CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

- Title: Fuel switching from fuel oil to natural gas at the Camargo Corrêa Cimentos plant of Pedro Leopoldo.
- Version number of the document: 01
- Date of the document: 26 December 2007

A.2. Description of the small-scale project activity:

>> **Project Activity Goals:**
Project Activity goal consists in the reduction of greenhouse gas emissions (GEE) by replacing fuel oil 6A (fossil fuel with higher emission rate) with natural gas (fossil fuel with lower emission rate) in the drying process of raw mixture for the white cement production and blast furnace slag for the production of grey cement in Pedro Leopoldo City, Minas Gerais State, Brazil, a Carmargo Corrêa Cimentos' unit. Project which was executed on 2004.

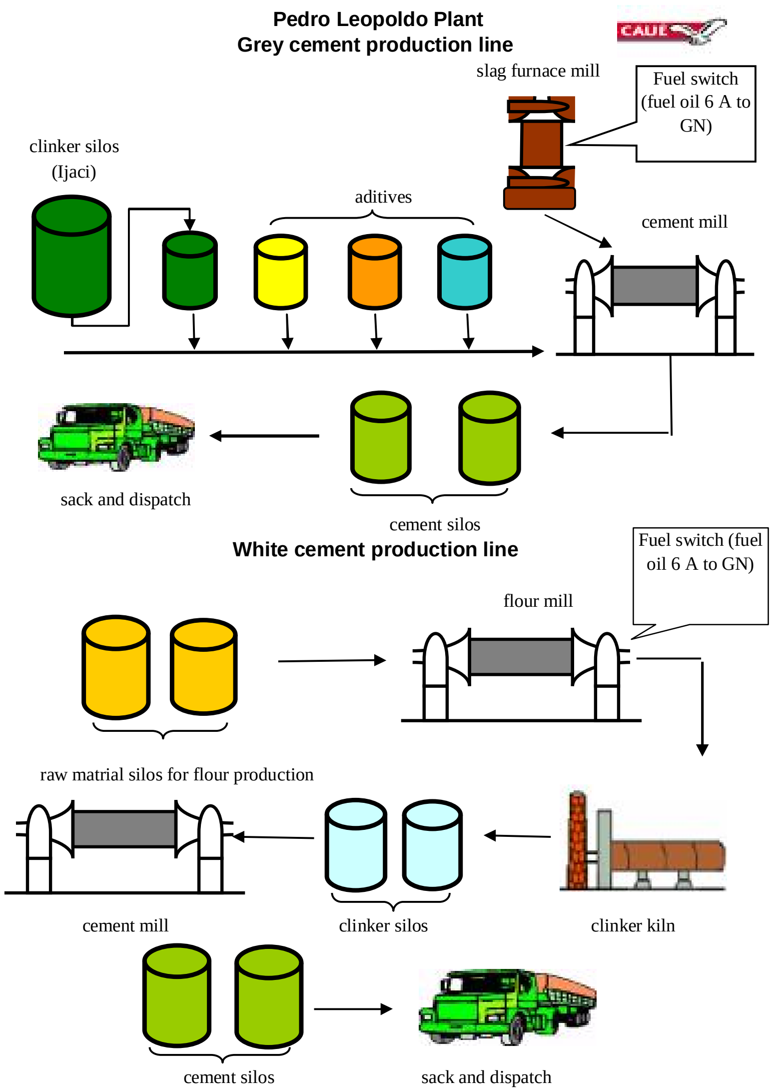
The Camargo Corrêa Group was founded in 1939 as a small construction and paving company. A strong and steady growing process let it to be one of the largest private economic groups in the country. Engineering and heavy construction remains its core activity while a wide diversification process takes place since 1968. Cement and steel production, environmental engineering, real estate development and light construction, textiles and footwear, public power utilities, transportation and highway concessions stand amongst other activities and investments of the Camargo Corrêa Group.

Camargo Corrêa Cimentos is the fifth largest cement manufacturer in Brazil, with 8% of the domestic market share. Its 5 production units are located in : Ijaci, Santana do Paraíso, Pedro Leopoldo, in Minas Gerais State, Bodoquena, in Mato Grosso State, Apiaí and Jacareí, in Sao Paulo State. Its main products are: grey and white Portland cement, special grouts and plaster, concrete and activated silica.

The group currently sums up overall sales of 6,3 MM tons of cement and 820M tons of concrete, operating in Brazil, Argentina, Bolivia, Paraguay and Uruguay.
Carmago Corrêa incorporated Pedro Leopoldo unit in 1997. It produces white cement type CPB 40 and grey cement types CPIII and CPIII 40 in two separate production lines.

For grey cement Pedro Leopoldo operates only as a finishing plant. It doesn't produce clinker locally. Clinker is provided by Ijaci unit. Arriving at Pedro Leopoldo it is stored in silos and conducted to cement mills. In the cement mills, addition of other materials takes place. Among them is slag, and once ready, the cement goes to sacking and shipping. Slag addition is very important regarding GHG emissions because slag partially displaces clinker in the final mixture, and the clinker production has very high GHG emissions (from its calcination process), while slag, being a residue, has none. However, slag has to be previously dried in order to adjust its humidity level to be introduced in the final mixture. Project activity takes place in this drying operation.

For white cement instead, Pedro Leopoldo produces its own clinker. In the production line, raw material for fine powder production is received and stored in silos, following to raw mixture mills where it's grinded and dried to adjust its humidity level to a proper lever for the calcination phase that follows. Project activity takes place in this drying operation. The fine and dried powder goes then to the clinker furnace, where the calcination reaction occurs. Ready clinker is transported to storage silos and from there follows on to the cement mill, where some additives are introduced. From the cement mill, ready white cement moves on to sacking and shipping.
The following diagram illustrates the white and grey cement production lines and the mill where fuel replacement takes place.



