government and Gigajoule International, and is responsible for a gas pipeline between Mozambique and South Africa. In a contract between CM and MGC /14/, MGC commits to deliver gas at a certain price, given that MGC will receive the rights to the CERs from the proposed CDM project in return.

In the proposed project, a 6-inch supply pipeline will be constructed from the main pipeline, which borders the CM plant property, and lead the gas to a customer metering station next to the CM plant. A second 8 inch pipeline will connect the customer metering station to the gas burner. The gas burner is a high efficiency precession jet burner. DNV was able to confirm the type of technology from the quotation from the supplier of the burner /10/. The natural gas will completely replace coal in the clinker production.

By replacing coal with natural gas, the proposed project is expected to reduce an estimated amount of 37 153 tCO_2e per year throughout the seven year renewable crediting period.

The project starting date has been selected as the date of the gas supply agreement between MGC and CM /14/, 3 July 2007. This contract has been provided to DNV from the project

participant and verified. DNV can confirm that this is the first significant financial commitment related to the project, and hence satisfies the criteria for the project starting date.

The seven year renewable crediting period is expected to start on 23 December 2009 which is in DNV's opinion realistic.

The project description is to the consideration of DNV complete and accurate.

4.3 Baseline Determination

The project applies the approved methodology ACM0009 version 3 "Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas" /3/. The applicability of this methodology is justified as:

- The proposed project activity switches from coal to natural gas in one element process, as described in the methodology. The fuel switch is undertaken in a process with a main output other than heat, i.e., clinker.
- Prior to the proposed project activity, only coal (and small quantities of diesel for start up) was used as fuel. This has been evidenced by monthly statistical reports and coal purchase receipts provided to DNV from CM /5/ /8/.
- No regulations constrain the use of coal prior to the fuel switch. This is evidenced by the fact that both Mozambique and South Africa are members of the WTO, and are not allowed to restrict the trade in fuels /42/.
- The project activity does not increase capacity of thermal output or the lifetime of the rotary kiln, nor is there any other thermal capacity expansion planned for the project facility in the crediting period. The plant manager for the CM clinker plant has confirmed that the rotary kiln will have a remaining useful life of more than 25 years. This is longer than the 15 years lifetime of the burner. The letter from the plant manager for the CM clinker plant to MGC has been provided to and verified by DNV /17/, and is in DNV's opinion reasonable.
- The project activity does not result in an integrated process change. The plant manager for the CM clinker plant has confirmed that no process changes will be implemented as a result of the project activity. The change of fuel will not change the efficiency of the rotary kiln, as this is only dependent on the kiln itself, and not on the fuels used to provide heat to the kiln. This was confirmed from the above mentioned letter from the plant manager for the CM clinker plant to MGC /17/.

In accordance with the methodology the project boundary is defined as the CO_2 emissions arising from the combustion of coal and diesel in the baseline and CO_2 emissions from natural gas combustion in the proposed project activity, while the spatial extent of the project boundary is the physical, geographical site of the cement plant. DNV can confirm that the project boundary is defined in accordance with the methodology ACM0009 version 3.

In order to identify the baseline scenario, four alternative scenarios have been discussed:

1. Continuation of the current practice of using coal and/or diesel;
2. Switching from coal or diesel to a different fuel than natural gas (such as biomass);
3. The project activity not undertaken under the CDM (switching from coal and/or diesel to natural gas);

4. Switching from coal or diesel to natural gas at a future point in time during the crediting period;

DNV considers the list of realistic and credible alternatives to be complete.

4.3.1 Barrier analysis

There are no regulations concerning the use of coal or natural gas in cement production in Mozambique, as confirmed from the fact that Mozambique is a member of the WTO /42/ and are not allowed to restrict trade in fuels, and furthermore the membership in Southern African Development Community /43/ confirms that energy trade and self-reliance of energy in the region is promoted. Hence, none of the alternatives are prohibited or do not comply with applicable laws and regulations.

Three barriers to the alternative scenarios are considered; *technological barriers*, *barriers due to prevailing practice* and *barriers due to the security of fuel supply*. The project proponent argues that technological barriers would prevent the second alternative from happening. As there are no experiences with alternative fuels in the cement production in Mozambique, and the technology needed for alternative fuels are more complex, the use of alternative fuels such as biomass would lead to an unacceptable technological risk for the scenario to happen. The project proponent has provided DNV with a statement from the CM cement plant /17/ and the Ministry of Energy /18/, both confirming that CM has the only clinker production in Mozambique. Hence, since CM was only using coal, there is no experience with alternative fuels in the clinker production in Mozambique. Furthermore, the project proponent has provided DNV with several e-mail conversations with other large cement producers in South Africa /30//31/, all stating that the use of other fuels than coal are very limited in South Africa. Based on the evidences provided, DNV is of the opinion that the use of alternative fuel in the clinker production faces technological barriers due to the risks associated with this new technology.

As there are currently no experiences with the use of alternative fuels or natural gas in the cement production in Mozambique, the alternative scenarios 2, 3, and 4 would be the first of its kind, and would be affected by barriers due to prevailing practice. This was evidenced by the statements from the CM cement plant and the Ministry of Energy, as referred to above /17//18/.

The project proponent states that the second alternative would also be prevented by insecure fuel supply, as there is no biomass or other waste available as alternative fuel for the cement plant. Based upon the statements from CM, the Ministry of Energy and the interviews and e-mail conversations referred to above, DNV finds it unlikely that excessive amounts of e.g., biomass would be available for fuel to the rotary kiln, as this is rarely seen in Mozambique or South Africa.

The project proponent argues that the third alternative would not be prevented by insecure fuel supply as MGC currently has royalty gas available to market. However, if the project would be implemented at a future point of time, MGC may not have the gas available due to insecure profitability in case of lack of consumers. DNV has confirmed through the supply contract between MGC and CM that MGC has committed to deliver gas to CM, and by that secured the sale of a minimum amount of gas per year. DNV accepts that the implementation of the project at a future point of time may impose a supply risk, and that this is a preventive barrier for scenario 4.

In conclusion, the project proponent has through a barrier analysis shown that the alternative scenarios 2 and 4, switching from coal to a different fuel than natural gas or switching from coal to gas at a future point in time, are prevented by technological barriers and barriers due to the security of fuel supply, respectively. Furthermore, alternatives 2, 3, and 4 are all subject to barriers due to prevailing practice as they would all be first of their kind in the cement industry in Mozambique. Evidences for the arguments used in the barrier analysis have been provided by the project participant to DNV for verification, and DNV is of the opinion that the analysis is correctly carried out. The alternatives 1 and 3 are discussed further in the financial analysis below.

4.3.2 Financial analysis: approach

In accordance with the methodology, the project proponent has performed a financial analysis to compare the remaining alternatives after the barrier analysis. An NPV analysis of the change in cashflow of the proposed project compared to the continuation of the current practice has been provided to DNV for validation.

4.3.3 Financial analysis: Input parameters

The input parameters to the financial analysis are stated in the PDD and in the spreadsheet provided with the calculations /16/. The parameters are:

- *Investment requirements* (equipment, gas pipe line, customer metering station and installation work). The cost of the gas burner equipment and the installation are sourced from the quotation for the burner by the producer /10/ and from a budget estimate by the project owner CM /11/. Both evidences have been submitted to DNV from the project proponent.
- *Discount rate*. The discount rate used is the weighted average cost of capital (WACC) used by CM, calculated by the Finance Director of CM to be 12.8%, as confirmed from a letter from the CEO of CM /13/. The use of this specific WACC is supported by an internal note from 2007, made for the assessment of a planned investment of a furnace in CM's other cement plant Dondo. This note states that a WACC of 12.8% is considered in the assessment of the investment. The investment was, however, postponed and has not yet taken place. CM has confirmed to DNV that no other larger capital investments were made in the time period before the investment decision to the proposed project activity was made. DNV was able to confirm from other sources that the discount rate is in a reasonable range for investments in Mozambique /32/. Hence, DNV is of the opinion that the selected discount rate is reasonable and acceptable for this project.
- *Efficiency*. The efficiency of the rotary kiln process is calculated based upon the ratio of coal consumption to the clinker production over the six most recent months prior to the investment decision. The coal consumption is based on coal deliveries and changes in the coal stocks, while the clinker production is based on the raw meal consumption, using a fixed ratio of raw meal-to-clinker. The amounts of coal delivered to the plant, changes in the coal stocks and raw meal consumption has been provided to DNV in monthly statistical reports from CM /9/. The six most recent months prior to the investment decision are November 2006 – April 2007. Due to maintenance and low clinker production in November and December 2006, these two months have been replaced with the data from September and October 2006 in order to provide a more realistic figure of the average production efficiency. The irregular reduced production

has been confirmed by DNV from the 2006 Minerals Yearbook by the U.S. Geological Survey /19/. DNV has verified the calculation of the efficiency and accepts the calculation method and the resulting efficiency as appropriate /33/. The efficiency of the rotary kiln is only dependent on the characteristics of the kiln itself, and is not dependent on the fuel type used to provide heat to the kiln processes.

- *Fuel prices*. The coal price used is the actual price for coal delivered in April 2007, which is the most recent data prior to the investment decision. This price has been validated by checking the coal purchase receipt from April 2007 /6/ and cross-checked with the coal supplier's delivery receipts from April 2007 /7/. The evidences have been provided to DNV from the project proponent. An annual increase in the coal price has been estimated based on an average over the most recent three years before the investment decision for the first five years of the project activity. The increase in the coal price over the most recent three years, 2005 – 2007, has been evidenced by transcripts from the SAP accounting system of CM which have been provided to DNV for validation /34/. Due to the high increase of 29% per year, the project proponent has assumed an annual increase of 20% per year for the first five years of the analysis, and an annual increase of 3.6% for the remaining time, corresponding to the average increase in the USA Producer Price Index over the ten years 1998 – 2008, as further described below /35/. Given the coal price trends in the period 2003 – 2008, DNV finds the estimates used in the analysis reasonable and conservative /36/.

  The gas price is agreed upon in the gas supply agreement between MGC and CM /14/. This agreement states that CM will receive a discount on the gas price by ceding the rights to the carbon revenues from this project to MGC. The discounted price will be subject to an annual adjustment according to the USA Producer Price Index, which has increased in average 3.6% per year over the period 1998 - 2008. This agreement has been provided to DNV by CM for validation. DNV can confirm that the undiscounted price is reasonable when compared to the gas price delivered to another customer of MGC a few years earlier (price increase taken into consideration), as evidenced by a confidential gas supply agreement provided to DNV by the project proponent /41/.
- *Operating costs for each fuel*. The reduced operating costs for coal handling and processing at the CM plant is estimated by CM to be $200 000 per year /13/, including some maintenance costs for the gas system. The sensitivity analysis shows however that the NPV is not sensitive to the value of the O&M costs, as even if the savings from the O&M costs were 50% larger, the NPV would only decrease by 10% /16/.
- *Lifetime of the project*. The remaining lifetime of the rotary kiln is confirmed in a letter to MGC from the plant manager of CM to be 25 years. The letter has been provided to and verified by DNV /17/.
- *Reduced plant down time*. In the business-as-usual situation, the coal fired plant needs to shut down for some days every year due to maintenance. In this period, CM needs to import clinker to support their cement production. CM estimates that maintenance and operation of the coal fired plant would be improved in the business-as-usual scenario, leading to less need for plant shutdowns in the future. Switching from coal to gas will however eliminate shutdowns caused by the coal fuel preparation system. This will again lead to savings as CM will not need to import clinker in the time periods of the shutdowns. The savings have been estimated to be 15 days in the first year and then gradually diminish to zero over the following four years. The savings of

the reduced shutdowns has been estimated by CM and confirmed in a letter from the CEO of CM to DNV /13/. The assumptions that plant down time would have also reduced in the baseline scenatio is in DNV's opinion e reasonable. DNV could also confirm that even when assuming a 15 days downtime over the whole project's lifetime, the NPV analysis for the proposed project without CDM revenues is still negative.

