CDM.Val0598

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VALIDATION REPORT

MD PAPÉIS

Fuel Switch Project in Caieiras, SP, Brazil

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Summary

This report summarizes the results of the validation of the project, performed on the basis of UNFCCC criteria. The validation has been performed as a desk review of the project documents presented by MD Papéis and a site visit to MD Papéis industrial unit, where staff from the company and its consultant was interviewed.

MD Papéis industrial unit is located in Caieiras, São Paulo, Brazil. The project activity consists of the conversion of fuel oil-fired boilers into natural gas-fired boilers. It is applied the approved baseline and monitoring methodology *ACM0009*.

The utilization of a less intensive carbon content fuel will reduce significantly GHG emissions due to MD Papéis' operations. The total amount of emission reductions estimated for the fixed crediting period (10 years) is 102,987.55 tCO2e.

SGS will request the registration of the Fuel Switch Project in Caieiras, SP, Brazil as a CDM project activity, once the written approval by the DNA of the participating Parties and the confirmation by the DNA of Brazil that the project assists in achieving sustainable development has been received.

Subject.:			
CDM validation			Indexing terms
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Abbreviations

- AM Approved Methodology
- CAR Corrective Action Request
- CER Certified Emission Reduction
- DNA Designated National Authority
- EF Emission Factor
- MP Monitoring Plan
- NIR New Information Request
- ODA Official Development Assistance
- PDD Project design Document
- SGS Société Générale de Surveillance
- UNFCCC United Nations Framework Convention on Climate Change

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1. Introduction

1.1 Objective

MD PAPÉIS has commissioned SGS to perform the validation of the project: "Fuel Switch Project in Caieiras, SP, Brazil" with regard to the relevant requirements for CDM project activities. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

1.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 GHG Project Description

MD Papéis is a company from the Formitex Group, one of the first paper manufactures of Brazil, producing high quality papers (special papers). Its industrial plant is located in Caieiras, São Paulo, Brazil.

The project activity consists of the conversion of two fuel oil-fired boilers into natural gas-fired boilers. The utilization of a less intensive carbon content fuel will reduce significantly GHG emissions due to MD Papéis' operations. In the baseline scenario, fuel oil would otherwise be used during the crediting period.

The technology employed consists of the replacement of fuel burners from oil fuel burners to natural gas injection system, the construction of the internal natural gas pipeline and revamping of field instruments.

Total amount of emission reductions for the 10 years fixed crediting period is therefore 102,987.55 tCO₂.

The starting date of the crediting period will be 01 March 2007.

Baseline Scenario:



The company would continue using fuel oil in its boilers for steam production.

With-project scenario:

Fuel switching from fuel oil to natural gas.

Leakage:

The estimated leakage for the crediting period is 41,707 tCO₂.

Environmental and social impacts:

The project is not expected to result in negative environmental and social impacts. The project brings some environmental benefits such as: it is safer to deal with natural gas than fuel oil, in terms of transportation and storage (natural gas uses pipelines instead of trucks and it is not needed to store natural gas in tanks; it also minimizes the risks of accidents and soil and/or water contamination. Regarding the social impacts, the project has created direct and indirect new jobs during conversion and operation of the equipments.

Name	Role
Aurea Nardelli	Team leader
Fabian Gonçalves	Lead Assessor
Geisa Principe	Local assessor
Rogério Carvalho	Local Assessor
Irma Lubrecht	Technical reviewer

1.4 The names and roles of the validation team members

2. Methodology

2.1 Review of CDM-PDD and additional documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline. Additional information can be required to complete the validation, which may be obtained from public sources or through telephone and face-to-face interviews with key stakeholders (including the project developers and Government and NGO representatives in the host country). These may be undertaken by the local SGS affiliate. The results of this local assessment are summarized in Annex 1 to this report.

2.2 Use of the validation protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the

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validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements are linked to checklist questions the project should meet.	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 (Y), or a Corrective Action Request (CAR) due to non- compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification.

The completed validation protocol for this project is attached as Annex 2 to this report

2.3 Findings

As an outcome of the validation process, the team can raise different types of findings.

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR).** A CAR is issued, where:

- I. mistakes have been made with a direct influence on project results;
- II. validation protocol requirements have not been met; or
- III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex 3). In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.



2.4 Internal quality control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

3. Determination Findings

3.1 Participation requirements

MD Papéis is the project participant. Brazil is listed as the host Party. Brazil has ratified the Kyoto Protocol on 23rd August 2002

(http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf).