Reduction of greenhouse gas emissions:

The project activity consists in replacing oil 6A with natural gas in three of Pedro Leopoldo units' mills, while one is destined to dry fine powder and two of them to dry blast furnace slag, one of the slag mills is activated occasionally. The reduction of greenhouse gas emissions is achieved by replacing higher emission fuels, in this case, fuel oil 6A with natural gas, which has a lower emission GHG factor.

Project's contribution to sustainable development:
The project contributes to sustainable development, since by replacing fuel oil 6A with natural gas, greenhouse gas emissions are reduced. Natural gas is odorless, colorless and non-toxic, therefore providing a safer work environment. At room temperature it is a gas and because of that its combustion is clean and complete so the emissions of locally harmful gases and particulates are significantly lower than from fuel oil. Furthermore natural gas is transported by gas pipelines, thus avoiding gas emissions and risks involved in the transport of oil 6A.
The Camargo Corrêa group has a strong environmental and social commitment, and had implemented concrete actions to reduce the environmental impacts of its operations.

A.3. Project participants:

>>

Name of Party Involved ((host) indicates a host Party)	Private and or Public entity(ies) project participants (as applicable)	Party involved wishes to be considered a participant (YES/NO)
Brazil	Camargo Corrêa Cimentos	No
Brazil	ATA - Ativos Técnicos e Ambientais	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

>>

A.4.1.1. Host Party(ies):

>>Brazil

A.4.1.2. Region/State/Province etc.:

>>Minas Gerais.

A.4.1.3. City/Town/Community etc:

>>Pedro Leopoldo is a Brazilian town located in the State of Minas Gerais. Its population is estimated in about 60.300 inhabitants and is located 46 kilometers at the Northwest of Belo Horizonte, the State capital. The roads of access to the unit are the MG-010 and MG-424.

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

Camargo Corrêa Cimentos S.A.
Rod. MG 424, s/n.º Km 18
CEP: 33600-000 – Pedro Leopoldo/ MG
Phone: 55 (31) 3660-3490 / 3478

The geographical location is:
Latitude: 19° 37´30.46” S
Longitude: 44° 01´37.67” W

>> 

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>> This current project is inserted in “Type III-other project activities”, “Category III. B-Replacement of fossil fuels”.

According to the Annex A of the Kyoto Protocol, this project is in accordance with Sectoral Category 4 (Manufacturing Industries)

The Project Activity consists in the mill kiln’s fuel replacement of fuel oil 6A with natural gas, generator of hot exhaust gases for drying up raw mixture and slag. The Project Activity is composed of two processes done in three equipments, in this document called, ***element process*** (defined in section B.6.1):

- Element process 1: Generator of hot exhaust gases for drying up raw mixture, referred to as raw mix hot gases generator;
- Element process 2: Generator of hot exhaust gases for drying up slag A, referred to as hot gases generator slag furnace A;
- Element process 3: Generator of hot exhaust gases for drying up slag B, referred to as slag hot gases generator slag furnace B;

The raw mixture and slag must have its particles sizes reduced and must present an adequate humidity percentage to move forward in the cement production process. Raw mixture grinding and drying happens in a Polysus cylinder roller mill, while slag grinding and drying takes place in a Mitsubishi vertical roller mill.

All three mills have inlets for drying gases produced by hot gases generators and transported through pipes. Prior to project activity, the burners in the generators used fuel oil 6A, stored in vessels, and a small amount of diesel fuel for heating the oil, this way reducing its viscosity. Then oil was pumped to the burners blowtorch, being burned and generating hot gases emission. To be more conservative, emissions from diesel were not computed in the baseline of the emission calculations.

Post project execution natural gas started to be used as fuel. To enable the fuel replacement, blowtorches were replaced with dual blowtorches (capable of burning fuel oil 6A and natural gas) from SOLTHERM brand and technology. The natural gas comes from a derivation of a gas feeder from Companhia de Gás de Minas Gerais - GASMIG, which passes close to the Pedro Leopoldo unit. Camargo Corrêa invested in pipelines to connect its plant to GASMIG's pipes. GASMIG’s natural gas comes from Brazilian and Bolivian production fields. The figure below shows raw mixture horizontal mill (A) and slag vertical mill (B).

The table below compares the hot gas generators before and after the project activity.

	1)Hot gas generator raw mix		**2)Hot gas generator slag furnace A**		**3)Hot gas generator slag furnace B**	
	before the project	**after the project**	**before the project**	**after the project**	**before the project**	**after the project**
fuel	fuel oil 6 A	natural gas	fuel oil 6 A	natural gas	fuel oil 6 A	natural gas
fuel consumption	530 kg/h	547,9 m^3/h	920 kg/h	950,8 m^3/h	920 kg/h	950,8 m^3/h
power	5.0 Gcal/h	5.0 Gcal/h	8.677 Gcal/h	8.677 Gcal/h	8.677 Gcal/h	8.677 Gcal/h

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

>>

Years	Annual estimation of emission reductions intonnes of CO2e
2008 (july-december)	905
2009	1.811
2010	1.811
2011	1.811
2012	1.811
2013	1.811
2014	1.811
2015	1.811
2016	1.811
2017	1.811
2018 (january-june)	905
Total estimated reduction (tonnes CO_2e)	18.109
Total number of crediting period	10
Annual average over the crediting period of estimated reductions (tonnes CO2e)	1.646

A.4.4. Public funding of the small-scale project activity:

>>No public funding has been requested for this project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

>>Based on the criteria set to determine the occurrence of debundling (see Appendix C of the Simplified Modalities & Procedures for Small-Scale CDM project activities – Determining the occurrence of debundling), we confirm that the project activity is not a debundled component of a large project activity as the project participants did not register or applied for another small-scale CDM project activity:

- In the same project category and technology/measure; and

- Registered within the previous 2 years; and

- Whose project boundary is within 1 km of the project boundary of the proposed small-scale project activity at the closest point.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>> Simplified Small scale Methodology AMS III. B. “Switching fossil fuels”, version 12.