DNV has compared the data used in the financial analysis in the spreadsheet provided /16/ and in the PDD /1/ with the sources referenced above, and can confirm that they are correctly transferred. By applying our sectoral competence, DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

4.3.4 Financial analysis: Calculations and conclusion

The NPV calculation was provided to DNV by the project proponent in a spreadsheet /16/, and DNV was able to verify the assumptions made and that the calculations are carried out correctly. The proposed project has an NPV of $ -6 282 736, considering the necessary investment for the fuel switch, the increase in energy costs, the decrease in the O&M costs and the reduced plant down time resulting from the use of natural gas instead of coal. Hence, the proposed project is not financially attractive. DNV was able to confirm that the gas price assumed in the NPV analysis is a reasonable gas price and is in line with gas prices agreed with another customer, as confirmed from a confidential agreement between MGC and another customer, delivered to DNV for verification by the project proponent /41/.

4.3.5 Financial analysis: Sensitivity analysis

A sensitivity analysis has been carried out, varying the coal price escalation, the operating costs savings, the savings due to the reduced downtime of the clinker production, the gas price escalation and the coal and gas prices from 2012 and onwards. By increasing the savings of the operating and maintenance costs by 50%, the NPV increased from -6 282 736 to $ -5 629 765, still far below zero. When increasing the savings from the reduced downtime due to the project activity by 50%, the NPV increases from $ -6 282 736 to $ -4 998 475. DNV considers 50% increases in the savings of the operating and maintenance costs or the savings from the reduced downtime as unlikely, and hence variation of these two parameters will not significantly affect the NPV of the project in a way that would make it profitable without CDM revenues.

The financial analysis assumes a yearly escalation of the coal prices of 20%. When increasing the yearly increase to 25%, the NPV increases from $ -6 282 736 to $ -621 001. As discussed above, although the coal prices increased in average by 29% per year in the years 2005 – 2007, the South-African price trends from 1990 to 2009 show an average annual change in the fuel prices of + 8%. Based on this, it is in DNV's opinion more likely that the yearly escalation of the coal prices is below 20% than above. Hence a yearly increase of 25%, corresponding to a triple of the price over the first five years, is considered unrealistic.

The gas prices are adjusted according to the U.S. producer price index, which increased in average 3.6% over the period 1998 – 2008. The project proponent has tested the sensitivity by increasing the escalation to 5.0% (+ 39%) and decreasing it to 2.0% (-44%). When decreasing the escalation to 2%, the NPV increases from -6 282 736 to -3 875 061, which is still negative. DNV can confirm that the NPV is negative, even when considering a zero annual adjustment in the gas prices.

DNV was able to verify the calculations in the sensitivity analysis by varying the input parameters in the NPV analysis, provided in an open and unprotected spreadsheet by the project proponent /16/. For reasonable variations of the input parameters, the NPV is still negative and the proposed project is not a financially viable without the carbon revenues. The sensitivity analysis covers in DNV's opinion the relevant parameters and with reasonable variations.

4.3.6 Conclusion

The project proponent has through a barrier analysis showed that the Scenarios 2 and 4 are prohibited by technological barriers and barriers due to prevailing practice and fuel supply. The remaining scenarios 1 and 4 have been compared in a NPV analysis, showing that the fuel switch project is not financially viable without the discount natural gas received by CDM when ceding the rights to the carbon credits to MGC. DNV is therefore of the opinion that the project proponent has demonstrated that the most likely baseline scenario is the continuation of the use of coal as fuel in the rotary kiln.

4.4 Additionality

The additionality of the project is demonstrated in three steps as in accordance with the methodology ACM0009 version 3.

4.4.1 Prior CDM consideration

DNV was able to confirm from the minutes of the MGC Board meeting on 30 May 2007 /38/ that the Board decided to proceed with the proposed project activity under the condition that it would qualify as a CDM project. Furthermore, the contract between MGC and CM dated 3 July 2007 /14/, which defines the starting date of the proposed project, explicitly states the carbon revenues as a pre-requisite for the discounted gas prices. The project proponent has in DNV's opinion thus sufficiently demonstrated that CDM was considered prior to the decision to proceed with the project.

Validation of the project commenced on 29 November 2007 and thus only few months after the project start date.

4.4.2 Investment & sensitivity analysis

An investment analysis and a sensitivity analysis have been performed as described in section 4.3.3 – 4.3.5 above.

4.4.3 Common practice analysis

As the CM plant is the only clinker production facility in Mozambique, the project is the first of its kind in the country. This is evidenced by a letter from the plant manager of the CM plant to MGC /17/ and in an e-mail conversation between the project proponent and a representative of the Ministry of Energy in Mozambique /18/, stating that the CM plant is the only clinker production plant in Mozambique. Furthermore, the 2006 Minerals Yearbook by the U.S. Geological Survey /19/ confirms that there are only two cement producers in Mozambique (the cement producer other than CM is not producing clinker). Based on the evidences provided by the project proponent, DNV can confirm that the project is the first of its kind in Mozambique and that hence gas is not commonly used as fuel for kilns in clinker production in Mozambique.

4.4.4 Impact of CDM registration

The CER revenue is a prerequisite for the agreed gas price, as confirmed by DNV by checking the gas supply agreement between MGC and CM /14/. Hence, the CDM registration will result in a lower gas price, decreasing the additional cost by switching from coal to gas in the clinker production.

DNV was able to verify that when considering the discount on the gas price, which was made available to DNV on a confidential basis, the NPV increases above zero, making the project profitable and thus demonstrating that the CDM alleviates the financial barriers that the project is facing in absence of the CDM. The project proponent has deemed the discount on the gas price confidential. Since the discounted gas price is not used to demonstrate that the project is not financially attractive and thus additional and was only used to demonstrate that the financial barriers faced by the project are alleviated by the CDM, it is in DNV's opinion acceptable that the discounted gas price is considered confidential information.

In conclusion, the three steps for demonstrating additionality as provided in the methodology ACM0009 version 3, are satisfied, and the proposed project activity has been demonstrated to be additional.

4.5 Monitoring

The project applies the *Consolidated monitoring methodology for fuel switching from coal or petroleum fuel to natural gas* ACM0009 version /3/, whose applicability has been confirmed in Section 4.3 above. The monitoring plan provides for the monitoring of the natural gas consumption and the data needed for the calculation of the baseline emissions from coal. The parameters monitored are specified below.

4.5.1 Parameters determined *ex-ante*

The following parameters are determined *ex-ante* and will be kept fixed throughout the crediting period:

- $EF_{FF,CO2,i}$: The CO_2-emission factor for coal and diesel that would be combusted in the absence of the project activity. 2006 IPCC values will be used, as Mozambique has not provided any country specific data.
- $NCV_{FF,i}$: The net calorific value of coal and diesel that would be combusted in the absence of the project activity. The coal data are determined from laboratory tests by the Cimpor-Tec laboratory in March and April 2007. The laboratory reports have been provided to and validated by DNV /20/, and DNV can confirm that the values have been correctly transferred and converted.
- $\varepsilon_{baseline,i,y}$: Energy efficiency of the rotary kiln when fired with coal and diesel. According to the methodology data for the six most recent months before the investment decision are required for the calculation of the energy efficiency. The six months relevant for the proposed project are November 2006 – April 2007. Due to irregular maintenance in November and December 2006, these two months were substituted with September and October 2006. DNV was able to confirm the maintenance from the 2006 Minerals Yearbook by the U.S. Geological Survey /19/. The fuel consumption is calculated from fuel deliveries and changes in the fuel stocks, and has been verified by checking the monthly statistical logs on coal and raw meal

consumption and stocks /9/, provided by the project proponent, a thermal balance report stating the raw meal to clinker ratio of the process /21/ and supported by the fuel delivery reports from the coal supplier /6/ /7/.

- $EF_{NG,upstream,CH4}$: Emission factor for upstream fugitive methane emissions from production, transportation and distribution of natural gas. The default value for "Natural gas – rest of the world" from Table 2 in ACM0009 has been selected. DNV can confirm that the value is appropriate and has been correctly transferred from the source.
- $EF_{Coal,upstream,CH4}$: Emission factor for upstream fugitive methane emissions from the production of coal. The default value from Table 2 in ACM0009 has been selected. DNV can confirm that the value is appropriate and has been correctly transferred from the source.
- $EF_{Diesel,upstream,CH4}$: Emission factor for upstream fugitive methane emissions from the production of diesel. The default value from Table 2 in ACM0009 has been selected. DNV can confirm that the value is appropriate and has been correctly transferred from the source.
- $EF_{NG,CO2,y}$: Emission factor for CO_2 produced by the combustion of natural gas in the rotary kiln. The 2006 IPCC default value has been selected. DNV can confirm that the value is appropriate and has been correctly transferred from the source.
- *Share of diesel and coal used as fuel in the baseline*. The value is based on internal records from 2004 – 2006. The records have been provided to DNV for validation, and DNV can confirm that the values are correctly transferred from the sources. Please refer to Section 4.6 for description of the request for deviation from the methodology in regards to the use of a weighted average share baseline emission factor and *NCV*.

4.5.2 Parameters monitored *ex-post*

The following parameters will be monitored *ex-post*:

- $FF_{project,y}$: Natural gas combusted in the rotary kiln at normal conditions. This value will be measured continuously by an electric flow meter at the customer metering station. DNV can confirm that the measurement interval is in accordance with the methodology.
- $NCV_{NG,y}$: Net calorific value of the natural gas supplied to the rotary kiln. This value will be measured monthly and sampled to ensure a 95% confidentiality level, as in accordance with the methodology. The measurements will be performed by a calorimeter at Sasol Petroleum Tamane Lta Laboratory.
- $\varepsilon_{project,i,y}$: The energy efficiency of the rotary kiln process. The value is calculated from monthly clinker production, gas consumption and the net calorific value of the gas.
- $P_{clinker,y}$: The clinker production. The clinker production is calculated from the measured raw meal used in the production multiplied with a fixed raw meal to clinker ratio.
- $Density_{NG}$: The density of the natural gas. This will be measured daily by a certified lab, as confirmed by the project participant. For the *ex-ante* calculations of the

emission reductions data sourced from the laboratory reports of the Sasol Patroleum Temane laboratory /22/ have been used.