At time of the validation, no Letter of Approval from the host country had been provided. The Letter of Approval will be signed when the DNA of Brazil receive and analyse the validation report.

At time of validation process, there is no Annex I parties in this project.

3.2 Baseline selection and additionality

The project consists of switching fuel oil to natural gas in two steam boilers at MD Papéis industrial unit applying the methodology ACM0009 – Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas (version 3).

It was confirmed that the project is in compliance with the applicability criteria defined in ACM0009, as described bellow:

- Prior to the implementation of the project activity, only fuel oil (petroleum) had been used in the two steam boilers. It was verified on-site visiting the previous installation which operates with fuel oil and the oil suppliers invoices.

- The local regulations/programs do not constrain the facility from using fuel oil. Verified on-site the licenses issued by the environmental agency (before 2005) and no legal requirement for fuel switching was identified.

- Regulations do not require the use of natural gas or other fuel in boilers.

- The project activity did not increase the capacity of final outputs and lifetime of the existing facility during the crediting period. The existing boilers will have a lifetime of 18 years, so more than the 10 year crediting period.

- The proposed project activity did not result in integrated process change. It was verified during site visit that there is no thermal capacity expansion planned during crediting period.

ACM0009 version 3 defines specific requirements for identification and selection of the baseline scenario. During the desk study, it was verified that the project did not consider all alternatives required in the methodology. Only two scenarios were selected: continuation of using oil or the project activity do not undertake under the CDM. It is required to consider at least two other additional alternatives: switching from oil to other fuel (such as biomass) and switching from oil to natural gas at a future point in time during the crediting period. These other scenarios were not discussed in the PDD. Complete information to support the analysis required by the methodology should be provided. <u>CAR 4 was raised</u>.



To close out CAR 4, the PDD was revised and the following alternatives scenarios were mentioned:

- (1) Continuation of the current practice of using oil as the fuel;
- (2) Switching from petroleum fuel to biomass;
- (3) Switching from petroleum fuel to natural gas at a future point in time during the crediting period;

(4) The project activity not undertaken under the CDM (switching from fuel oil to natural gas)

The barriers faced by alternatives (2) and (3) were discussed in the revised PDD. It was confirmed that the alternative 2 faces technical barriers as biomass is not available on-site and also the burning of it in the boiler is not operational efficient or even possible. According to the equipment's manual (supplied by Aalborg Industries), the flame tube boiler only works with fuel oil or natural gas. The utilization of biomass in flame tube boilers would generate residues inside the equipment. Copy of the manual supporting this information was provided to the validation team.

It was mentioned on the PDD that the alternative 3 also faces prohibitive barriers as the determination of the future prices of natural gas and fuel oil is not accurate, mainly due to a lot of uncertainties involving the domestic and international markets that affect direct or indirectly the fuels price. References of the sector were provided in the PDD to support this discussion of barrier.

A comparison of the NPV (Net present value) of the alternatives 1 and 4 (scenarios that do not face any prohibitive barrier) was presented to select the most cost-effective scenario (with the highest NPV) as the baseline scenario. This analysis was supported by data and assumptions used for the calculations, presented in the spreadsheets provided by MD Papéis to the validation team.

In addition, a sensitivity analysis applying Sub-step 2d of the latest version of the "Tool for demonstration assessment and of additionality" was carried out. A spreadsheet with sensitivity analysis was provided. This analysis was carried out considering changes in the natural gas price (reduction from 0.5% - 3.0%) and changes of the interest rate (10% - 14%). Under these plausible conditions, the sensitivity analysis supported the results of the economic analysis (NPV analysis comparing gas natural and fuel oil).

The most cost effective scenario is the alternative1- fuel oil boilers -, which presents the highest NPV. Then, it was the baseline scenario.

Considering the complete information included in the PDD version 3 about the baseline scenario discussion and selection, <u>CAR 4 was closed out</u>.

To determine the additionality the project follows the steps required in the methodology: investment & sensitivity analysis, common practice analysis and impact of CDM registration.

During the desk study, it was verified that the discussion on the additionality was not clear and had been not supported by objective evidences and a <u>NIR (2)</u> was raised. Considering only the information provided in the PDD, the following items could not be verified during the desk study:

- Prices and consumption of fuel oil and natural gas;

- NPV analysis (spreadsheet with formulas, data and assumptions used were not provided);

- Efficiency of fuels (oil and natural gas).