B.2 Justification of the choice of the project category:

>> Project Category III B.

1. This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls in category II.D or II.E.

The project activity consists in the fuel switching from fuel oil 6 A to natural gas in hot gas generators that are attached to the raw mix and slag furnace mills at the Pedro Leopoldo unit. The project activity aims at reducing emissions through fuel switching and therefore fits in the III. B category.

This category is not applicable to project activities that propose switch from fossil fuel use in the baseline to renewable biomass, biofuel or renewable energy in the project scenario. A relevant type I methodology shall be used for such project activities that generate renewable energy displacing fossil fuel use.

The project activity consists in the fuel switching from fuel oil 6 A to natural gas, not renewable biomass, biofuel nor renewable energy.

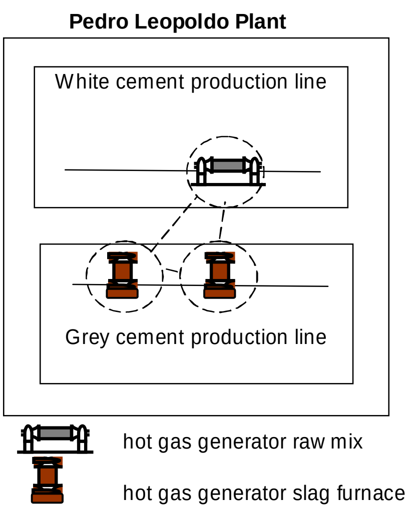
2. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.

The project activity will not exceed the upper limit of 60Kt de CO_2e /year. If the limit is exceeded in any year, the emission reductions accounted will match the 60kt of CO_2e.

B.3. Description of the project boundary:

>> The project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs.

The project boundary is comprised by the hot gas generators of the raw mix and slag furnace mills. The project boundary is represented in the figure below.



B.4. Description of baseline and its development:

>> Baseline scenario is defined by ASM III.B "Switching Fossil Fuels" methodology, as what would happen in this project's absence. In the absence of this project, hot gases generators used in the drying process of raw mixture and slag would continue to burn fuel oil 6A instead of natural gas. Baseline computations are based on methodology ACM0009 "Consolidated methodology for fuel switching from coal or petroleum fuel to natural gas". According to this methodology, baseline emissions are calculated from current natural gas consumption, converted to a value that represents fuel oil 6A's consumption in the absence of this project ($FF_{baseline,i,y}$), and then multiplied by its calorific power ($NCV_{FO,I}$) and fuel oil 6A's emission power ($EF_{FO, CO2,I}$). More details about the computation of this baseline and how fuel oil 6A was calculated can be found in section B.6.1.

$BE_y = FF_{baseline,i,y} \cdot NCV_{FO,I} \cdot EF_{FF, CO2,i}$

Where:

BE_y	Baseline emissions during year "y" in t CO_2e.
$FF_{baseline,i,y}$	Quantity fuel oil 6 A that would be combusted in the absence of project activity in the element process during year "y" in Gg;
$NCV_{FO,i}$	Average net calorific value of fuel oil 6 A that would be combusted in the absence of the project activity in the element process "i" during year "y" in (TJ/Gg);
$EF_{FO, CO2,i}$	CO_2 emission factor of fuel oil 6 A that would be combusted in the absence of the project activity in the element process "i" during year "y" (t CO_2 / TJ).

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The reduction of greenhouse gas emissions will be achieved by replacing fossil fuels with higher emission power, in this case the fuel oil 6A with natural gas, which has lower emission power. The reduction of

emissions will only be possible due to the existence of the project. In the absence of the project, the mills would continue to consume fuel oil.
The addition is determined as indicated in Attachment A of Appendix B of the "Simplified modalities and procedures for small scale CDM project activities". According to this tool, the project participants should provide explanations to demonstrate that the project activity would not occur due to at least one of the following barriers:

- ***a)*** Investment barriers;
- ***b)*** Technological barrier
- ***c)*** Barrier due to common practice;
- ***d)*** Other barriers.

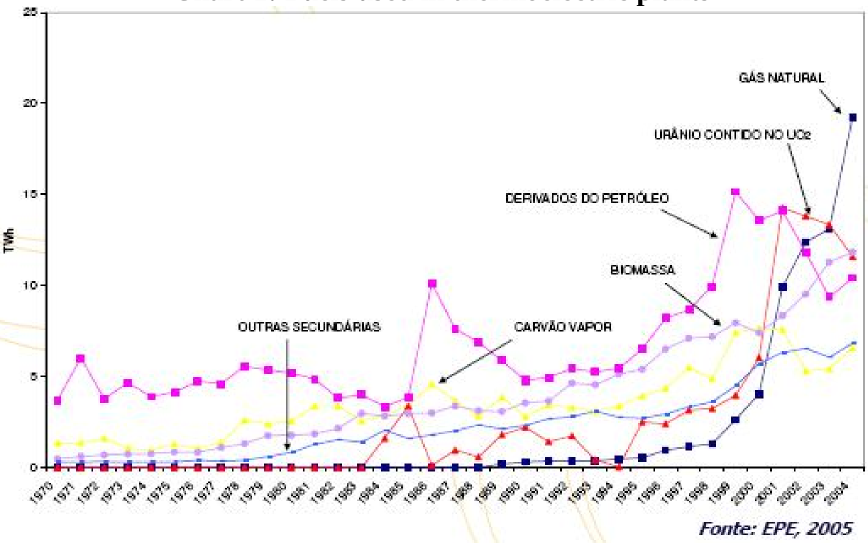
The explanations below prove that the use of natural gas is not a common practice of the cement industry in Brazil due to the high risk of lacking natural gas supply, and for that, of price instability. This information was obtained from the ANP (Agência Nacional do Petróleo), ANEEL (Agência Nacional de Energia Elétrica), BEN (Balanço Energético Nacional) 2005 and 2007, both under the Ministério de Minas e Energia (Ministry of Mining and Energy), EPE (Empresa de Pesquisa Energética), BNDES (Banco Nacional de Desenvolvimento Econômico e Social) and CSI (Confederação Nacional da Indústria) websites.