4.5.3 Management system and quality assurance

A detailed description of the monitoring management system has been provided in the PDD. The overall project monitoring and verification responsibility is placed with the Marketing Manager at the Matola Gas Company, while the Matola Plant Manager will be the responsible for the overall project at the Matola plant. Furthermore, the responsibilities of the day-to-day supervision, monitoring, preparation of reports and quality control and identification of corrective actions are identified and placed with staff in the different entities involved in the proposed project. The monthly monitoring data will each year be aggregated and cross-checked against the original records. The monitoring report will be reviewed by the Matola Plant Manager and the CEO of the Matola Gas Company. The monitoring plan confirms that all data will be kept in electronic and hard-copy format and stored for two years after the end of the crediting period.

The staff in both companies is experienced in similar measurements, and training of the staff were performed in 2008. The monitoring plan is in DNV's opinion appropriate and in accordance with the methodology ACM0009 version 3, and the project participants are expected to be able to implement the monitoring plan.

4.6 Estimate of GHG Emissions

The emission reductions from the proposed project are calculated as the baseline emissions minus the project emissions and minus the leakage from the production of coal, diesel and production, transportation and distribution of natural gas:

$$ER_y = BE_y - PE_y - LE_y$$

The project emissions are calculated by estimating the amount of natural gas needed to fuel the rotary kiln, multiplied with the net calorific value of natural gas and the emission factor for natural gas. To estimate the amount of natural gas needed, the historical clinker production data have been divided by the expected energy efficiency of the process when using natural gas. This value has been set to the same as for coal for the project emission forecast.

According to the methodology ACM0009 version 3, the baseline emission factor and the net calorific value should be calculated based upon the fuel type used in the element processes with the lowest CO_2 emission factor. For this project, small quantities of diesel are used as start-up fuel, while the rotary kiln is designed to be run on coal only. As the diesel used only supplies 3% of the energy used in the kiln, a request for deviation was submitted to the CDM Executive Board on 10 February 2009 /37/ in order to allow the use of a weighted CO_2 emission factor derived from the CO_2 emission factor of coal and diesel. This request for deviation was approved at EB46.

The baseline emissions are hence calculated as the quantity of coal and diesel that would have been combusted in the absence of the project activity in the kiln, multiplied with the weighted average net calorific value of coal and diesel and a weighted average emission factor for coal and diesel. The quantity of coal and diesel consumed in the project activity is calculated as:

$$FF_{baseline,i,y} = FF_{project,i,y} \cdot \frac{NCV_{NG,y} \cdot \varepsilon_{project,i}}{NCV_{FF,y} \cdot \varepsilon_{baseline,i}}, \quad (1)$$

where $FF_{baseline,i,y}$ is the quantity of diesel and coal that would have been combusted in the absence of the project activity in year *y*, using a weighted average of the two fuels based on historical data. The $FF_{project,i,y}$ is the quantity of natural gas expected to be combusted in the kiln in year *y*. The parameters $NCV_{NG,y}$ and $NCV_{FF,y}$ are the net calorific values for natural gas and a weighted average of coal and diesel, respectively. The efficiencies $\varepsilon_{project,i}$ and $\varepsilon_{baseline,i}$ were set equal as explained above for forecasting baseline emissions.

In accordance with the methodology, leakage emissions from production, transportation and distribution of natural gas and from the production of coal and diesel are calculated. The leakage emissions are calculated by multiplying the estimated amount of natural gas used per year in the rotary kiln with the net calorific value for natural gas and the emission factor for natural gas and subtracting the corresponding emissions that would occur from the production of coal and diesel used in the absence of the project:

$$L_{CH4,y} = \left[FF_{project,y} \cdot NCV_{NG,y} \cdot EF_{NG,upstream,CH4} - \sum_k FF_{baseline,k,y} \cdot NCV_k \cdot EF_{k,upstream,CH4} \right] \cdot GWP_{CH4}$$

,

where $FF_{project,y}$ is the estimated quantity of natural gas combusted in the rotary kiln in year *y* and $FF_{baseline,k,y}$ the quantities of coal and diesel combusted in the absence of the project in year *y*, $NCV_{NG,y}$ and NCV_k are the net calorific values of natural gas in year *y* and the weighted net calorific values of diesel and coal in year *y* respectively, $EF_{NG,upstream,CH4}$ and $EF_{k,upstream,CH4}$ are the emission factors for natural gas and diesel and coal respectively, and GWP_{CH4} is the global warming potential of methane in the relevant commitment period.

The leakages from the baseline fuels, coal and diesel are calculated based on the historical use of these fuels in 2004 – 2006, where diesel constituted 3.1% and coal 96.9% of the energy content. The baseline fuel use is then calculated as in (1) above, where $\varepsilon_{project,i} = \varepsilon_{baseline,i}$.

The ex-ante estimate of the yearly emission reductions are then:

$ER_y = BE_y - PE_y - L_y =$ 99 448 tCO_2e -59 370 tCO_2e – 2 924 tCO_2e = 37 153 tCO_2e.

The baseline emission estimate can be replicated using the 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 transparent, and their accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.7 Environmental Impacts

As the proposed project will result in a switch from coal to natural gas as fuel in the rotary kiln, a reduction in dust and ash from the combustion processes is expected. Furthermore, the fuel switch eliminates the need for hazardous coal handling, and the risk of previously seen incidents where excessive CO_2 emissions have tripped the electrostatic precipitators, which has resulted in excessive releases of coal dust to the surrounding areas. The project proponent has provided a map of the project area /27/, and DNV was able to confirm that the gas pipeline has been built on land owned by CM. No negative environmental impacts have been identified from the project.

DNV was able to verify the environmental licence /23/ and the construction licence /24/ for the proposed project activity, and the construction licence /26/ for and approval /25/ of the gas supply system and can confirm that no negative environmental impacts have been identified.

4.8 Comments by Local Stakeholders

DNV has received copies of invitation letters for stakeholder's comments from the project proponent /29/. Letters were sent to different governmental bodies, oil companies, Matola City Municipality and the University of Eduardo Mondlane. Two comments were received, none being negative to the project. DNV considers the list of stakeholders contacted as complete and the consultation as adequate for this type of project.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 27 November 2007, version 01, was made publicly available on DNV's climate change website[1] and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 29 November 2007 to 28 December 2007.

No comments were received.

[1] http://www.dnv.com/focus/climate_change/projects/projectdetails.asp?ProjectId=1611

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	~~CAR 1~~ 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, Mozambique has designated Ministério para a Coordenação da Acção Ambiental (MICOA) as national authority. Norway has designated Det Kongelige Miljøverndepartement.

Requirement	Reference	Conclusion
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK,Mozambique has ratified the Kyoto protocol on 18 January 2005. Noway ratified the Kyoto Protocol on 30 May 2002.
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 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	~~CL13~~ OK
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 stakeholder involvement		

Requirement	Reference	Conclusion
13. 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
14. 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
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. 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
17. 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
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
19. 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 *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR	Yes. The project site is located at Matola, Maputo Province, Mozambique. It is located at coordinates 25^0 57' 27.47" S 32^0 29' 17.16" E.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	The technology is to use natural gas by replacing coal and diesel in firing a rotary kiln to produce clinker. The installation of the new system will consist of a gas distribution system piping, controls and jet burner. However technical specification of gas compressing system, power generation system and the area covered by gas pipelines need to be mentioned in the PDD. The length of the gas distribution systems needs to be provided for verification.	~~CL 2~~	OK
A.2. Participation Requirements *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.*					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	Mozambique is the Host Party and the private entities Matola Gas Company (MGC) and Carbon Limits A/S are the Project Participants in this project. Carbon Limits A/S must be approved by a Party.	~~CL28~~	OK
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	The LoA from the DNA of Mozambique needs to be provided for verification.	~~CAR 1~~	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	The host Party Mozambique signed and ratified the Kyoto Protocol in 18 November 2005, The Designated National Authority of Mozambique is Ministério para a Coordenação da Acção Ambiental (MICOA).		OK
1. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	No public funding from any Annex-I Party is available for the project activity.		OK
A.3. Technology to be employed *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.*					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes, the project aims to switch from Coal/ Diesel to Natural Gas by using high		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			efficiency precessing jet burner. The precession creates much larger scale of mixing, also the increased speed of jet. The precessing motion is generated without any moving part within the nozzle.		
- 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 aims to use natural gas for the process in the cement manufacturing plant. The change in fuel is stated to be the first of its kind in Mozambique. This needs to be verified on the basis of documents provided by project proponents.	~~CL 3~~	OK
A.3.2. Does the project make provisions for meeting training and maintenance needs?	/1/	DR, I	It should be clarified which provisions will be made for meeting training and maintenance needs.	~~CL 4~~	OK
A.4. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	The host Party 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	Other environmental or social benefits than GHG emission reductions need to be addressed in the PDD.	~~CL 5~~	~~OK~~
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/	DR	Yes, the project applies an approved consolidated methodology ACM0009 version 3 "Consolidated baseline methodology for fuel switching from coal or petroleum to natural gas", dated 28 July 2006, which is still valid.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR, I	According to the applicability criteria as set out in the methodology, ACM0009 is applicable to a situation where: The fuel switching is undertaken in processes for heat generation that are located at and directly linked to an industrial process with a main output other than heat or that provide heat to a district heating system by means of heat-only boilers. This project activity switches fuel from coal to natural gas in element process. 1) Prior to the implementation of the project activity, only coal or petroleum fuel (but no natural gas) have been used in the element processes. ▪ From the coal purchase /4/ and the quantity of coal used /5/ in the plant it was evident that coal was used by the project proponent in rotary kiln. Values provided in the purchase	~~CL 6~~ ~~CAR 2~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			receipts and the statement mentioning quantity of coal consumed, do not match, Justification and documentation of the discrepancy needs to be provided. 2) Regulations/programs do not constrain the facility from using the fossil fuels being used prior to fuel switching. 3) Regulations do not require the use of natural gas or any other fuel in the element process. ▪ The PDD needs to discuss and document relevant national and sectoral policies, macro-economic trends and political aspirations, to justify that there is no constrain on fuels used prior to the project, or requirement for the use of natural gas or other fuels used in the element process. 4) The project activity does not increase the capacity of thermal output or lifetime of the element process during the crediting period nor is there any thermal capacity expansion planned for the project facility during the crediting period. ▪ The PDD does not state clearly whether the project proponents are planning for expansion, though the same has been claimed. A detailed project report has to be provided for		

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			verification along the onsite verification. ▪ The lifetime of the project activity needs to be mentioned in the PDD. 5) The proposed project activity does not result in the integrated process change. ▪ Whether there is any change in process is not evident in this PDD except for the fuel switch. The project proponent is requested to clarify this in the PDD.		
B.2. Baseline Scenario Determination *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.*					
B.2.1. What is the baseline scenario?	/1/	DR	The identified baseline scenario is that in the absence of the CDM project activity, MGC would continue to use coal or petroleum fuel for their operations. Refer to B.2.2.		
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR, I	The methodology requires the identification of a baseline scenario through a 3-step process: Step 1: Identify all realistic and credible alternatives for the fuel use in the element process. The following alternatives have been identified.	~~CL 8~~ ~~CL 9~~ ~~CAR 3~~ ~~CL 10~~ ~~CL 11~~ ~~CL 12~~ ~~CL 16~~	OK

