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

CONTENTS

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:

Burning of solid biomass for process steam generation for beer manufacture in place of fuel oils at AMBEV´s Branchs Agudos (SP) and Teresina (PI).

Version 4 date 31/10/2007 _ A

The only difference between this PDD version and Version 4, date 31/10/2007, referred in the Brazilian LoA, dated on December 20th, 2007, is related to information provided regarding evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.

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

The purpose of the project activities is to introduce renewable sources in AMBEV's Agudos (FAG) and Teresina Branchs (FTE) energy matrix replacing the fuel oils BPF 3 A and BPF 1 A, respectively. Instead, the excess of biomass from local surroundings will be used at AMBEV´s boilers. Project activity reduces CO_2 emissions and inserts renewable energy sources in company operations. In FAG (São Paulo) the biomass comes mainly from sawmills, but a whole logistics chain with others suppliers was established to attend project´s biomass fuel demand. In FTE (Piauí) a social programme with poor local community families was established, and, nowadays provide 30% of project´s biomass needs. The other 70% of biomass is bought from small merchants, who indirectly help other poor families with this alternative local income generation. In both cases new biomass boilers were installed to substitute the old fuel oil fired boilers. In FTE there were 3 mix (fuel oil and biomass) fired boilers. The FAM 20, manufactured on 1993, was installed on 1997 and retrofitted in 2004 to continue its operations on-site accepting 100% biomass. The others were also retrofitted to comprise a new furnace and were sent to AMBEV´s Cuiabá branch to burn 100% biomass. To serve as fuel oil stand-by boilers for Teresina, 2 other fuel oil boilers were sent (ATA MP815 – manufactured on 1995 and CBC CFI 1200 BHP – manufactured on 1991). ATA MP815 has an expected lifetime operation of 13 years and CBC CFI 1200 BHP of 9 years. Both were installed in FTE on 2005. However, as they will only function as stand-by it is expected to function more years than expected. In addition to this, AMBEV undertakes a boiler revision when its 25 operational lifetime is achieved and necessary retrofits or corrections are made to extend its operational lifetime, as per Brazilian NR13 regulation. In FAG 2 new biomass boiler were bought (Biochamm models- manufactured on 2003 and installed on 22/01/2005) and the 2 old fuel oil fired boilers (Aalborg AR4D and ATA MP815) are still on-site also for stand-by purposes only. The ATA MP815 has a minimum operational lifetime expectancy of 4 years and was installed in FAG on 1986. The Aalborgh AR4D has a minimum operational lifetime of 10 years and was installed on 1992. However the same explanation for Teresina boiler applies to Agudos, the 25th revision according to Brazilian NR13 regulation.

The biomass boilers are operated by local partners, which are responsible for the full operation and maintenance of the biomass steam generation system. All investment for biomass collection, civil facility construction and boilers purchase were undertaken by the partners. In FAG the partner is FLAMAX and in FTE is Alusid.

AMBEV will monthly buy the steam monitored value supplied from the owner of the boiler for its beer and soft drinks manufacturing operations. All steam consumed is recorded by on-site meters. The CER´s property generated by this project activity is established by contractual agreement between AMBEV and

the partner. Ashes resulting from biomass burning are disposed in the municipal landfill in Tersina´s case and at Agudos they are sent to Biolândia (Piracicababa - 200Km distance) to be transformed into fertilizer. In FAG the biomass system shall be able to generate 30 tons of steam per hour to meet brewery and soft drink production of 600,000 hl/month. In FTE it generates 20 tons of steam per hour to meet a 150,000 hl/month. Biomass forecast consumption in FAG is 5,200 tons per month and in Teresina is 1,200 tons. The biomass steam generation plant was designed to have:

In FAG: Minimum biomass stocking area for 1 month of operations, automated boiler biomass feed, 02 biomass burning boilers of 15 tons of steam generation per/hour and automated ash removal system.

In FTE: Minimum biomass stocking area for 2 months of operations, Automated boiler biomass feed, 01 biomass burning boilers of 20 tons of steam generation per/hour and manual ash removal system.