Barrier due to the risks of lack of natural gas supply

To understand the risks of lack of natural gas supply one must draw an overview of the natural gas industry in Brazil, both when the project was implemented, and at the current time.
During more than four decades Petrobrás (Petróleo Brasileiro S.A), exercised the legal monopoly on the activities that comprise the petroleum and natural gas industries in Brazil. Institutional Amendment no. 9, dated 1995, established the end of Petrobrás' monopoly regarding the activities of prospection and exploration of petroleum and natural gas reserves, petroleum refining, international trade and transport of petroleum and natural gas byproducts, thus allowing the entrance of more agents in the market, thereby opening the sector for competition. In this process, Law 9478/971 (the Law of Petroleum) created ANP (National Petroleum Agency).
According to ANP, the implementation of a model to open the industry to private capital was not appropriate, generating frictions and uncertainties for investors due to poorly appropriate measures, and how the reform was structured. Even after the opening to private capital, Petrobrás continued to play a dominant role in the industry, since no limits to the company's share in the market were established.
There is no regulation defined for the distribution and transport of natural gas and therefore no rules to determine agreements and tariffs exists. Taxes are often assessed at several points in the chain, and in the different states crossed by the pipelines. Regarding distribution and marketing there is no unified regulation, which ends up under the responsibility of each state, and different jurisdictions.
CNI (National Industry Confederation) indicates the need to organize the market and establish conditions for the different uses of natural gas, and that the sector lacks specific regulations, since petroleum and natural gas fall under the same legislation. Still according to CNI, a set of regulations would stimulate competition and attract investments, thus increasing the offer of energy.
Besides the uncertainties and risks mentioned by ANP itself, there is the actual fact that the use of natural gas is prioritized for power generation purposes in thermoelectric plants, due to an agreement between Petrobrás and ANEEL (National Agency for Electric Power). The document stipulates the application of penalties to Petrobrás in case of lack of fuel supply. Thus, the risk of gas shortages for industrial purposes is even bigger.

In Brazil, about 75.9% of all electric power generated in 2006 came from hydroelectric power plants. The generation of energy by hydroelectric plants depends on an appropriate level of water in the reservoirs, which are fed by rain. In years with low pluvial index these reservoirs can reach critically low levels, jeopardizing and even disrupting the electric power production. When this occurs, power generation is secured by thermoelectric plants. These plants use different fuels, among which, natural gas. The chart below, contained in the Decennial Energy Plan, shows that natural gas is the source that holds the largest share in those plants in Brazil.

Chart 1: Fuels used in thermoelectric plants



The table below, found in the Decennial Energy Plan prepared by EPE (Energy Research Company) of the Ministério de Minas e Energia (Ministry of Mining and Energy), shows the expected expansion of the installed potential of natural gas fueled thermoelectric plants until 2011 – 50%. This expansion will increase demand and competition for natural gas.

Table 1: Decennial Plan for the Expansion of Thermoelectric Plants

Usina	Subsistema	Potência (MW)	Data
		670	
		123	mar/06
Termorio	SE/CO/RO	370	ago/06
Camaçari	NE	3	dez/06
Vale do Açu	NE	340	mar/07
		240	
Três Lagoas	SE/CO/RO	110	jan/08
		160	
Canoas	S	90	jan/08
Cubatão	SE/CO/RO	216	jan/08
Araucária	S	469	dez/08
		2.450	dez/10
Nordeste*	NE	100	dez/11
	Total	5.341	

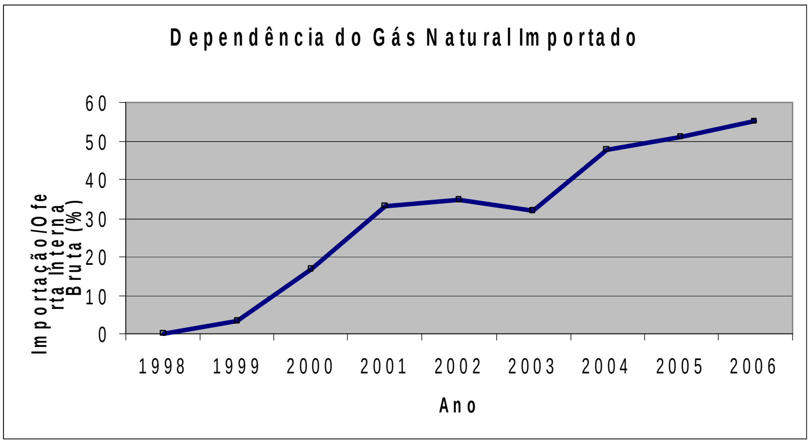
Fonte: Plano Decenal de Expansão, 2006

In addition to this, there is the lack of investments to build new hydroelectric power plants due to the low energy prices set by the federal government, which can increase the reliance on natural gas by the Brazilian energetic matrix.

The recent events occurred in October 2007, when the gas supply was reduced for distributors, are an example of the risks involved in the adoption of this fuel. Natural gas was diverted to feed thermoelectric plants, leaving the manufacture industries with a shortened gas supply, and increased losses. For this reason, many industries are using new sources, and making investments in new fuels.

The risk of shortage is worsened by the fact Brazil imports almost 50% of the natural gas consumed nationwide from a single country, Bolivia. Argentina, another exporter country, currently faces a production crisis and has been restricting the supply to other countries. According to BEN (National Energy Balance) 2007, the production of natural gas didn't change in 2006 as compared to 2005, while imports increased 8.8%. The chart below shows the Brazilian dependence on natural gas imports, which is growing since mid-2003.