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			Alternative 1: Continuation of the current practice of using coal and/or petroleum fuel; Alternative 2: Switching from coal or petroleum fuel to a different fuel than natural gas (such as biomass); Alternative 3: The project activity not undertaken under the CDM (switching from coal and/or petroleum fuel to natural gas); Alternative 4: Switching from coal or petroleum fuel to natural gas at a future point in time during the crediting period; Baseline scenarios 3 and 4 were not compared in the PDD. A discussion of possible differences in scenario 4 is requested. Step 2: Eliminate alternatives that are not complying with applicable laws and regulations The PDD states that all alternatives considered above are consistent with mandatory laws and regulations hence no alternative faces any barrier here in implementation. Justification and documentation needs to be provided, in particular with regard to any regulations on coal imports from South Africa. Step 3: Eliminate alternatives that face	~~CL 15~~	

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			prohibitive barriers As per the methodology, scenarios that face prohibitive barriers should be eliminated in the step 3. To assess prohibitive barriers, all scenarios must be assessed by applying step 3 of the latest version of "Tool for demonstration assessment and additionality". The project proponent has used the version 3 of the Tool for demonstration assessment and additionality wherein they are required to use version 5 which is latest version agreed by CDM Executive Board. The following barriers have been identified: Barrier 1: Investment Barrier Barrier 2: Technological Barrier Barrier 3: Prevailing Practice Barrier Barrier 4: Security of fuel supply Barrier 1: Investment Barrier :- According to the PDD, none of the alternatives face an investment barrier, because the project developer is a subsidiary of a multinational company and hence has access to capital. Barriers that are not prohibiting any of the alternatives should be removed from the PDD. According to the PDD, fuel switch to biomass (alternative 2) will face a technological barrier as there is no experience available for implementation of		

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			this alternative. There are no cement companies using this fuel in Mozambique and South Africa. Also, the technology may prove highly risky as there is a need to study the process and prepare this fuel for mixing or using solely on biomass. Usage of biomass will require major changes in the combustion system in the plant leading to higher technological risks. Documentation that no other clinker plant in Mozambique or South Africa is using biomass as fuel is required. The PDD version 1.0 states that Alternative 2, 3 and 4, which all involve fuel switch, will face barriers due to prevailing practice. There is only one cement kiln in Mozambique and that is using coal as fuel. The project proponent is requested to provide documentation that there are no cement companies using fuels other than coal, in Mozambique and South Africa. Furthermore, it is argued that Alternative 2 will face a barrier due to supply risk as there is no surplus biomass available that could be utilized as fuel in Mozambique. Alternative scenarios 3 and 4 are also claimed to face a supply risk barrier. However this needs to be substantiated. Gas is available in Maputo area where this project activity is implemented, so there		

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			should not be any dependency on negotiations between Mozambique and South African governments. This argument is not accepted. According to IEA data for 2005, Mozambique exported 99% of its production to South Africa. It needs to be substantiated how a supply risk of natural gas in Mozambique is considered realistic. According to the PDD version 1.0, fuel supply would not be a barrier to alternative 1 as there is availability of coal from South Africa is possible as its being implemented in pre-project activity. It has been claimed in the argument that the influence of both Governments of Mozambique and South Africa can be crucial for the supply of gas. Therefore supporting proofs are needed to justify why political risks would not be a possible barrier to the supply of coal from South Africa to Mozambique (scenario 1). Step 4: Compare economic attractiveness of remaining alternatives In the step 4, a comparison of the net present values of the remaining scenarios is to be presented, by applying step 2 of the latest version of the "Tool for demonstration and assessment of additionality".		

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			Although the PDD argues that baseline scenario 3 faces barriers of technology, prevailing practice, and fuel supply, both baseline scenarios 1 and 3 have been compared. Upon the project participants' response to the clarifications raised under steps 1-3 above, it needs to be reassessed if more alternative baseline scenarios should be included in the investment comparison. Pending clarification on the starting date, it needs to be confirmed that all sources of input data for the investment comparison were available and up-to-date at the time of the investment decision. As per methodology, economic investment analysis for above mentioned scenarios is done below: ▪ Investment Requirement: Scenario 1, the continuation of current practice does not require additional investment. For scenario 3, the project activity without CDM, the changes in the plant, process, fuel supply chain and other related infrastructure requires the investment of €450,000 based on quotes from equipment suppliers.		

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			Quotes provided for every equipment need to be provided for verification. ▪ Discount Rate: Cimentos de Mozambique will raise the finance as the prevailing rate of 12.8 % which is available in the Mozambique financial market. Proofs regarding the market rate need to be provided for verification. ▪ Efficiency of elemental process taking into account any differences between fuels: The clinker manufacturing data has been taken from 2003 to 2005 as the manufacturing in 2006 was hampered by the maintenance problem. The data for calculating efficiency, the data has been taken from 2007 and for other calculation average manufacturing data has been taken from 2003 to 2005- The relation between these two data sets needs to be justified. Sources for both energy efficiency and yearly manufacturing need to be provided for verification. ▪ The type of maintenance needs to be justified along with sufficient proofs to substantiate the assumed maintenance costs.. ▪ Proofs regarding the quantity of coal and		

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			diesel taken in for calculation needs to be provided for all three years. ▪ Sources for the specific heat, fuel cost and calorific value need to be provided. The calculation needs to be elaborated. Use of proper units corresponding to the value needs to be done. ▪ Current Price and expected future price of each fuel: At present the coal prices in Mozambique are 50.00 USD/Tonne and it has increased more than 60 % from 2005 to 2007. As per the Energy Information Administration, Mozambique, the prices are going to increase due to demand in power generation and industrial growth. Natural Gas prices are driven by production cost and the infrastructure developed to supply gas. Matola Gas Company has a contract with Cimentos do Mozambique to supply Natural Gas at a discounted price. It has also been contracted that the revenue earned from successful CDM project would be claimed by the gas supply company. Documentation of the coal price hike, as well as evidence for natural gas prices in Mozambique needs to be provided for verification. ▪ Cost comparison needs to be carried out		

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			based on the requirement of fuel considering the energy content of the respective fuel. ▪ The quantity of natural gas assumed in the NPV calculation sheet provided for verification is different from the one provided in the PDD. Please clarify with supporting documents. ▪ The value provided for specific energy consumption in the PDD and the NPV analysis are not exactly the same, correction needs to be done. ▪ Justification and documentation need to be provided for fixing a 1% escalation in the natural gas consumption when the contract is already fixed with gas supplying company. ▪ According to IEA data for 2005, Mozambique exported 99% of its production to South Africa. It needs to be substantiated how a supply risk of natural gas in Mozambique is considered realistic. ▪ The running costs of the cement kiln are, even after including high CER revenue, still increased by the project and an investment has to be done. Given that the cement plant still are claimed to be allowed to continue using coal from South Africa, DNV requests an		

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			explanation for how this project may be realized. ▪ ACM0009 version 3 requires the lowest carbon intensive fuel used in the baseline to calculate the baseline emissions, not a weighed average of the baseline fuel mix. The net calorific value also needs to be changed according to the baseline fuel. Updated PDD is requested. ▪ Operating cost for each fuel: Coal is usually transported from South Africa and it is further pulverized prior to injection in the kiln. There would be some maintenance cost associated with supply and distribution of natural gas. But it is not feasible to predict since there is no other cement plant in the country use natural gas. Given the uncertainty it has been conservatively assumed that maintenance costs associated with supply and distribution of natural gas are zero. A detailed analysis on the operating cost for coal need to be prepared and provided for verification along with supporting proofs. The operating cost of Natural Gas need to be obtained from the technology supplier. The same need to be provided for verification.		

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			▪ In the financial analysis it is assumed no change in O&M costs and this is described as conservative. DNV request evidence for an apparently simpler gas system does not reduce the O&M costs. ▪ Lifetime of the project, equal to the remaining lifetime of the existing heat generation: The PDD version 1.0 states that the rotary kiln was installed in 1920 and it can be used more than 20 years. The estimated lifetime of the equipment installed is also 20 years. There is no local market for second hand gas injection burner and there would be no residual value of any equipment used by the project. Supporting proofs for the stated lifetime for the existing rotary kiln and the gas injection burners for verification. ▪ Other operational and maintenance cost: No other operation and maintenance costs are expected ▪ Energy efficiency: it is possible that natural gas will lead to higher energy efficiency, yet there are no conclusive evidences of this in the region or country. For this reason, the project proponent has taken the efficiency of the plant same to that of using coal. The contract document from technology		

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			supplier mentioning the efficiency needs to be provided for verification. ▪ A sensitivity analysis has been carried out studying the effect of a +/-30% variation in the gas price and the coal price. DNV requests a sensitivity analysis that clarifies at which level of variation each significant parameter (contributing to more than 20% of cost or income) would make the NPV equal zero, as well as a discussion of the likelihood of such a variation happening.		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR, I	The methodology has been followed. Please refer to section B.2.2 above	~~CL 8 – CL 15~~	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR, I	Please refer to section B.2.2 above	~~CL 8 – CL 15~~	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	Please refer to section B.2.2 above	~~CL 8 – CL 15~~	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	Please refer to section B.2.2 above	~~CL 8 – CL 15~~	OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR, I	The major risks to the assumptions on which the baseline has been determined, need to be addressed in the PDD	~~CL 8 – CL 15~~	OK

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B.3. Additionality Determination *The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.*					
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR, I	As per the methodology, the assessment of additionality comprises three steps: Step 1: Investment analysis and sensitivity analysis: According to the methodology ACM0009 v03, an investment analysis is to be undertaken as per step 4 of the baseline determination above, and a sensitivity analysis carried out as per substep 2d of the latest version of the Tool for the demonstration and assessment of additionality. The conclusion of the investment analysis is pending the project participants' response to the clarification requests raised under step 4 of the baseline determination. Please refer to section B.2.2 above. Step 2: Common Practice Analysis It has been argued that CM is the only producer of clinker in Mozambique and it has used coal historically for the manufacturing of clinker. There are also no examples of similar fuel being used in clinker production in South Africa. The project proponent is requested to provide	~~CAR 4~~ ~~CL 13~~ ~~CL 10~~	OK

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			documents justifying the argument that there no cement companies using fuels other than coal, in Mozambique and South Africa. Step 3: Impact of CDM registration According to the contract between Matola Gas Company and Cimentos do Mozambique, CdM will be able to purchase gas at a lower price due to the CER revenue that MGC will receive. The revenue generated from CERs obtained as a result of valid CDM project registration will make the project activity financially viable as in terms of offsetting the price of natural gas. DNV's conclusion on this is pending response to the clarifications requested under section B.2.2 above.		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR, I	Refer to B.3.1.	~~CL 10~~ ~~CL 13~~	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR, I	Refer to B.3.1.	~~CL 10~~ ~~CL 13~~	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	The project activity starting date has been defined in the PDD version 1.0 as 25 December 2007. As per the guidance of EB33, the starting date should be defined the earliest of "implementation, construction or real action",	~~CL 16~~	OK

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			i.e. in practice corresponding to the date of the final investment decision. The project developer is requested to clarify whether the project start date refers to the construction start date or the commissioning date of the plant. The project developer is also requested to provide the evidence for the starting date of the proposed project. The project was submitted for validation and published for stakeholder comments on 29 November 2007. If the project starting date is revised to a date before 29 November 2007, the project developer is requested to provide the evidence for the earliest serious consideration of CDM for the proposed project activity.		
B.4. Calculation of GHG Emission Reductions – Project emissions *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.*					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The following points need to be clarified. The assumed quantity of the natural gas is not consistently given in the PDD versus the supporting documentation. Clarification is requested With regard to the density of the natural gas,	~~CL 17~~ ~~CL 18~~	OK