<u>To close out NIR 2</u> the following documents were verified to confirm the information presented in the revised PDD:

- Invoices issued in January 2005 (fuel oil invoices from suppliers: Grigolleto, Shell and Petrobrás).
- Boiler efficiency (document sent from Aalborg boiler manufacturer), confirming the value of 90%. For MD Papéis's project activity, the efficiency of the element process does not change due to the fuel switch, so it is assumed $\varepsilon_{project,i} = \varepsilon_{baseline,i}$ as a simplification." It was confirmed by

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manufacturer information provided during the validation.

- Portaria CSPE N°297 that mention the gas price according industrial segment, class and consumption.
- Spreadsheet with financial analysis and worksheet with data about the investment on the project activity.

The common practice analysis was carried out and presented in the PDD. Source of data mentioned in the PDD was checked and concluded that nevertheless natural gas market is growing in Brazil the common practice has been the use of fuel oil. Considering the documents presented and information provided it was concluded that the project is not a common practice and its region and sector.

The impact of CDM Registration was demonstrated from the investment analysis. It was demonstrated that the use of natural gas represents a negative NPV, with and without the CERs., but the CERs reduce the financial loss, which was fundamental for the implementation of the project activity.

Since the project satisfied the three steps, it was concluded that the project is additional.

3.3 Application of Baseline methodology and calculation of emission factors

The methodology applied to this fuel switch project is ACM0009 – Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas (version 3).

The quantity of oil that would be used in the absence of the project activity in each boiler is calculated based on the actual monitored quantity of natural gas combusted in the boiler and the relation of the energy efficiencies and the net calorific values between the project scenario and the baseline scenario.

During the visit on-site, it was identified that the plant industrial kitchen consumes natural gas from the same pipeline of the project activity and there is not meter installed to quantify its individual consumption. The kitchen is not included in the project activity boundary. <u>CAR 8 was raised</u>.

To close out CAR 8, the company prepared an internal corrective action report according to ISO standard aiming to: (a) verify the amount of gas consumed in the industrial kitchen; (b) define the meter to be installed; (c) identify costs; and (d) elaborate a plan to install the specific meter for the gas consumed at the industrial kitchen (RACO 01/06, 30/10/06). <u>CAR 8 was closed out and an observation</u> (2) was raised: according to RACO 01/06, MD will install a specific meter for the natural gas consumption by the industrial kitchen. This meter shall be installed before the starting date of the crediting period.

Formulas described in PDD are in compliance with ACM 0009 (version 3), but additional information were needed to verify if the baseline emissions, project emissions, leakage and emissions reductions were determined in accordance with the methodology. <u>NIR 3 was raised</u>: details about the calculation of data presented in the PDD were not provided during the desk study, as spreadsheet with formulas, and conversion factors. To close out NIR 3, it was provided the spreadsheet "*Cálculo CER e análise econômico financeira*". The spreadsheet contains the data and formulas necessary for CER calculation. Default emission factors were obtained from Volume 3 of the 1996 Revised IPCC Guidelines. Details of baseline emissions, project emissions and leakage were adequately discussed. <u>NIR 3 was closed out</u>.

It is observed on-site by document review that the volume of natural gas mentioned in the PDD was bigger than the volume informed on the contract signed by the gas supplier and MD Papéis. In addition, the PDD was not clear to indicate into which class of gas consumer (CSPE legislation) the company is classified. <u>NIR 9 and NIR 10 were raised</u>. The company representative explained that, for the preliminary calculation of the PDD, the volume of natural gas considered was the volume



necessary to meet the historic energy need of the plant (from 2005) – that used to be met by the diesel oil consumption in the baseline scenario – instead of the minimum volume indicated in the contract. The explanation provided by the company was accepted. The calculation and factors used to estimate the volume of natural gas were provided. The volume reported in the PDD was confirmed. <u>NIR 9 was closed out</u>. Copy of the "Portaria CSPE N°297" was provided. The class of consumption was confirmed as class 10. <u>NIR 10 was closed out</u>.

3.4 Application of Monitoring methodology and Monitoring Plan

The project applies the approved consolidated baseline methodology ACM0009 "Consolidated monitoring methodology for fuel switching from coal or petroleum fuel to natural gas" (version 3).

The project meets all the applicability criteria listed in the monitoring methodology.

The monitoring methodology involves monitoring of parameters with regard to the combustion of natural gas in the project activity. Monitoring of parameters for calculating baseline emissions or leakage is not needed. The quantity of oil that would be used in the absence of the project activity in the boiler is calculated from the actual monitored quantity of natural gas combusted in the boiler and the relation of the energy efficiencies and the net calorific values between the project scenario (use of natural gas) and the baseline scenario (use of oil).