Chart 2: Brazilian dependence on natural gas imports

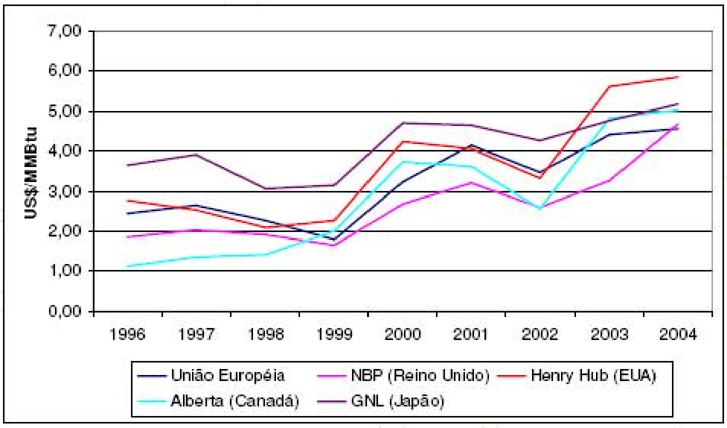


Source: BEN 2007.

The reliance on natural gas imports increases the negotiating power of suppliers when it comes to set prices for new agreements. In 2005 the Bolivian legislation on hydrocarbons changed, increasing the government's share in YPFB (the Bolivian oil company) from 18% to 50%, and with that prices increased in more than 20% (BNDES study data). In 2006, the nationalization of the natural gas production in that country caused uncertainties and tax increases, besides a clear will of the Bolivian authorities to negotiate new price raises.

Regarding natural gas prices, the National Energy Plan 2030 indicates a commoditization trend for the product, since it behaves as shown in the graph below - gathered from the Decennial Energy Plan, based on data provided by British Petroleum.

Chart 3: Natural gas prices (commoditization)



Fonte: BP, 2006

A study conducted in 2006 by BNDES (National Economic and Social Development Bank) indicates that imports will continue to play a significant role in gas offer for the upcoming years, because even if the natural gas reserves recently found in Brazil are confirmed, these fields won't be phased into production immediately. According to that document, this occurs because most Brazilian reserves are a gas/oil mix, with less extraction reliability, and about 58% of them are located offshore, requiring heavy investments in the exploration and phasing the fields into production. This document also states that “the vulnerability of the natural gas market is due not only to the fact that a major part of the gas offer (nearly 50%) is imported virtually from a single country, but also because Brazil still doesn’t have a gas pipeline infrastructure that secures the stabilization of the regional gas offer."

Barrier due to common practice:

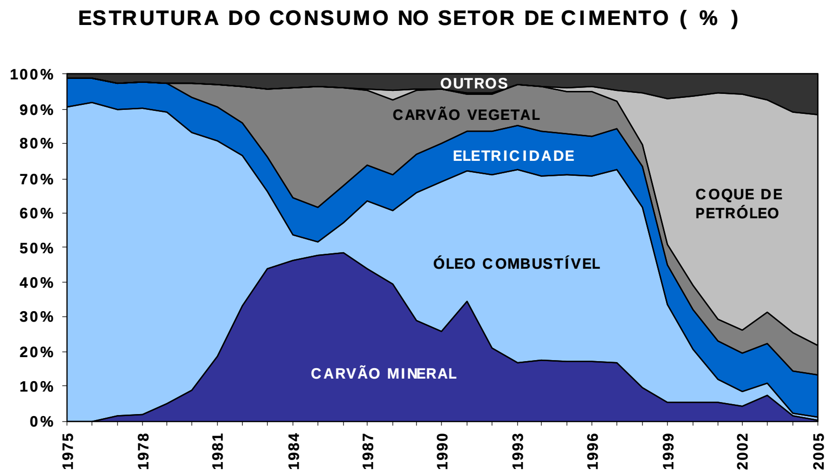
The uncertain environment and the risk of natural gas shortages for the industry will probably reflect in low rates of adoption of this fuel by the cement industry. The data on the table and chart below were gathered from BEN 2005, and clearly show that natural gas is not a widely used fuel in the cement industry, and therefore is not a common practice.

Table 3: Fuel consumption by the cement industry (%)

	2001	2002	2003	2004	2005
CARVÃO MINERAL	5,3	4,3	7,5	1,5	0,2
ÓLEO COMBUSTÍVEL	6,8	4,3	3,2	0,8	0,8
ELETRICIDADE	11,1	10,9	11,7	12,2	12,2
CARVÃO VEGETAL	6,2	6,6	8,8	10,7	8,8
COQUE DE PETRÓLEO	65,0	67,8	61,5	64,0	66,5
OUTRAS	5,5	6,0	7,3	10,7	11,5
TOTAL	**100**	**100**	**100**	**100**	**100**

Source: BEN 2005

Chart 4: Fuel structure consumption in the cement sector



Source: BEN 2005

Considering the above-mentioned facts, one can draw the conclusion that the adoption of natural gas to replace 6A fuel oil represents a strategic risk for the company. Thus, the continuity of the Project Activity is only interesting if carbon credits are factored in.

Evidence that the CDM revenues were seriously considered:

According to the Guidelines for completing CDM-PDDs, CDM-NM Version 6.2 in page. 11 states: "If the starting date of the project activity is before the date of validation, provide evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity".

The present project activity started before the date of validation. The decision process described below indicates clearly that the incentive from the CDM was seriously considered to proceed with the project activity.

In January 2004, Camargo Correa Cimentos, with the intention of reducing the emission of greenhouse gases, initiated an investment for the substitution of fuel utilization from fuel oil to natural gas in three equipments (element processes) at the unit of Pedro Leopoldo: i) two blast furnace dryers for Portland cement production and ii) a homogenized mixture (raw mix) dryer for white cement production.