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			supporting documents are to be provided for the calculation of density. Accreditation certificate of the Temane Gas Field lab needs to be provided for verification.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Please refer to B.4.1	~~CL 17~~ ~~CL 18~~	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR, I	Uncertainties as mentioned below need to be addressed: The monitoring of the gas leakage at various joints leading to jet burners. The measures to be taken into account if an emergency situation occurs.	~~CL 21~~	OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions *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.*					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	ACM0009 version 3 requires the least carbon intensive fuel used in the baseline to calculate the baseline emissions, not a weighed average of the baseline fuel mix. An updated PDD is requested. Records for diesel consumption need to be provided for validation. It is claimed that data for 2006 were not consistent as maintenance work hampered the production. Supporting documents need to be	~~CAR 6~~ ~~CL 19~~	OK

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			provided for validation. The type of coal used earlier has not been mentioned. The supporting proofs regarding the NCV needs to be provided for validation. It should be clarified if the laboratory used for analysis of the NCV of coal purchased by CdM is accredited by a third party.		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Please refer to B.5.1	~~CL 19~~	OK
B.6. Calculation of GHG Emission Reductions – Leakage *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.*					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR, I	According to the PDD version 1.0 the leakage estimated for the project will be negative because the upstream fugitive methane emissions related to coal and diesel extraction are greater than the upstream fugitive methane emissions resulting from the extraction and distribution of natural gas. The calculation of leakage needs to be elaborated to be in accordance with the formulae given in the methodology, including the units used. Supporting proofs should be provided to	~~CL 20~~	OK

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			demonstrate that the coal supplied to the clinker plant is from underground mining.		
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Please refer to section B.6.1 above.	~~CL 20~~	OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR, I	Please refer to section B.6.1 above.	~~CL 20~~	OK
B.7. Emission Reductions *The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.*					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	The conclusion on this point is pending clarification of Sections B.2-B.6 above.	~~CL 20~~	OK
B.8. Monitoring Methodology *It is assessed whether the project applies an appropriate monitoring methodology.*					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes, the monitoring plan is documented according to the approved consolidated methodology ACM0009 is complete & transparent.		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Yes, the data required for verification and issuance would be kept for two years after the end of the crediting period for this project activity.		OK

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B.9. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
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	Yes, the monitoring plan provides for the collection and archiving of all the relevant data necessary for the estimation of the GHG emissions over the entire crediting period.		OK
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	The choice of carbon dioxide as the GHG indicator is reasonable and conservative.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR, I	Calibration of equipments, frequency and maintenance schedule has to be provided for verification.	~~CL 21~~	OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR, I	Yes. The measurement of clinker would be done by the scale at the exit of cooler that needs to be testified by other options.	~~CL 21~~	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	The measurement accuracy and corrective actions are to be addressed in case of erroneous measurement. Procedures need to be addressed to deal with erroneous measurements need to be given.	~~CL 21~~	OK
B.9.6. Is the measurement *interval* identified and deemed appropriate?	/1/	DR, I	The measurement interval needs to be addressed in the PDD.	~~CL 21~~	OK
B.9.7. Is the *registration, monitoring, measurement* and *reporting* procedure defined?	/1/	DR, I	Matola Gas Company is responsible for monitoring and reporting of the measured	~~CL 21~~	OK

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			data from production unit of Cementos do Mozambique. However the responsibility regarding registration needs to be addressed.		
B.9.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR, I	Same as above	~~CL 21~~	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	Procedures need to be identified for day-to-day records handling.	~~CL 21~~	OK
B.10. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.*					
B.10.1. 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, the monitoring plan provides for the collection and archiving of all the relevant data necessary for the estimation of the GHG emissions over the entire crediting period. The quantity and energy content of natural gas, and the combustion efficiency of the element processes are needed to calculate baseline emissions, and are the same as to determine project emissions.		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes. The project uses the ex-ante determination of emission factor. The choices of baseline GHG indicator are reasonable and conservative.		OK

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B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR, I	As the measurements methods to determine baseline emissions are the same as to determine project emissions, please refer to the clarification raised in section B.9 above.	~~CL 21~~	OK
B.10.4. Is the measurement *equipment* described and deemed appropriate?	/1/	DR, I	Refer to B.10.3	~~CL 21~~	OK
B.10.5. Is the measurement *accuracy* addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR, I	Refer to B.10.3	~~CL 21~~	OK
B.10.6. Is the measurement *interval* for baseline data identified and deemed appropriate?	/1/	DR, I	Refer to B.10.3	~~CL 21~~	OK
B.10.7. Are the registration, *monitoring, measurement* and *reporting* procedure defined?	/1/	DR, I	Refer to B.10.3	~~CL 21~~	OK
B.10.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR, I	Refer to B.10.3	~~CL 21~~	OK
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	Refer to B.10.3	~~CL 21~~	OK
B.11. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					

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B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/		Yes. The parameters needed to determine leakage are the same as to determine project and baseline emissions.		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/		Yes.		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/		Please refer to the clarification raised in section B.9 above.	~~CL 21~~	OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	The PDD does not mention any requirement of Mozambique regarding the monitoring of sustainable development indicators or environmental impacts. Host country requirement on collection and archiving of relevant data concerning environmental, social and economic impacts along with status on sustainable indicators if set by the host country need to be addressed.	~~CL 22~~	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	Please refer to section B.12.1 above.	~~CL 22~~	OK

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B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	Please refer to section B.12.1 above.	~~CL 22~~	OK
B.13. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR	The authority and responsibility of the project management need to be identified in the PDD.	~~CL 23~~	OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Detailed procedures for training of monitoring personnel are to be addressed in the PDD.	~~CL 23~~	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Procedures for emergency preparedness for cases when emergencies can cause unintended emissions need to be addressed.	~~CL 23~~	OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	Procedures for review of reported results/ data need to be identified in the PDD.	~~CL 23~~	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	Procedures for corrective actions in order to provide for more accurate future monitoring and reporting need to be addressed in the PDD.	~~CL 23~~	OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					

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C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR, I	The starting date of the project activity has been defined as 25 December 2007. The operational lifetime of project is 20 years. Proofs regarding the start of the project activity and lifetime need to be provided for verification. A complete timeline should be provided of the chronological order of events since the conceptualisation of the project until submission of the project for validation.	~~CL 16~~	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 stated as 1 January 2008. This needs to be revised.	~~CL 24~~	OK
D. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	The PDD version 1.0 states that the fuel switch will reduce the emission of CO_2 and the impact is positive compared to usage of coal in the kiln. It needs to be clarified whether the fuel switch involves the installation of a gas distribution pipeline feeding the burner, that could have local environmental impacts.	~~CL 25~~	OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR, I	The PDD version 1.0 states that the environmental licensing authority did not ask for an EIA.	~~CL 26~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Documentation of environmental approvals needs to be provided for verification.		
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	Please refer to section D.1.1 above.	~~CL 25~~	OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	N/A.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	Please refer to section D.1.1 above.	~~CL 25~~	OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Documentation of environmental approvals needs to be provided for verification.	~~CL 26~~	
E. Stakeholder Comments *The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.*					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR, I	Yes, a summary of the proposed CDM project activity was sent to a list of stakeholders, inviting comments by 8 November 2007. The stakeholder invitation letter is requested to be provided for validation.	~~CL 27~~	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR, I	Pending clarification requested in section D.1.1 above, it should be clarified if landowners would have to be consulted in case the project requires purchase of land for a gas pipeline leading to the clinker plant.	~~CL 25~~	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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	According to the PDD version 1.0, a stakeholder consultation process for CDM projects is not required by law in Mozambique. Please refer to section E.1.3 above.	~~CL 25~~	OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR, I	Yes. Two comments were received for the project, both of which have been included in the PDD.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes. Refer to E.1.4. No action was needed.		OK

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Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.5. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/4/	DR	The LoA has been received from the project participant.		OK
A.6. 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	Yes, the PDD provides an accurate and transparent description of the project activity.		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 proposed project involves modification of a rotary kiln, and the construction had started at the start of validation.		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	The project is a large scale project with estimated annual emission reductions of 37 176 tCO_2e per year. An on-site visist was carried out in week 7 of 2008.		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 project involves a modification of a rotary kiln, and the differences have been clearly described in the PDD.		OK
A.7. Project emissions not addressed by the methodology					
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	Yes, all project emission sources that contributes 1% or more to the emission reductions are included in the methodology.		OK
A.8. Documentation of baseline emissions					
A.4.1 Documentation of the baseline determination:	/1/	DR,	a) The assumptions and data used in the		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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		I	calculations of the baseline emissions have been listed in the PDD, and their references are properly described. b) All documentation has been provided to DNV for verification, and DNV can confirm that the documentation is correctly quoted and interpreted. c) The assumptions and data used in the baseline determination are deemed reasonable. d) The PDD refers to the relevant policies for fuel use in the baseline determination. e) The baseline determination has been performed in accordance with the methodology.		
A.9. Documentation of the calculations					
A.5.1 Algorithms and/or formulae used to determine emission reductions • 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 • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • 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.	/1/ /5/-/14/ /16/ /20/-/22/	DR	a) The assumptions and data used in the calculations of the baseline emissions have been listed in the PDD, and their references are properly described. The calculation has been provided to DNV by the project participant and DNV can confirm that the calculations are done correctly. b) All documentation has been provided to DNV for verification, and DNV can confirm that the documentation is correctly quoted and interpreted. c) The assumptions and data used in the emission reduction calculations are deemed		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			reasonable. e) The calculations of the emission reductions have been performed in accordance with the methodology. The project participant has provided DNV with a spreadsheet which enables the calculations to be replicated.		
A.10. 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 by monitored ex-post and verified later by a DOE?	/1/	DR, I	The project proponent has clearly described in the monitoring plan how the emission reductions can be implemented. The project proponent has previous experience with similar monitoring and is using expertise from other parts of the parent company for training. Responsibilities for data management and QA/QC procedures are properly addressed in the monitoring plan. The emission reductions can in DNV's opinion be properly achieved, monitored and later verified by a DOE.		OK
A.11. 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	Minutes from the Board meeting in Matola Gas Company on 30 May 2007 states that the Board decided to proceed with the Cimentos project as a CDM project. This is prior to the project starting date (3 July 2007), and six months prior to the start of validation (29 November 2007)		OK

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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 1 The LoA from the DNA of Mozambique needs to be provided.	Table 1, A.2.2, A.4.1,	Letter of approval received 31 August 2008, and forwarded to DNV (see Appendix A1). All of the data on project information and project participants in the revised PDD matches the data in the Letter of Approval.	Ok. Both the LoAs from Mozambique and Norway have been received and checked by DNV. **This CAR is closed.**
CAR 2 The applicability criterion on lifetime of existing equipment needs to be discussed and substantiated.	B.1.2	Eng. Antonio Miranda, Plant Manager of the Matola Plant has verified the lifetime of the plant and the maintenance procedures in place to ensure that kiln life is as long as project life, as shown in Appendix A2.	Ok. The project proponent has provided a statement explaining that the rotary kiln will have a useful life for at least another 25 years without requiring replacement. As the project has a lifetime of 15 years, it will hence not affect the lifetime of the element processes. **This CAR is closed.**
CAR 3 According to the PDD, none of the alternatives face an investment barrier, because the project developer is a subsidiary of a multinational company and hence has access to capital. Barriers that are not prohibiting any of the alternatives should be removed from the PDD.	B.2.1, B.2.2, B.2.3, B.2.4, B.2.6	This barrier has been removed in the revised PDD.	Ok. The barrier has been removed from the PDD. **This CAR is closed.**
CAR 4 The project proponent has used the version 3	B.2.2 B.3.2	This has been changed in the revised PDD.	Ok. The revised PDD refer to version 5 of the "Tool for the demonstration and assessment of additionality".