The monitoring plan had not adequately addressed all necessary information for monitoring the emission reductions due to the project activity. <u>CAR 5 was raised</u>: The tables presented in the section B.7 are not completed. There are parameters mentioned in the ACM0009 that were not included in the PDD. It was not informed if the NCV and EF of natural gas will be measured or if would be applied default values. Information related to "Value of data applied for the purpose of calculating expected emission reductions" was not included in the tables.

To close out CAR 5, the PDD was revised and the tables presented in the section B.7 were completed. Value of all data applied for the purpose of calculating expected emission reductions were included. The fuel efficiency of natural gas was included and it was informed that the NCV of natural gas will be given by the natural gas supplier (Comgás). It was clarified that although the value for NCV informed in the Portaria CSPE n° 297 is 9400 kcal/m³, the value applied in the project was 9065kcal/m³. This second value was justified from documented evidence provided by the natural gas supplier. In addition, the results of an analysis of the natural gas supplied in January 2007 to MD Papéis (analysis carried out by Comgás laboratory, reported on 09/02/2007) mentioned that the average value of NCV for January 2007 was 8606kcal/m³. It was confirmed that the value applied for estimative of the baseline and for economic analysis was conservative. <u>CAR 5 was closed out</u>.

For determination of energy efficiency, the consumption of natural gas and corresponding steam generation will be monitored. Procedures for steam generation (see CAR 7 closing out details bellow) and daily records of boilers operation were verified. The generation of steam and natural gas consumption are recorded on the worksheet "Boletim diário das caldeiras". There are daily records that will be used for calculation of the monthly efficiency. These daily measurements cover the different load factors (if there is any variation in a day). For each day, data about consumption of natural gas and steam generation is consolidated. The monitoring of efficiency has been established also as an operational monitoring of the plant and is included in its quality management system.

During the desk study and site visit, <u>CAR 7 was raised</u> related to the management system of the project activity. It was verified that there were no procedures identified for:



- Calibration of monitoring equipment;
- Measurements and reporting;
- Day-to day records handling;
- Emergency preparedness.

To close out CAR 7, the following procedures were prepared or revised to cover the requirements related to the management system of a CDM project:

- PRG-MN-002, rev. 2 (Planejamento, Organização e Controle da Manutenção);
- FOQ-UY.002 R.02 (Boletim diário das caldeiras);
- PMIE (Planilha de Monitoramento de Indicadores de Eficácia);

- UT011 (Geração de vapor); DES-UT.001 rev03 (Controle de Documentos Externos – Utilidades); DES-UT.003 rev04 (Tabela de registro da qualidade – Processo 5). It was also raised an internal corrective action to include the gas meter calibration as a responsibility of the quality management system of the MD plant and not only Comgás (gas supplier) responsibility. <u>CAR 7 was closed out</u>.

No specific QC and QA were required in the ACM0009, but independent on the methodology not require specific QC/QA, they should be provided to ensure good monitoring (Observation 1).

3.5 Project design

The project activity consists of the conversion of two fuel oil-fired boilers into natural gas-fired boilers.

With regard to the technology to be employed by the project activity, it is pretty conventional and basically it consists of the replacement of fuel burners (from oil fuel burners to natural gas injection system), the construction of the internal natural gas pipeline and revamping of field instrument. The technology applied is considered current good practice and is not expected to be replaced within the crediting period.

Starting date of the project was 1st August 2006. The operational lifetime of the project activity is estimated to be 18 years. A fixed crediting period of 10 years starting on 1 March 2007 is selected.

The project did not make use of a diversion of official development assistance (ODA) or public funding.

Regarding the completion of the PDD template, the project should correctly complete a Project Design Document, using the current version and exactly following the guidance, without modifying/adding headings or logo, format or font. The specific requirements should be addressed under each header. During the desk study, it was verified that the PDD presented changes in the first page of the template (it is used version 3) and there were mistakes (repetitions) under section A.4 (name of the country and map). <u>CAR 1 was raised</u>.

To close out CAR 1, a new version of PDD was prepared, solving the non-conformities detected during the desk study. <u>CAR 1 was closed out</u>.

3.6 Environmental Impacts

Considering the nature of the project, no significant adverse environmental impacts are expected.



It was informed in the PDD: "According to a preliminary consultation to the Environmental Agency of São Paulo State (CETESB), CETESB won't oppose to the proposed fuel switching project. A formal licensing process according to Brazilian regulations will be carried out in due time."

Additional information is required regarding the analysis of the environmental impacts of the project activity. Information provided in the PDD was not clear about environmental studies/impacts of the project and about legal requirements. No installation license or the requirement for state environmental agency was mentioned. <u>NIR 6 was raised</u>.