The project consists in the installation of a natural gas line deriving from the main GASMIG feeder (the local Natural Gas provider) to reach the consumption points located inside the Pedro Leopoldo plant (including measurement and flow systems), and the substitution of the fuel burners at the three mills. Comprehensive operational adjustments to the use of GN as a new fuel were also to be conducted as part of the project. The investment was requested in 21/01/2004 by the Operations Coordination team, and formally approved by the Board of Directors of the company. The approval by the Board of Directors was conditioned to the effective reduction of GHG emissions and the achievement of the benefits of CERs from the CDM as a support to overcome the problems that would occur due to uncertainties of NG supply and the investment that would be faced.

The usage of NG started in September 2004. During the following months the operational performance of the installed equipments was analyzed and so was the impact on the production process, which resulted in successive adjustments. In the following year, according to the condition that was imposed by the company's Board, Camargo Corrêa initiated negotiations with CDM project developers to establish proper technical and commercial partnerships for the achievement of Carbon Credits. Other GHG reduction opportunities were also being identified in the company at that time as a comprehensive search for GHG emission reductions opportunities was being developed, requiring some coordination of efforts. Negotiations with several local and international project developers were started in order to cover the company as a whole, facing a certain degree of complexity caused by its size, the number of plants involved and some difficulties in the negotiations. Finally, a proper working structure was established in early 2007, which allowed an adequate rhythm to the CDM project now being submitted.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>> The calculations are based on the consolidated methodology ACM0009 "Consolidated methodology for fuel switching from coal or petroleum fuel to natural gas", referred in this document as ACM0009.

Definition of element process, according to the ACM 0009:

An "element process" is defined as fuel combustion in single equipment at one point of an industrial facility or of a district heating system, for the purpose of providing thermal energy (the fuel is not combusted for the purpose of electricity generation or used as oxidant in chemical reactions or otherwise used as feedstock.

The project activity is composed of three element process. The table below shows the element processes with their average of two years consumption of natural gas.

element process	N°	Average natural gas consumption (m^3/year)
hot gas generator raw mix	1	293.989,36
hot gas generator slag furnace A	2	903.266,01
hot gas generator slag furnace B	3	1.111.004,83
Total Consumption		**2.308.260,20**

The total consumption of natural gas in the element processes is the natural gas combusted ($FF_{project,I,y}$) and will be used to calculate the amount of fuel oil 6 A that would have been burned in the absence of the project ($FF_{baselIle,i,y}$) in the baseline and for the calculation of project emissions as shown in the formula below.

Baseline Emissions:

Baseline emissions (BE $_y$) include CO2 emissions from the combustion of the quantity of coal or petroleum fuel that would in the absence of the project activity be used in all element processes “i”.
Baseline emissions are calculated based on the quantity of fuel oil that would be combusted in each element process “i” in the absence of the project activity and respective net calorific values and CO2 emission factors. The quantity of fuel oil that would be used in the absence of the project activity in an element process “i” (FF $_{baselIne,i,y}$) is calculated based on the actual monitored quantity of natural gas combusted in this element process (FF $_{proIect,i,y}$) 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 fuel oil).

<u>Formula used to calculate baseline emissions</u>:

$$BI_y = \sum_i FF_{baIeline,i,y} \, . \, NCV_{FF,I} \, . \, EF_{FF,\, CO2,i}$$

in which:

$$FF_{baselinei,\,y} = (FF_{projecti,\,y}) x \frac{NCV_{NG,\,y}}{NCV_{FO,\,y}} x \frac{e_{NG}}{e_{FO}}$$

where:

BE_y	Baseline emissions during year “y” in t CO_2e.
$FF_{bIseline,i,y}$	Quantity fuel oil 6 A that would be combusted in the absence of project activity in the element process “i” during the year “y” in m^3
$FF_{project,I,y}$	Quantity of natural gas combusted in the element process “i” during year “y” in m^3
$NCV_{NG,y}$	Average net calorific value of natural gas combusted during year “y” (TJ/m^3)
$NCV_{FO,I}$	Average net calorific value of fuel oil 6 A that would be combusted in the absence of project activity in the element process “i” during the year “y” in (TJ/Gg)
$EF_{FO,\, CO2,I}$	CO_2 emission factor of fuel oil 6 A that would be combusted in the absence of the project activity in the element process “i” during the year “y” (t CO_2 / TJ).
e_{NG}	Energy efficiency of the element process “i” fired with natural gas (%);
e_{NG}	Energy efficiency of the element process “i” fired with fuel oil 6 A (%).

In order to be conservative, and meet the recommendations of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, the energy efficiencies (e_{NG} and e_{NG}) were considered 100%. Then, the equation for calculation of the amount of fossil fuel oil 6 A (FF $_{baseline,\,y}$) is:

$$FF_{baselinei,\,y} = (FF_{projecti,\,y}) x \frac{NCV_{NG,\,y}}{NCV_{FO,\,y}}$$

<u>Project emissions:</u>

Project emissions (*PEy*) include CO2 emissions from the combustion of natural gas in all element processes "*i*". Project emissions are calculated based on the quantity of natural gas combusted in all element processes "*i*" and respective net calorific values and CO2 emission factors for natural gas (*EFNG,CO2*), as follows:

$$PE_y = FF_{project,y} \times NCV_{NG,y} \times EF_{NG,CO2,y}$$

onde:

PE_y	Project emissions during year "y" in tCO_2.
$FF_{project,y}$	Quantity of natural gas combusted in all element processes during year "y" in m^3.
$NCV_{NG,y}$	Average net calorific value of natural gas combusted during year "y" (TJ/m^3).
$EF_{NG,CO2,y}$	CO_2 emission factor of natural gas combusted in all element processes in year "y" in. (tCO_2 / Tj).

Leakage:

No leakage calculation is required according to the small scale methodology – AMS III B - "Switching fossil fuels".