In FAG the old oil-fired boilers consumed 12,564,030 Kg, 11,029,200 Kg and 11, 917,490 of fuel oil 03 A during the years 2002, 2003 and 2004, respectively. In FTE the fuel oil 01 A consumption was 4,759,369 Kg, 4,191,660 Kg and 4,707,885 Kg in 2002, 2003 and 2004 years, respectively.

Project activities started its testing period in FAG on December 2004 and in FTE on November 2004.

At both sites fuel oil fired boilers shall remain as standby so as to serve for emergency steam supply in case of any problem occurs with the biomass boilers, to prevent any interruption. BPF 1 A oil consumption forecast for the project activities is no more then 60,000Kg per year per site.

The FAG was designed for the manufacture of beer and chopp. Production forecast for the year of 2007 is 5,600,000 hl of beer and 51,400 hl of chopp. The FTE was designed to manufacture beer and soft drinks. Its forecast for 2007 is 1,200,000 hl of beer and 770,000 hl of soft drink.

Steam is used in several areas in the factory for heating liquids in the intermediate beer production processes, in tank, equipment, vat and piping asepsis, in bottle asepsis in the beer bottling process and in the beer pasteurization.

Project activities contribute to host Country sustainable development by providing:

- The adoption of energy efficiency and cleaner technologies in industrial processes;
- Increase in employment opportunities in the nearby region and in the city where biomass boilers are located;
- Generation of local income;
- An efficient solution for regional biomass excess destination avoiding its natural decay or uncontrolled burning emissions.

A.3. Project participants:

Name of Party involved (*)((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host party)	AmBev – Agudos Branch	No
Brazil (host party)	AmBev – Teresina Branch	No
Brazil (host party)	Apsis Consultoria Empresarial S/C Ltda (Apsis Consulting)	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have

provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

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.:

FAG – Agudos in the State of São Paulo and FTE – Teresina in the State of Piauí

A.4.1.3. City/Town/Community etc:

FAG in Agudos and FTE in Teresina.

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

State of São Paulo:

AMBEV´s Agudos Branch - In FAG biomass boilers area is located inside the branch and storage site is 1 Km distance.

FAG´s address is: Rodovia Marechal Rondon, km 317, Agudos, SP

State of Piauí

AMBEV´s Teresina Branch (FTE) - Biomass boilers area and storage site are located inside the branch.

FTE´s address is Av. Henry Wall de Carvalho, 7220 - Distrito Industrial - Teresina – PI.

FTE: Biomass boilers area and storage site are located inside AMBEV´s FTE - Av. Henry Wall de Carvalho, 7220 - Distrito Industrial.

FAG: Biomass boilers area is located inside FAG and storage site is 1 Km distance. FAG´s address is: Rodovia Marechal Rondom, km 317, Agudos, SP

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

Project activities fall under Type I – Renewable energy project activities with maximum production capacity equivalent to 45MWth, Category I.C. Thermal Energy for the user - version 9, from 23/12/2006**,** which comprises renewable energy technology to supply thermal energy directly to the user.