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
of tool for demonstration assessment and additionality whereas they are required to use version 5 which is the latest version adopted by the CDM Executive Board.			**This CAR is closed.**
CAR 5 The running costs of the cement kiln are, even after including high CER revenue, still increased by the project and an investment has to be done. Given that the cement plant still are claimed to be allowed to continue using coal from South Africa, DNV requests an explanation for how this project may be realized.	B.2.1, B.2.2, B.2.3, B.2.4, B.2.6	The project proponent has provided an NPV analysis which considers the discount on the gas prices given in return for the rights to the CERs by the MGC.The NPV analysis provided show that the NPV becomes positive when the gas discount given by MGC is considered.	When considering the discount given on the gas price by MGC in return of the rights to the CERs, the NPV becomes positive, and the fuel switch project is financially viable. The calculations and input data have all been checked by DNV, and is found acceptable. **This CAR is closed.**
CAR 6 ACM0009 version 3 requires the least carbon intensive fuel used in the baseline to calculate the baseline emissions, not a weighed average of the baseline fuel mix. The net calorific value needs to be changed according to the baseline fuel. Updated PDD is requested.	B.5.1	While there is some diesel use in the kiln during start up periods, as reported in the PDD, the Plant Manager at the Matola Plant (Appendix A2) has confirmed that the existing kiln is designed to run on only coal as the main fuel. The plant has a dedicated pulverised fuel handling system for coal. It can not be run on diesel as the main fuel, so using this diesel as the baseline fuel would be technical incorrect.	A deviation request has been submitted to, and approved by, the CDM Executive Board. **This CAR is closed.**
CL 1 A complete timeline should be provided of the chronological order of events since the		A timeline has been included in the revised PDD. MGC contracted ECON Carbon (now Carbon Limits) to be PDD consultant on 16 April 2007; the MGC	Ok. The contract between MGC and Econ dated 16 April 2007, the minutes of the MGC Board meeting of 30 May 2007, the contract between Cimentos

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
conceptualisation of the project until submission of the project for validation.		Board Decision to move forward with the carbon credits project on 30 May 2007, and the 3 July 2007 date of signing the Cimentos-MGC Gas Supply Contract. The starting date of the project is therefore 3 July 2007, when a binding financial commitment contingent upon the CDM project development was made by MGC and CM. The completed PDD was submitted to DNV for validation on 27 November 2007.	and MGC dated 3 July 2007 have all been received from the project proponent and verified by DNV. **This CL is closed.**
CL 2 ▪ Technical specifications of gas compressing system, power generation system & area that is covered by the gas pipelines are not mentioned in the PDD. ▪ The length of the gas distribution systems needs to be specified.	A.1.2, A.3.1, A.4.2	There is no gas compression or power generation system. The specifications of the gas pipelines are presented in technical drawings and maps submitted to DNV. The overall process flow of the Matola plant is provided to DNV. The gas pipelines are entirely within land owned by CM, as shown in the map provided to DNV. The supply pipeline is 1.3 km and the internal pipeline is 0.2 km.	All referred documents have been received from the project proponent. **This CL is closed.**
CL 3 The claim that the project is first of its kind in the country needs to be justified.		The only two cement producers in Mozambique are CM and ARJ Group (see USGS article provided to DNV). Matola is the only clinker production facility in CM (letter provided to DNV). As stated in the letter from Ministry of Energy, there is	The referred documents confirm that there is only two cement producers in Mozambique, and that the Matola plant is the only clinker production facility in CM. The documents were received by the

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
		no clinker production at ARJ's Nacala plant.	project proponent and verified by DNV. **This CL is closed.**
CL 4 It should be clarified which provisions will be made for meeting training and maintenance needs		Training is covered in the revised PDD under the monitoring plan. The maintenance needs for the burner are presented in Appendix A12. The maintenance needs for the CMS and Pipeline are presented in Appendices A13-A16. Additional training was not required for the CMS or pipeline. All MGC pipelines are covered by maintenance agreement with Sasol, as shown in Appendix A16.	Ok. The provisions for training have been described in the PDD. Description of the maintenance needs and procedures and training have been submitted to DNV from the project proponent, and verified by DNV. **This CL is closed.**
CL 5 The PDD should address whether the project has any other environmental or social benefits than GHG emission reductions, such as land-use in case gas is distributed to the clinker plant via a pipeline.		The main local environmental benefit is the reduction of particulate emissions, as evidence by the emissions monitoring data showing the drop in particulate emissions after installation in April 2008, appendix submitted to DNV. In addition, there is a national economic benefit from using domestic energy resources. The pipeline is all on CM land that is not used for any other purpose, as shown by the map in submitted to DNV.	The project proponent has provided DNV with copies of the environmental licence and construction licence for the project activity, together with the construction licence and approval for the gas pipeline. A map og the project area was provided, showing that the gas pipeline was built on the property of CM. **This CL is closed.**
CL 6 The proposed project activity's compliance	B.1.2, B.2.5,	Historical coal consumption is presented in Table 2 of the revised PDD. The evidence for these purchases is the	The coal reports have been checked and found consistent.

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
with each of the applicability criteria of ACM0009 needs to be justified in the PDD: ▪ Values provided in the purchase receipts and the statement mentioning quantity of coal consumed, do not match, justification on the same along with supporting documents need to be provided. ▪ The PDD needs to discuss and document relevant national and sectoral policies, macro-economic trends and political aspirations, to justify that there is no constrain on fuels used prior to the project, or requirement for the use of natural gas or other fuels used in the element process. ▪ The applicability criterion on the lifetime of existing equipment needs to be discussed and substantiated. ▪ The PDD needs to state clearly whether the project proponents are planning for expansion though the same has been claimed. A detailed project report has to be provided for verification, and the lifetime of the project activity needs to be mentioned in the PDD. ▪ It should be specified whether the project activity leads to changes in the integrated	B.2.7,	Cimentos Matola Plant Monthly Reports and the supporting coal delivery notes and invoices. Coal consumption is calculated from coal deliveries and change in coal stocks. Coal stocks are measured on a monthly basis using aerial photography, as provided to DNV, and levels and consumptions are corrected each month accordingly. The calculations are shown in the "input data" sheet of the revised "Cimentos NPV, ver02.xls". Mozambique and South Africa are both members of the WTO (www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm), so they are not legally allowed to restrict fuel trade. In addition, both countries are signatories to the SADC Protocol on Energy (www.sadc.int/index/browse/page/147), which promotes energy trade and self-reliance within the region. SA is the 3rd largest coal exporter in the world (tonto.eia.doe.gov/country/country_energy_data.cfm?fips=SF). This is covered by the letter from Antonio Miranda, Plant Manager submitted to DNV. There is no expansion planned, as	The argumentation regarding fuel constraints is accepted based upon the evidences presented by the project participant. The lifetime of the existing equipment, and possible future expansion plans have been discussed and clarified by a letter from the CM plant manager. This letter also clarifies that no changes in the integrated element process will take place. **This CL 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
elemental process.		evidenced in the letter from Antonio Miranda, Plant Manager. The project consists of the specifications agreed during implementation after July 2007, as presented to DNV. None of these covers any plant expansion or integrated process changes.	
CL 7 Major risks to the assumptions of the baseline need to be identified and addressed in the PDD.		The major risk to any significant capital investment in Mozambique is the unstable political and economic climate. This limits capital investment, drives up local lending rates, and makes it more difficult to import and maintain equipment. The fact that CM is a subsidiary of the multi-national corporation, CIMPOR, does overcome some of these risks, but there are still risk in the economic climate in Mozambique that CM and MGC must constantly monitor and address.	Ok. **This CL is closed.**
CL 8 Baseline determination – step 1 Baseline scenarios 3 and 4 were not compared in the PDD. A discussion of possible differences in scenario 4 is requested.	B.2.2	The revised PDD discusses Scenario 4 in more detail. Scenario 4 faces a prohibitive barrier related to fuel supply, because MGC must secure consumers for their royalty gas urgently in order to be profitable and also to request more than the minimum guaranteed gas quantities. This means that implementing this project	Ok. The PDD is revised and includes a discussion of the scenario 4. **This CL 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
		4-5 years in the future would not be possible because it is very unlikely that this quantity of gas would still be available in Matola.	
CL 9 Documentation needs to be provided to substantiate that all baseline scenarios identified are in compliance with mandatory laws and regulations and therefore do not face any legal barriers, in particular with regard to any regulations on coal imports from South Africa. Consideration of relevant national and/or sectoral policies, political aspirations need to be clarified by the project proponent.	B.2.1, B.2.2, B.2.3, B.2.4, B.2.6, D.1.6	In terms of scenario 1, Mozambique and South Africa are both members of the WTO (www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm), so they are not legally allowed to restrict fuel trade. In addition, both countries are signatories to the SADC Protocol on Energy (www.sadc.int/index/browse/page/147), which promotes energy trade and self-reliance within the region. SA is the 3rd largest coal exporter in the world (tonto.eia.doe.gov/country/country_energy_data.cfm?fips=SF). In addition, Mozambique itself has significant coal reserves that will be developing in coming years. (Evidences provided to DNV. See also Mozambique's Initial National Communication (INC) to the UNFCCC unfccc.int/resource/docs/natc/moznc1.pdf). In terms of scenarios 3 and 4, Mozambique's energy policy includes investment in developing energy	Ok, the memberships of WTO and SADC serves as evidences for that there are no legal barriers or restrictions on the import of coal from South Africa to Mozambique. **This CL 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
		resources as a priority and there are significant gas reserves under development (See evidences provided to DNV and Mozambique's INC).	
CL 10 Step 3- Barrier 2 and 3: Use of fuel such as biomass; Prevailing practice The project proponent is requested to provide documentation that there are no cement companies using fuels other than coal, in Mozambique and South Africa.	B.2.1- B.2.6	As the letters from CM and Ministry of Energy show, the only clinker plant in Mozambique is the Matola plant (evidences provided to DNV), so there is no fuel use other than coal in clinker production in Mozambique (see reply to CL6). SA is not a relevant comparison because of the much higher level of development, different primary energy mix, and different industrial and resource base. Nevertheless, the four largest producers of cement, Holcim/Afrisam, NPC, PPC and Lafarge, have stated that they are not using natural gas or alternative fuels (evidences provided to DNV).	Ok. The project participants have provided evidences which have been verified by DNV. **This CL is closed.**
CL 11 Step 3 – Barrier 4: Fuel supply It needs to be substantiated how a supply risk of natural gas in Mozambique due to the political relations between Mozambique and South Africa is considered realistic (scenario 3 and 4).	B.2.1- B.2.6	This barrier has been deleted	Ok. The PDD has been revised. **This CL 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 12 Step 3 – Barrier 4: Fuel supply Supporting proofs are needed to justify why political risks would not be a possible barrier to the supply of coal from South Africa to Mozambique (scenario 1).	B.2.1- B.2.6	This barrier has been deleted. As mentioned above, South Africa and Mozambique's membership in the WTO, and their accession to the SADC Energy Protocol, would preclude any restrictions of coal supply from SA to Mozambique.	Ok. The PDD has been revised. **This CL is closed.**
CL 13 Proofs and sources of all assumptions made in the NPV calculation sheet need to be provided for verification. i) Investment requirement: Quotes provided for every equipment need to be provided for verification. ii) Discount rate: Proofs regarding the market rate need to be provided for verification. iii) Efficiency of elemental process taking into account any difference between fuels: The data for calculating efficiency, the data has been taken from 2007 and for other calculation average manufacturing data has been taken from 2003 to 2005. Please justify the relation between these two data sets. Sources for both energy efficiency and yearly manufacturing need to be provided for verification.	Table 1, B.2.1, B.2.2, B.2.3, B.2.4, B.2.6, B.3.1, B.3.2, B.3.3,	These assumptions are presented in the additionality section of the revised PDD. i) Investment requirement The burner cost is based on a quote from a supply in Appendix A28. The cost of the internal supply pipeline and CMS were estimated by MGC in discussions with CM in early 2007 (see Appendix A29). These detailed calculations are shown in the revised spreadsheet "Cimentos NPV, ver02.xls" ii) Discount rate The cost of capital used by CM for internal decision making is explained by the CEO of CM in Appendix A3 iii) Efficiency of rotary kiln process under both fuels We have calculated the process efficiency using coal consumption and clinker production from the most recent six	The project proponent has provided evidences and references for the input values to DNV. DNV was able to verify the evidences and is of the opinion that the input values reasonably represent the situation when the investment decision was made. **This CL 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
The contract document from technology supplier mentioning the efficiency needs to be provided for verification. Cost comparison need to be carried out based on the requirement of fuel considering the energy content respective fuel. In the financial analysis it is assumed no change in energy efficiency after fuel change from coal to natural gas and this is claimed to be conservative. This needs to be substantiated. iv) O&M costs The type of maintenance needs to be justified along with sufficient proofs. In the financial analysis it is assumed no change in O&M costs and this is described as conservative. DNV request evidence that an apparently simpler gas system does not reduce the O&M costs. v) Fuel costs Proofs regarding the quantity of coal and diesel taken in for calculation needs to be provided for all three years. Sources for the specific heat, fuel cost and calorific value need to be provided. The calculation needs to be elaborated. Use of proper units corresponding to the value needs		months of data prior to the investment decision (i.e. November 2006-April 2007), plus two additional months (September-October 2006) due to low clinker production during Nov-Dec 2006. As discussed in CL6, coal consumption is based on measured coal deliveries and measured changes in coal stocks. Clinker production is calculated from raw meal consumption and a fixed ratio of raw meal to clinker established in an engineering assessment of the plant (see Appendix A31). The summary data for these variables in presented in Appendix A18 (pages partially covered due to other sensitive business information contained in these monthly reports), while the supporting detail on fuels for April 2007 is presented in Appendix A19, A51-56 & A30, with raw meal measurements shown in Appendix A32. The minor difference between daily deliveries of coal in April 2007 and the total shown in the Monthly Report is within the tolerance allowed for coal moisture content, settling during shipping, and accuracy of scales. The calculations are shown in the revised spreadsheet “Cimentos NPV, ver02.xls”.	