Emission reductions:

The emission reduction by the project activity during a given year "y" (ERy) is the difference between the baseline emissions (BEy) and project emissions (PEy), as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y	Emission reductions of the project activity during the year "y" in tCO_2e.
BE	Baseline emissions during year "y" in tCO_2e.
PE	Project emissions during year "y" in tCO_2e.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$NCV_{NG,y}$
Data unit:	TJ/m^3
Description:	Average net calorific value of the natural gas combusted during the year y
Source of data used:	BEN (National Energy Balance) 2007
Value applied:	0,0000368324
Justification of the choice of data or	National source

description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	NCV $_{FF,i}$
Data unit:	(TJ/Gg)
Description:	Average net calorific value of the fuel oil that would be combusted in the absence of the project activity in the element process i during the year y
Source of data used:	BEN (National Energy Balance) 2007
Value applied:	40,14
Justification of the choice of data or description of measurement methods and procedures actually applied :	National source
Any comment:	

Data / Parameter:	EF $_{FF, CO2,i}$
Data unit:	(t CO_2 / TJ)
Description:	CO2 emission factor of the fuel oil that would be combusted in the absence of the project activity in the element process i during the year y
Source of data used:	2006 IPCC Guidelines For National Greenhouse Gas Inventories Volume 2 Energy
Value applied:	77,40
Justification of the choice of data or description of measurement methods and procedures actually applied :	There is no national data available.
Any comment:	

Data / Parameter:	EF $_{NG, CO2,i}$
Data unit:	(t CO_2 / TJ)
Description:	CO_2 emission factor of natural gas combusted in all element processes in year “y” in
Source of data used:	2006 IPCC Guidelines For National Greenhouse Gas Inventories Volume 2 Energy
Value applied:	56,1
Justification of the choice of data or description of measurement methods	There is no national data available.

and procedures actually applied :	
Any comment:	

Data / Parameter:	$\varepsilon_{project\ i,y}$
Data unit:	%
Description:	Energy efficiency of the element process i if fired with natural gas
Source of data used:	IPCC
Value applied:	100
Justification of the choice of data or description of measurement methods and procedures actually applied :	Conservative and adequate value in accordance with good practices of the 2006 IPCC Guidelines for Greenhouse Gas Inventories.
Any comment:	

Data / Parameter:	$\varepsilon_{\text{baseline},i,,y}$
Data unit:	%
Description:	Energy efficiency of Ihe element process i if fired with fuel oil
Source of data used:	IPCC
Value applied:	100
Justification of the choice of data or description of measurement methods and procedures actually applied :	Conservative and adequate value in accordance with good practices of the 2006 IPCC Guidelines for Greenhouse Gás Inventories
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>**Ex-ante Project Emissions:**

The project emissions were calculated as shown in the formula below:

$$PE_y = FF_{project,y} \times NCV_{NG,y} \times EF_{NG,CO2,y}$$

	unit	2008 and 2018	2009 to 2017
PE_y	tCO_2e	2.385	4.770
$FF_{project\ i,y}$	m^3	1.154.130	2.308.260
$NCV_{NG,y}$	TJ/m^3	0,0000368324	0,0000368324
$EF_{NG,CO2,y}$	tCO_2/TJ	56,10	56,10

Ex-ante Baseline Emissions:

The baseline emissions were calculated as shown in the formula below:

$BE_y = \sum_i FF_{baseline,i,y} \cdot NCV_{FO,I} \cdot EF_{FF,\ CO2,i}$

	unit	2008 and 2018	2009 to 2017
BE_y	tCO_2e	3.290	6.580
$FF_{baseline\ i,y}$	Gg	1,1	2,12
NCV_{F0}	TJ/Gg	40,14	40,14
$EF_{F0,CO2}$	tCO_2/TJ	77,40	77,40

Where $FF_{baseline,i,y}$ was calculated as follows:

$$FF_{baselinei,\,y} = \left(FF_{projecti,\,y}\right) x \frac{NCV_{NG,\,y}}{NCV_{FO,\,y}}$$

	unit	2008 and 2018	2009 to 2017
$FF_{baseline\ i,y}$	Gg	1,1	2,12
$FF_{project\ i,y}$	m^3	1.154.130,10	2.308.260,20
$NCV_{NG,y}$	TJ/m^3	0,0000368324	0,0000368324
NCV_{F0}	TJ/Gg	40,14	40,14

Ex-ante Emission reduction:

The emission reductions were calculated according to the formula below:

$$ER_y = BE_y - PE_y$$

	unit	2008 and 2018	2009 to 2017
ER_y	tCO_2e	905	1.811
BE_y	tCO_2e	3.290	6.580
PEy	tCO_2e	2.385	4.770

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of overall emissions reductions (tCO_2e)
2008 (july-december)	2.385	3.290	905
2009	4.770	6.580	1.811
2010	4.770	6.580	1.811
2011	4.770	6.580	1.811
2012	4.770	6.580	1.811
2013	4.770	6.580	1.811
2014	4.770	6.580	1.811
2015	4.770	6.580	1.811
2016	4.770	6.580	1.811
2017	4.770	6.580	1.811
2018 (january-june)	2.385	3.290	905
Total (tonnes of CO_2e)	47.700	65.805	18.109

B.7 Application of a monitoring methodology and description of the monitoring plan:

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B.7.1 Data and parameters monitored:

Data / Parameter:	$FF_{baseline,i,y}$
Data unit:	Gg
Description:	Quantity of fuel oil 6 A that would be combusted in the absence of the project activity in the element process i during the year y in m^3
Source of data to be used:	calculated
Value of data	1,1 (2008 and 2018) and 2,2 (2009 to 2017)
Description of	Measurements were done according to the good practices of the 2006 IPCC

measurement methods and procedures to be applied:	Guidelines for Greenhouse Gas Inventories
QA/QC procedures to be applied:	According to ISO 9000
Any comment:	