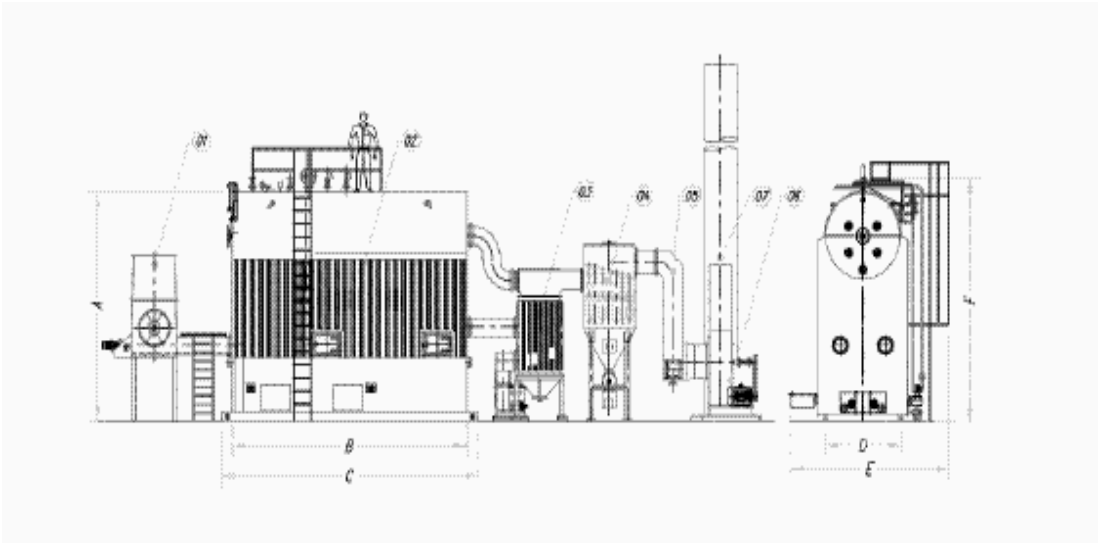
Technology to be used by project activities:
FAG:
The old fossil fuel-fired boilers were replaced with 2 new boilers that are capable of combusting most kinds of biomass to generate steam, a vital process ingredient at AMBEV facilities. The boilers are Brazilian made (Flamotubular Biochamm Model BGV) and will contribute significantly to improving local air quality, eliminating in particular SO_2 and NO_2emissions from fuel oil use. Moreover, the use of recycled biomass will reduce Brazil's reliance on imported hydrocarbons but will not put additional pressure on the environment for biomass. No plantation wood planted for the sole purpose of providing firewood will be required for this project. Instead biomass that would otherwise have been uncontrolled burned in abandoned areas in the nearby region.

FAG biomass suppliers are listed below:

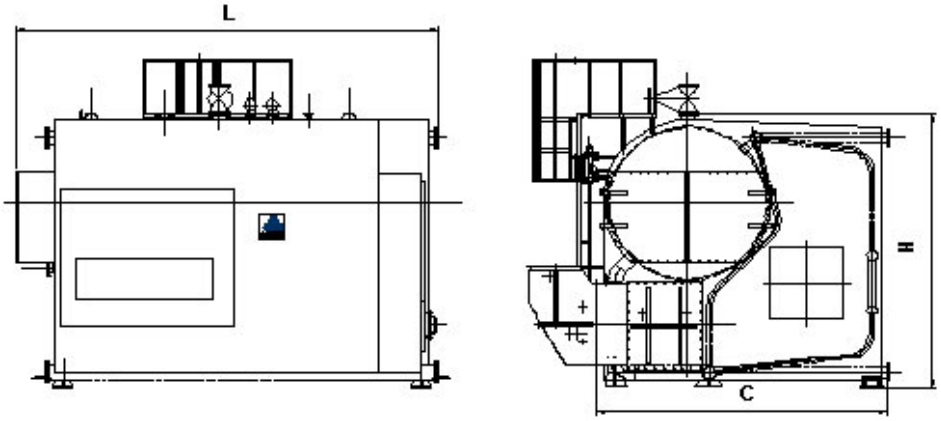
Type of biomass	Supplier	Distance from biomass storage area (in Km)	Triturated at Biomass storage area?
Tritured woodchips from MDF furniture production	Sawmill Tabapinus	20	No
Eucalyptus woodchips	Sawmill in Duartina	60	No
Tritured pinus woodchips from furniture production	Bozo beds manufacturer from Lençóis Paulistas	25	No
Broken pallets	AMBEV	1	Yes
Broken Pallets	Duratex in Agudos	5	Yes
Eucalyptus husks	Duratex in Botucatu	55	Yes
Sugar cane bagasse	Alcohol destillery in Bernardino do Campo	150	Yes
Pinus woodchips from coffins production	Serraria Santa Bárbara em Cordeirópolis	280	Yes

The boilers have automatic controlled operations for steam generation in industrial processes. It is a compact equipment approved by German Technical Control Society (TÜV) in regards to its safety and polluiton levels.
Boilers picture and basic lay-out:

The use of 02 Biochamm Flamotubulares Biomass Boiler Model BGV are envisaged for the FAG Project, bearing a 15 ton of steam/hour generation capacity at 21 bar pressure.