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
to be done. Evidence for natural gas prices in Mozambique needs to be provided. vi) Current price and expected future price of each fuel: Sources stating the coal price hike need to be provided for verification. Evidence for natural gas prices in Mozambique needs to be provided. Cost comparison need to be carried out based on the requirement of fuel considering the energy content respective fuel. Copy of contract between MGC and CdM needs to be provided for verification. vii) Quantity of fuels The quantity of natural gas in the calculation sheet is different from the one provided in the PDD. Please clarify with supporting documents. Value provided for Specific Energy Consumption are not exactly the same, correction needs to be done. Justification need to be provided for fixing 1% escalation in the natural gas consumption when the contract is already fixed with gas supplying company. How it was termed as		The efficiency of rotary kiln is not dependent on the efficiency the gas burner. The gas burner supplier specifications take the kiln specific heat consumption as given, because the burner itself does not change this (see Appendix A23 & A24). The efficiency of the rotary kiln process is related, rather, to the configuration, insulation and mechanics of the kiln itself. This is why there is no basis upon which to justify a change in the efficiency of the element process with fuel switching. The financial analysis is based on coal and natural gas providing the same useful energy for clinker production. This is shown in the equations in the revised spreadsheet "Cimentos NPV, ver02.xls" iv) O&M costs The letter from the CEO of CM (Appendix A3) explains the operating cost benefits of switching. The reduction in coal handling costs and reduction in costs due to plant stoppage caused by failures in the coal handling system are significant, as are the change in other O&M costs. These are shown in the calculations in the revised spreadsheet	

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
conservative assumption? Justification along with supporting proofs needs to be provided. ix) Gas supply risks According to IEA data for 2005, Mozambique exported 99% of its production to South Africa. It needs to be substantiated how a supply risk of natural gas in Mozambique is considered realistic. x) Operating cost for each fuel: A detailed analysis on the operating cost for coal need to be prepared and provided for verification along with supporting proofs. The operating cost of natural gas need to be obtained from the technology supplier. The same need to be provided for verification. xi) Lifetime of the project, equal to the remaining lifetime of the existing heat generation: Supporting proofs stating the lifetime need to be provided for installed rotary kiln and the gas injection burners for verification.		"Cimentos NPV, ver02.xls" v) Fuel costs As per sub-point (iii) above, to be consistent, all data will be taken from Sep 2006 to April 2007. In addition, consumption for 2004-2006 is shown in Appendix A33. Appendix A34 shows the change in coal prices from 2005 to 2007. The price of coal in April 2007 is shown in Appendix A39. Diesel consumption is calculated from diesel deliveries and daily diesel stocks, as presented in Appendix A18 in month summary form (pages partially covered due to other sensitive business information contained in these monthly reports) and Appendix A30 showing daily deliveries and stocks in April 2007. The data is analysed in the revised spreadsheet "Cimentos NPV, ver02.xls" Specific heat consumption: This is calculated from clinker production and fuel consumption. See point iii above . Calorific value coal: Laboratory tests of calorific value of coal are presented in Appendix A35 & A36. Natural gas calorific value, which is specified	

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
		contractually in the MGC contract with Sasol Temane Gas Suppliers, is measured by the accredited Sasol lab (data reported in Appendix A37). vi) Current and future fuel prices Coal price: Coal purchase receipts for April 2007 are shown in Appendix, A51-56. The letter from the CEO of CM (Appendix A3) explains future coal price assumptions. Gas price: MGC has exclusive distribution rights for natural gas in Maputo, as shown in the Distribution Concession Contract (Appendix A40), so MGC prices are market prices. The gas price for CM is fixed according to the contract between MGC and CM, with an escalation rate based on the US Producer Price Index (PPI). The average PPI increase over the last decade is 3.6% (Appendix A41). A copy of this contract has been provided to DNV in Appendix C1 under confidentiality, due to the sensitive business information contained in the contract. As explained above, the financial and emissions analysis assumes the same quantity of useful energy in the baseline and	

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
		project scenarios. vii) Quantity of fuels The ex-ante estimation of natural gas consumption in section B.6.3 and the "ER" sheet in the spreadsheet "Cimentos NPV, ver02.xls" are the same, and are calculated from average clinker production, specific heat consumption, and calorific value of gas and coal, which are all justified above. Specific energy consumption for Sep 2006 to Apr 2007 is presented in Table 5 of the PDD, with calculations shown in revised spreadsheet "Cimentos NPV, ver02.xls". Sources for these are elaborated above. viii) ix) Gas supply risks Discovery of more natural gas reserves has increased Mozambique's reserve levels from 2 trillion cubic feet in 2000 to 4.5 trillion cubic feet (3,915,000 M GJ) in 2006. (http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=MZ). MGC has right of first refusal given by the Mozambique Government to market 3GJ/year of natural gas, as part of the "Royalty Gas" that the Mozambique Government controls in the Temane Fields pipeline, as shown in Appendix A40 & A42. MGC can request	

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
		more gas to market as well, with proper justification (e.g. supply contacts with customers). The gas supply to CM represents only about a third of the minimum gas rights. x) Operating cost for each fuel See reply to point iv) above for this data, including estimate of change in operating costs. xi) Lifetime of the project The lifetime of the kiln is verified in the letter from CM (Appendix A2). The lifetime of the gas burner is verified in the specifications document for the burner (Appendix A24)	
CL 14 Additionality: Step – 2: The project proponent is requested to provide documents justifying the argument that there are no cement companies using fuels other than coal, in Mozambique and South Africa.	Table 1, B.3.1, B.3.2, B.3.3,	As the letters from CM and Ministry of Energy show, the only clinker plant in Mozambique is the Matola plant (evidences provided to DNV), so there is no fuel use other than coal in clinker production in Mozambique (see reply to CL6). SA is not a relevant comparison because of the much higher level of development, different primary energy mix, and different industrial and resource base. In addition, the four largest producers of	Evidences have been presented by the project proponent and verified by DNV. The information has also been cross-checked with other sources /28/. **This CL 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
		cement, Holcim/Afrisam, PPC, Lafarge and NPC, have stated explicitly that they are not using natural gas or alternative fuels (evidences provided to DNV). The SA energy balance shows that there is no significant consumption of biomass in the cement industry (http://www.dme.gov.za/pdfs/energy/statistics/Me/South%20African%20Energy%20Balance%202006%20(Version%201).xls)	