Data / Parameter:	$FF_{project\ y,i,y}$
Data unit:	m^3
Description:	Quantity of natural gas combusted in the element process i during the year y.
Source of data to be used:	measured
Value of data	1154130,1005 (2008 and 2018) and 2308260,201 (2009 to 2017)
Description of measurement methods and procedures to be applied:	Measurements were done according to the good practices of the 2006 IPCC Guidelines for Greenhouse Gas Inventories
QA/QC procedures to be applied:	According to ISO 9000
Any comment:	

B.7.2 Description of the monitoring plan:

>>According to the AMS III B- “Switching fossil fuels”, the monitoring shall involve:

a. Monitoring of the fuel use and output for an appropriate period (e.g., a few years, but records of fuel use may be used) prior to the fuel switch being implemented - e.g. coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used *in lieu* of actual monitoring);

b. Monitoring fuel use and output after the fuel switch has been implemented - e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit.2

The section contains the means and procedures to gather and store data for project monitoring purposes. The monitored data will be kept for at least two years after the end of the credit period, or at least two years after the last project activity CER is issued, whatever happens last. According to the methodology, the monitoring involves parameters related to natural gas combustion, and will be a responsibility of Camargo Corrêa and ATA.

Camargo Corrêa Cimentos will provide the monitoring, compared against GASMIG data (gas supplier); ISO 9001 certification will provide reliability for the gathered and monitored data, thereby meeting the best monitoring practices. Additional information on the monitoring plan can be found in Attachment 4.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> The baseline and monitoring methodology were completed in 26/12/2007 by ATA- Ativos Técnicos e Ambientais.

ATA - Ativos Técnicos e Ambientais
São Paulo-Brazil
Tel: 55 (11) 5505-9676
e-mail: info@atapart.com.br

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>September 2004

C.1.2. Expected operational lifetime of the project activity:

>>30 years

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>N/A

C.2.1.2. Length of the first crediting period:

>>N/A

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>July, 2008

C.2.2.2. Length:

>>10 years

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>> Camargo Corrêa Cimentos holds an Operation License for the activities of gray cement and white cement production, granted by Fundação Estado do Meio Ambiente (FEAM), a state organization of the Government of the State of Minas Gerais, under COPAN Process no. 0015/1978/093/2003. The replacement of burners in the hot gas generators during project implementation was communicated to FEAM via an official note - FEAM Protocol no. 00653/2004 dated 23/01/2004).

The grant of the Operational License means that the company meets the legal requirements for the activity. The Operation License diploma is enclosed herein.

Camargo Corrêa Cimentos elaborated a document called "Corporate Standard for Emergency Readiness and Handling", referred to as "Standard". The purpose of this Standard is to set and keep updated the mechanisms to handle health and safety environmental emergency occurrences, identifying their potential risk, and seeking to handle any situation involving victims, material damages and/or environmental damages; it is also intended to prevent and minimize the effects associated to those occurrences. Thus, Camargo Corrêa Cimentos S.A. demonstrates its commitment and concerns with sustainability and the environment.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>According to the Resolution #1 dated on December 2nd, 2003, from the Brazilian Inter-Ministerial Commission of Climate Change (Comissão Interministerial de Mudança Global do Clima -CIMGC), decreed on July 7th, 1999, any CDM projects must send a letter with a description of the project and an invitation for comments by local stakeholders. In this case, letters were sent to the following local stakeholders:

- City Hall of Pedro Leopoldo;
- Chamber of Pedro Leopoldo;
- Environment agencies from the State and Local Authority;
    - FEAM (Fundação Estadual do Meio Ambiente)
- Brazilian Forum of NGOs;
- District Attorney in Portuguese: Ministério Público and;

• Local communities associations:

- ASCAPEL (Associação de catadores de Pedro Leopoldo);
- Associação dos Engenheiros de Pedro Leopoldo;
- ACI (Associação Comercial e Industrial de Pedro Leopoldo).

Local stakeholders were invited to provide comments about the project activity. Local stakeholders had 30 days after receiving the letter to post their comments and concerns. The questions and were adressed by ATA- Ativos Técnicos e Ambientais e Camargo Corrêa Cimentos. A written copy of the PDD was sent as requested.

E.2. Summary of the comments received:

>>No comments were received until this moment.

E.3. Report on how due account was taken of any comments received:

>>N/A

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Camargo Corrêa Cimentos
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NO PUBLIC FUNDING WAS REQUESTED FOR THIS PROJECT

Annex 3

BASELINE INFORMATION

Already addressed in the main document

Annex 4

MONITORING INFORMATION

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Monitoring will be performed in two ways:

1. By GASMIG (utility that supplies natural gas for Pedro Leopoldo unit):

This system measures the gas flow from the network to the factory in a continuous, on-line way. GASMIG is responsible for the maintenance and calibration of this global consumption meter. The consumption reports at the global general meter are issued on a biweekly basis, when the consumption invoices are sent to Camargo Corrêa.

2. By Camargo Corrêa Cimentos:

In this system, monitoring is made for the consumption points (element process) within the factory. These meters are also on-line, and integrated to the operational control system for those chains, i.e., the central panel operator controls the injection of NG into the process as necessary. For the production chain meters, the report is made on a daily basis. The In-touch supervisory system gathers the different data from the unit and consolidates then into a daily report on the respective production systems (element process).
Those informations are manually entered in 3 different systems:
- OEE Spreadsheet (database to measure the global efficiency of the productive chains)
- Signaler (spreadsheet with the main performance indicators of the manufacturing units)
- Report on the produced item, SAP report, transaction code MFBF
Each consumption point or element process is identified by an acronym as indicated below:

Nº	element process	
1	hot gas generator raw mix	R4
2	hot gas generator slag furnace A	tag V8
3	hot gas generator slag furnace B	tag V9