FTE: In FTE there were 3 mix (fuel oil and biomass) fired boilers. The FAM 20 was retrofitted to continue its operations on-site accepting 100% biomass and the others were sent to AMBEV´s Cuiabá branch to burn biomass. To serve as fuel oil stand-by boilers for Teresina, 2 other fuel oil boilers were sent (ATA MP815 and CBC CFI 1200 BHP). The FAM 20 is capable of combusting Babaçu husks (NCV = 4.000kcal/kg) to generate steam, with a thermal efficiency of 83% The boiler is Brazilian made by Aalborg industries bearing a 20 ton of steam/hour generation capacity at 10 bar pressure.
Boiler basic lay-out:



FTE Boiler picture:

FAG: The biomass logistics chain is described below and benefits the local environment as well as economy markedly. Additional employment will be created for biomass transport and processing.

1 – Biomass is weighed at the entrance of storage area.

2 – Biomass is unloaded from dump-carts in the storage area.

3 – Biomass is pushed to the automatic mat.

4 – Biomass is transported by automatic mat to the triturate equipment.

5 – Biomass is triturated and poured into dump carts trucks to be stored

6 – Biomass is stored

7 – Biomass is transported to the boilers for1 Km distance in diesel fueled trucks.

8 – Biomass is unloaded at the boilers

9 – Biomass is burnt into the boilers

10 – Both boilers functioning are controlled by PLC system

In Teresina the biomass logistics chain benefits poor families from local community generating income and better environment quality. Additional employment will be created for biomass transport and processing.

1 – Native Babaçu coconut
2 – Poor families who supply 30% of project needs
3 - Biomass is collected by contracted Alusid dump-carts from poor families and small merchants.
4 – Biomass is weighed in the entrance of FTE.
5 – Biomass is unloaded from dump-carts in the storage area.
6 – Biomass is poured into a feeding system.
7 – Biomass is transported by an automatic mat into the boiler.
8 – Biomass in burnt into the boiler.

(1)

(2)

(3)

(5)

(5)

(6)

(7)

(8)

There was no transfer of technology, they are all domestic. The technology for biomass boiler construction is widespread in Brazil; however, the use of this type of equipment in beverage manufacture is an innovation on the part of AmBev.

Biomass boilers are used mainly in the paper pulp, sugar and alcohol, and vegetable oil production. Beverage factories usually work with Natural Gas or BPF oil boilers due to technological and supply chain restrictions imposed by this type of equipment to the beverage industrial process.

From an environmental viewpoint:

FAG and FTE boilers already boast of an Operational License, thereby demonstrating States Environmental Agencies (SP is CETESB and Piauí is SEMAR) approval to project activities.

FTE boilers already boast of an Operational License, thereby demonstrating State Environmental Agency – SEMAR approval to project activity.

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

Years	Estimation of annual emission reductions in tonnes CO_2 e
2007*	8,339
2008	50,035
2009	50,035
2010	50,035
2011	50,035
2012	50,035
2013	50,035
2014	50,035
2015	50,035
2016	50,035
2017	41,696
Total estimated reductions (tones of CO_2 e)	**500,350**
Total number of crediting years	10 years
Annual average of the estimated reductions over the crediting period (tones of CO_2 e)	50,035

*As the crediting period starts on Nov 07 and ends on nov2017, the baseline and project emissions considered the periods from Nov07-Dec07 (2months) and the period Jan17-Oct17 (10 months).

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

The project activities will not receive any public funding from Parties listed in Annex I of the UNFCCC.

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

The project activity is not a debundled component of a large scale project activity because each project boundary is far from each other more than 1 Km.

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:

AMS -I.C. Thermal Energy for the user - version 9, from 23/12/2006.

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

According to Appendix B, the AMS – I.C Thermal Energy for the User for thermal biomass, biofuels or biogas applications Item 3 from Technology /Measure: the energy output shall not exceed 45 MWthermal.

The FAG and FTE biomass boilers were installed to substitute the old fuel oil fired boilers, which will only remain in place for use in case of the new equipment stoppage.

For FAG the installed capacity of each new thermal application boiler is 15,000 Kg steam/hour at 21 kgf/cm2, that is, 10,000,000 Kcal/hour each, that means 11.63 MWth each, a total of 20,000,000 Kcal/hour = 23.26MWth. For FTE new thermal application boiler is 20,000 Kg steam/hour at 10.5 kgf/cm2, that is, 12,900,000 Kcal/hour, that means 15 MWth. FAG and FTE total capacity is 38.26

MWth for all the boilers affected by the project activity combined, which does not exceed the 45 MWthermal limit in any year of the crediting period.