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 15 DNV requests a sensitivity analysis that clarifies at which level of variation each significant parameter (contributing to more than 20% of cost or income) would make the NPV equal zero, as well as a discussion of the likelihood of such a variation happening.		The sensitivity analysis has been revised to include all of the major variables in the financial analysis that can vary: future coal price, operating cost savings, and savings from reduced plant downtime. The gas price is known, so a sensitivity analysis of this is not necessary. This shows that over a reasonable range of variation, the project would not have a positive NPV. Only if the coal price grew at more than 25% per year for the next 5 years would the project have a positive NPV. Given that this implies a coal price in 2012 of almost 3 times the current price, this scenario is highly unlikely.	The sensitivity analysis has been included. Variations in the gas prices have been included as well, with an explanation of the likelihood that this will vary. **This CL is closed.**
CL 16 The project developer is requested to clarify whether the project start date refers to the construction start date or the commissioning date of the plant. The project developer is also requested to provide the evidence for the starting date of the proposed project.	B.3.4 C.1.1	As per the guidance of EB33, the starting date should be defined the earliest of "implementation, construction or real action", i.e. in practice corresponding to the date of a binding financial commitment. This was agreed internally in MGC and CM during May and June 2007, and formalised with the signing of the gas supply contract between MGC and CM on 3 July 2007 (submitted to DNV), and because this constituted a binding financial commitment, this is taken as the start date.	Ok. The project starting date refers to the date of the contract regarding the gas supply from Matola Gas Company and Cimentos de Mocambique. **This CL 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 17 The following points need to be clarified. The assumed quantity of the natural gas is not consistently given in the PDD versus the supporting documentation. Clarification is requested.	B.4.1	This has been corrected in the revised PDD and spreadsheet "Cimentos NPV, ver02.xls"	The assumed quantity of natural gas has been corrected, and is consistent in the PDDD and the supporting documentation. **This CL is closed.**
CL 18 With regard to the density of the natural gas, supporting documents are to be provided for the calculation of density. Accreditation certificate of the Temane Gas Field lab needs to be provided for verification.	B.4.1	The gas density is measured by Sasol Petroleum Temane Ltd. The measurements and the laboratory calibration and certification documents are show in Appendix A37.	The calibration and certification documents have been verified. The density of the natural gas has been confirmed. **This CL is closed.**
CL 19 For baseline emissions, the following clarifications are needed: Records for diesel consumption need to be provided for all three years for validation. It is claimed that data for 2006 were not consistent as maintenance work hampered the production. Supporting documents need to be provided for validation. The type of coal used earlier has not been mentioned. The supporting proofs regarding the NCV needs to be provided for validation. It should be clarified if the laboratory used for analysis of the NCV of coal purchased by CM	B.5.1 B.5.2	See CL 13 (v) for explanation of historical fuel consumption and supporting documentation as provided to DNV (pages partially covered due to other sensitive business information contained in these monthly reports). These are all presented in the revised spreadsheet "Cimentos NPV, ver02.xls". The CM Matola plant was shut down during November and December 2006 to install and repair environmental protection equipment (see article from USGS, provided to DNV)	Evidences for historical fuel consumption have been provided to and verified by DNV. DNV was able to confirm the statements regarding maintenance of the CM plant in November and December 2006 from 2006 Minerals Yearbook by the U.S. Geological Survey. Lab reports for the coal purchased by CM have been verified by DNV, together with the proof of the accreditation of the laboratory performing the tests of the coal. **This CL 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
is accredited by a third party.		See CL 13 (v): Cimpor Tec lab tests show the NCV on dry basis as 23.85 GJ/tonne (provided to DNV). The accreditation of the lab is shown in the test result documentation.	
CL 20 The calculation of leakage needs to be elaborated to be in accordance with the formulae given in the methodology, including the units used. Supporting proofs should be provided to demonstrate that the coal supplied to the clinker plant is from underground mining.	B.6.1, B.6.2, B.6.3,	The units and calculations have been revised. Because the emissions factor for upstream coal emissions is given in units of tCH_4/t coal, the net calorific value of coal is not used in the calculation. Furthermore, because the units of the upstream gas emissions are given as tCH_4/GJ of gas (not MWh), the net calorific value for gas is shown in GJ/m^3. The letter from the coal supplier, Gentrde, is shown in Annex A38, provides the documentation of the coal sourced from underground mining.	The leakage calculations have been provided to DNV in an open spreadsheet, and the calculations have been checked and found correct. The units are correctly converted, and found appropriate. **This CL is closed.**
CL 21 Regarding monitoring, the following needs to be clarified. 1. Documentation of calibration of equipments, frequency and maintenance schedule has to be provided for verification.	B.4.3 B.9.3 B.9.5 B.9.6 B.9.7 B.9.8 B.9.9	There are three variables monitored: gas consumption, gas NCV and clinker production. Gas consumption: specifications of Customer Metering System (CMS) used are presented in Annex 4 of the revised PDD. The commissioning certificate and detailed specifications are provided to	The monitoring plan and Annex 4 in the PDD describes in an adequate way the procedures for and documentation of calibration frequency and intervals, maintenance schedule and responsibles, accuracy, corrective actions and error handling, measurement intervals and procedures for day-to-day records.

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
2. The measurement accuracy and corrective actions to be addressed in case of erroneous measurement. 3. Procedures need to be addressed to deal with erroneous measurements. 4. The measurement intervals. 5. The responsibility regarding registration of data. 6. Procedures for maintenance of monitoring equipment and installations. 7. Calibration intervals. 8. Procedures for day-to-day records handling.		DNV for verification. The Standard Operating Procedures for gas metering by MGC are provided to DNV. Gas NCV: This is measured by Sasol Petroleum Temane Ltd, whose measurements and accreditation documentation is provided to DNV. Temane Gas laboratory supplies this data to Sasol, the main purchaser of the gas, and the measurements are part of the standard practice that must be carried out with high reliability to meet contractual obligations. Clinker production: This is calculated from measured raw meal input, read from a scale, and a fixed raw meal to clinker ratio determined by periodic engineering assessment of the plant (provided to DNV). The specifications and calibration procedures of the raw meal scale are presented in Annex 4 of the revised PDD.	**This CL is closed.**
CL 22 The PDD does not mention about the requirement of host country regarding the monitoring of sustainable development indicators/environmental impacts. Requirement by Mozambique on collection	B.12.1 B.12.2 B.12.3	The Mozambique DNA does not have any rules on monitoring of sustainable development indicators or environmental impacts. This is clear from the letter of approval, which confirms that the project meets the development priorities of	The LoA from Mozambique confirms that the project supports sustainable development, and does not mention any requirements for the project. **This CL 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
and archiving of relevant data concerning environmental, social and economic impacts along with status on sustainable indicators if set by the host country need to be addressed.		Mozambique and does not impose any ongoing requirements on the project.	
CL 23 1. The authority and responsibility of the project management need to be identified in the PDD. 2. Detailed procedures for training of monitoring personnel are to be addressed in the PDD. 3. Procedures for emergency preparedness for cases when emergencies can cause unintended emissions need to be addressed. 4. Procedures for review of reported results/ data need to be identified in the PDD. 5. Procedures for corrective actions in order to provide for more accurate future monitoring and reporting need to be addressed in the PDD.	B.13.1 B.13.2 B.13.3 B.13.4 B.13.5	All of these project management roles are elaborated in Table 9 in section B.7.2 of the revised PDD. Emergency equipment and procedures for Cimentos Matola plant are provided to DNV. MGC emergency procedures, safety standards, and SHE Management Guidelines are provided to DNV.	The PDD has been updated with the requested information and supporting documentation has been provided to DNV. **This CL is closed.**
CL 24 The start date of the crediting period needs to be revised.	C.1.2	This has been changed in the revised PDD.	This has been changed to 23 December 2009, or the date of registration whichever is the latest. **This CL 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 25 It needs to be clarified whether the fuel switch involves the installation of a gas distribution pipeline feeding the burner that could have local environmental impacts.	D.1.1 D.1.3 D.1.5	The project activity included the installation of 1.3 km of pipeline to connect the main pipeline (from Ressano Garcia to Matola) to the CM plant, and an internal pipeline of 0.2km. These pipelines are built entirely on land owned by CM which is zoned for industrial use, as shown by a map provided to DNV. The construction of the pipeline did not require an Environmental Impact Assessment, as evidenced by the approval for the gas supply network provided to DNV.	The project participant has provided evidences for that the pipeline will not lead to adverse environmental impacts. **This CL is closed.**
CL 26 Documentation of environmental approvals needs to be provided for verification.	D.1.2 D.1.6	A copy of the environmental license for the CM Matola plant is provided to DNV. In addition, the approval from the Maputo City Council for the gas conversion, approval for the gas supply network and the construction license are provided to DNV.	The documenting evidences have been provided to DNV. **This CL is closed.**
CL 27 The stakeholder invitation letter is requested to be provided for validation.	E.1.2 E.1.3	This is shown in Appendix A50.	Copies of the letters have been provided to DNV. **This CL is closed.**
CL 28 A Party must approve the project participation Carbon Limits A/S	A.2.1	Norway is included.	Ok. **This CL is closed.**

APPENDIX B

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Tonje Folkestad

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes

Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*					
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management						
Waste / wastewater treatment						
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

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Michael Lehmann

Michael Lehmann
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CERTIFICATE OF COMPETENCE

Shivraj Sharma

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes

Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*					
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
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Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
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Biofuel						
Pipeline leakage reduction						
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Frederick Haupt

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes

Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*					
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
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Biofuel						
Pipeline leakage reduction						
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Ramesh Ramachandran

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009	Jan 2009	Jan 2009		
Renewables	*Hydro power*	Jan 2009	Jan 2009		Jan 2009	Jan 2009
	Wind power	Jan 2009	Jan 2009			
	Other renewable	Jan 2009	Jan 2009			
Biomass		Jan 2009	Jan 2009			
Grid connection of isolated system		Jan 2009	Jan 2009			
Cement		Jan 2009	Jan 2009			
Waste-heat / waste-gas recovery		Jan 2009	Jan 2009			
Efficiency of thermal power plants		Jan 2009	Jan 2009			
Coal mine methane		Jan 2009	Jan 2009			
Fuel switch		Jan 2009	Jan 2009			
Manure management		Jan 2009	Jan 2009			
Waste / wastewater treatment		Jan 2009	Jan 2009	Jan 2009		
Energy efficiency		Jan 2009	Jan 2009			
N_2O		Jan 2009	Jan 2009			
HFCs		Jan 2009	Jan 2009			
Flare reduction		Jan 2009	Jan 2009			
PFCs		Jan 2009	Jan 2009			
Charcoal		Jan 2009	Jan 2009			
CO_2 recovery		Jan 2009	Jan 2009			
Transport		Jan 2009	Jan 2009			
Non-renewable biomass		Jan 2009	Jan 2009			
Biofuel		Jan 2009	Jan 2009			
Pipeline leakage reduction		Jan 2009	Jan 2009			
SF_6		Jan 2009	Jan 2009			

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Soumik Biswas

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009				
Renewables	*Hydro power*	Jan 2009				
	Wind power	Jan 2009	Jan 2009			
	Other renewable					
Biomass		Jan 2009	Jan 2009			
Grid connection of isolated system						
Cement		Jan 2009	Jan 2009			
Waste-heat / waste-gas recovery		Jan 2009	Jan 2009			
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch				Jan 2009		
Manure management						
Waste / wastewater treatment						
Energy efficiency		Jan 2009	Jan 2009			
N_2O						
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Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

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CERTIFICATE OF COMPETENCE

Peter Molin

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*	Jan 2009				
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery						
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CERTIFICATE OF COMPETENCE

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GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Renewables	*Hydro power*	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
	Wind power	Jan 2009	Jan 2009			
	Other renewable	Jan 2009	Jan 2009			
Biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
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Coal mine methane		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Fuel switch		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Manure management		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Waste / wastewater treatment		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Energy efficiency		Jan 2009	Jan 2009		Jan 2009	Jan 2009
N_2O		Jan 2009	Jan 2009		Jan 2009	Jan 2009
HFCs		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Flare reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
PFCs		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Charcoal		Jan 2009	Jan 2009		Jan 2009	Jan 2009
CO_2 recovery		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Transport		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Non-renewable biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Biofuel		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Pipeline leakage reduction		Jan 2009	Jan 2009		Jan 2009	Jan 2009
SF_6		Jan 2009	Jan 2009		Jan 2009	Jan 2009

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CERTIFICATE OF COMPETENCE

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Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas		Jan 2009			Jan 2009	Jan 2009
Renewables	*Hydro power*					
	Wind power				Jan 2009	Jan 2009
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Biomass					Jan 2009	Jan 2009
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Non-renewable biomass						
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