It was confirmed on-site that the process of environmental licensing is on-going. The licenses: LP 29001355, LI 29002750 were requested on 26/10/2006, as verified by the local assessors. MD Papéis sent a letter to environmental agency (CETESB) on 12 January 2006 informing about the fuel switch from fuel oil to natural gas in the boilers. Environmental agency (CETESB) sent an answer on 13/02/2006 informing that agree with project implementation. The previous licenses related to MD Papéis industrial units were also verified on-site. <u>NIR 6 was closed out</u>.

3.7 Local stakeholder comments

A list of stakeholders contacted was presented in the PDD. Verified on-site the letters sent in local language to local stakeholders. The list of stakeholders complies with Resolução n°1.

Copy of the letters and delivery receipt was provided. Comments received are favourable to the project and did not require responses from the project developer.

4. Comments by Parties, Stakeholders and NGOs

In accordance with sub-paragraphs 40 (b) and (c) of the CDM modalities and procedures, the project design document of a proposed CDM project activity shall be made publicly available and the DOE shall invite comments on the validation requirements from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. This chapter describes this process for this project.

4.1 Description of how and when the PDD was made publicly available

The PDD and the monitoring plan for this project were made available on the SGS website <u>http://cdm.unfccc.int/Projects/Validation/DB/WF57REQQ3B4EJOYNRN467LQB5IEUUJ/view.html</u> and were open for comments from 29 Sep 2006 until 28 Oct 2006. Comments were invited through the UNFCCC CDM homepage.

4.2 Compilation of all comments received

No comments were received to the DOE during the 30 days commenting period.

4.3 Explanation of how comments have been taken into account

No comments were received.

5. Validation opinion

Steps have been taken to close out 10 Findings and two observations.

SGS has performed a validation of project: Fuel Switch Project in Caieiras, SP, Brazil. The validation was performed on the basis of the UNFCCC criteria and host country criteria, as well as criteria given



to provide consistent project operations, monitoring and reporting. Using a risk based approach, the validation of the project design documentation and the subsequent follow-up interviews have provided SGS with sufficient evidence to determine the fulfilment of the stated criteria.

By switching fuel oil to natural gas, the project results in reducing greenhouse gas emissions that are real, measurable and give long-term benefits to the mitigation of climate change. A review of the barriers presented demonstrates that the proposed project activity was 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. If the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The validation is based on the information made available to SGS and the engagement conditions detailed in the report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence SGS can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

5. List of persons interviewed			
Date	Name	Position	Short description of subject discussed
10 Oct 2006	Alberto O. Lupetti	Utilities	Technical issues, operational issues, findings, monitoring plan, baseline, licenses.
10 Ост 2006	Júlio Cesar Alves	Quality	Quality procedures.
16 Nov 2006	Letícia Roxo	Project developer	Validation process and findings.

6. List of persons interviewed

7. Document references

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

- /1/ Project Design Document, Fuel Switch in Caieiras, SP, Brazil. Version 1, 25/08/2006; Version 2, 08/11/2006; version 3 (27/02/2007).
- /2/ ACM0009 Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas. Version 03, 28 July 2006.

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

- /3/ Worksheet: CERs, financial analysis.
- /4/ "Análise de Viabilidade do Gás Natural". Analysis to implement the fuel switch.

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/5/ Installation license requirement: LP 29001355, LI 29002750 requested on 26/10/2006.

Letter to environmental agency (CETESB) on 12 January 2006 informing the fuel switch from fuel oil to natural gas in the boilers.

Environmental agency (CETESB) answer on 13/02/2006 informing that agrees with project implementation.

- /6/ Comgás training and attendance list, 18/07/2006.
- /7/ PRG-MN-002, rev. 2 (Planejamento, Organização e Controle da Manutenção); FOQ-UY.002
 R.02 (Boletim diário das caldeiras); PMIE (Planilha de Monitoramento de Indicadores de Eficácia); UT011 (Geração de vapor); DES-UT.001 rev03 (Controle de Documentos Externos Utilidades); DES-UT.003 rev04 (Tabela de registro da qualidade Processo 5)
- /8/ Internal corrective action (MD).
- /9/ Investment for the fuel switch (invoices).
- /10/ Boiler efficiency and lifetime.
- /11/ Fuel oil invoices.
- /12/ ISO certificate.
- /13/ "Part 1 General description" of the manual of the boiler
- /14/ Communication from Comgás about natural gas NCV
- /15/ Sensitivity analysis

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