Project activities comprise mainly the burning of woodchips and babaçu husks for the generation of steam used in the beer manufacturing process. Project activities decrease GHG gas emissions by the use of biomass in place of fuel oil in 40,000tonnes of CO2e per year at FAG and in 15,000 tonnes of CO2e at FTE. Project activities do not directly emit more than 200 tons of CO2e per year in both sites.

B.3. Description of the project boundary:

Project borderline definition according to methodology I.C. Thermal Energy for the User is the physical and geographic area where the renewable energy is generated. Thus, project borderline comprises the biomass boiler plant within the FTE and Biomass plant and storage site at FAG.

B.4. Description of baseline and its development:

The baseline scenario chosen was the fuel oil used by the conventional boilers without replacement by biomass boilers for thermal energy generation, which applies to renewable energy technologies that displace technologies using fossil fuels classified into I.C Categoy – Thermal Energy for the user.

The same baseline scenario was chosen for both project activities as the testing period with the biomass boilers and logistic chains were consolidated on 2005 in both sites. From then on, both AMBEV branches started to be mainly supplied of thermal energy by biomass in the beginning of 2005.

The emissions prevented result from the balance between the emissions on account of fuel oil 3A (in FAG) and fuel oil 01 A (in FTE) consumption by the old conventional boilers installed in the plant, without the activity of this CDM project, and the emissions from the proposed CDM project related to the installation of biomass boilers.

Both sites boilers´ efficiency of its specific fuel-oil is 88% according to manufacturer´s information. The Net Calorific Value (NCVi) of both residual fuel oils BPF 01 A and 03 A is 9,590kcal/kg. 6,34kcal/kg will be needed to reach the necessary steam temperature, with water temperature at 20º. Thus, one kilogram of fuel oil is needed to produce 14kg of steam. The annual steam production estimated for 2007 is 165,815tonnes in FAG and 63,937 tonnes in FTE, which is associated to the mean of ratio between steam/oil consumption in the past years 2002, 2003 and 2004. From 2008 until the end of the crediting period, the value was maintained as a conservative estimative for oil consumption prediction. It´s expected for both sites 5.000 Kg of fuel oil 01A monthly consumption for emergency cases, which represent the projects´ emissions. Thus, the baseline will be recalculated ex-post according to the total steam actually generated. The amount of fuel oil which shall cease to be consumed will be calculated by dividing the total steam actually generated by the ex-ante fixed steam/oil ratio (14 kg of steam per kg of fuel oil)

AGU:

	2002	2003	2004
SLE - Saturated Liquid Enthalph (kcal/kg)	186	186	186
Vaporization enhtalpy in Kcal / Kg	478	478	478
Steam title	0.99	0.99	0.99
Water enthalpy in Kcal/Kg	55	60	55
Boiler Performance	88%	88%	88%
Net Calorific Value	9590	9590	9590
Steam production per kg of 3A oil	**14.0**	**14.1**	**14.0**

FTE:

	2002	2003	2004
SLE - Saturated Liquid Enthalph (kcal/kg)	186	186	186
Vaporization enhtalpy in Kcal / Kg	478	478	478
Steam title	0.99	0.99	0.99
Water enthalpy in Kcal/Kg	52	50	52
Boiler Performance	89%	89%	89%
Net Calorific Value	9590	9590	9590
Steam production per kg of 1A oil	**14.1**	**14.0**	**14.1**

The amount of fuel oil which would be consumed in 2007 (11,837 tonnes in FAG and 4,553 in FTE) is equivalent to the amount of steam, **165,815tonnes in FAG and 63,937 tonnes in FTE** of steam (2007 estimative), divided by the mean of historic ratio between steam/oil for the past years 2002, 2003 and 2004 (14). So each kg of fuel oil 03A or 01A, can produce 14kg of steam. Thus 165,815 tonnes of steam in FAG/14 = 11,837 tonnes of fuel oil which would be used and 63,937 tonnes of steam in FTE/14 = 4,553 tonnes of fuel oil which would be used.

Baseline emissions
BLE = FOC * NCVi * EF * λ
In which:

BLE - Baseline emissions
FOC - Fuel oil consumption in conventional boiler
NCVi – Fuel oil Net Calorific Value
EF - Emission factor
λ - Carbon fraction actually oxidized in combustion

- BPF oil consumption expressed in kg/year = : 11,837 tonnes in FAG and 4,553 in FTE in 2007
- NCVi: = 9,590 kcal/kg
- Conversion factor - 1 kcal = 0.000000004186 TJ

Energy Consumption in TJ/year = FOC * NCV* 0.000000004186

CDM – Executive Board

1. Emission in ton $C0_2e$ are estimated as from energy in TJ

    - EF - emission factor (t C/TJ) - Fuel oil = 21.1
    - λ □= 0.99
    - Molecular weight ratio between CO2/C: 44/12

Emissions ton C/year = Energy Consumption (TJ/year)* EF * λ

Emissions ton CO_2e/year = Emissions of ton C/year * 44/12

Date of completion of final text for this baseline section: 26/04/2007.
Name of the person/entity determining baseline: Ingrid Person – Maxambiental.

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 fuel oil boilers would continue to supply steam to FAG and FTE in the absence of project activities. Option for the implementation of a biomass boiler almost eliminates fuel oil use.

The decrease of anthropogenic emissions will occur by the avoidance of fuel oil combustions substituted by biomass. Residual project emissions occurs due to the small amount of fuel oil still consumed but only in the cases of biomass boiler maintenance and firing up. With project activities a biomass boiler is used for the same amount of steam needed for the brewery's production process.

FAG and FTE have hired two partner companies, one for each site, to establish a new biomass supply chain and operate the new boilers. For FAG all the residues used in the projects were previously dumped in vacant lots or had them sent to non-controlled landfills. For FTE the biomass was previously left on the field and decomposed aerobically.

Sustainable development of the region is promoted with the disposal of this waste at the FAG and FTE boilers, through the solving of a chronic problem – biomass decomposition in the open air – and, moreover, jobs are also generated specially in FTE for poor families and specifically the hiring of trucks and new employees for the biomass storage site in Agudos.

According to the category IC. Thermal Energy for the User, leakage would occur if the old equipment were transferred to another activity, which does not occur. In the case of FTE 2 boilers from baseline were retrofitted to comprise a new furnace and were sent to AMBEV´s Cuiabá branch to burn 100% biomass. The conventional boiler in FAG will remain in the factory as an alternative to the biomass boiler. Leakage would only be possible if the biomass boilers ceased to operate. This, however, would be accounted for by the amount of fuel oil used in the steam generation plant.

The proposed project activities qualify it to use simplified methodologies, additional by option (b),(c) and (d) of "Annex A of Appendix B" on the simplified modalities and procedures for small-scale CDM project activities.

(a) Investment barrier: The investment in new boilers was undertaken by partners as it was not AMBEV´s most attractive financial option.

b) Technological barrier: The fuel oil boilers previously used in the unit shall remain as standby in order to ensure, in the event of any problem with the biomass boilers, emergency steam supply by means of the oil-fired boilers, so that no interruptions would occur. There is not yet technological reliability in using such technology to a beverage-sector enterprise as the number of fixing related to the new system has dramatically increased. These include patching feeder pipelines, removing the grill as a result of ashes amongst many other constant interventions. The particulate emissions from a biomass boiler are usually higher then a fuel oil one, requiring a more complex operation rather then a fuel oil boiler. This may cause problems with local stakeholders and requires more human and capital resources to maintain an adjusted a reliable operation. In addition to that, entrepreneurs are being caution in implementing this type of biomass boiler, as steam supply must be continuous and this problem is complex to be easily managed in a case of suddenly shortage.

c) Barrier on account of prevailing practice: the prevailing practice in the Brazilian beverage industry comprises the use of fuel oil-fired boilers for generating the steam used in the beer manufacture process. The project displays an innovative character, as it replaces fossil fuel with biomass.

d) Other barriers: reliability in raw material supply. In neither sites formal contracts were established ensuring supply of biomass by. In FAG sawmill suppliers are located within a radius of up to 300 km from the factory. These suppliers previously dumped their wastes on vacant lots or dispatched them to non-controlled landfills. In FTE a complex logistics chain recruiting poor families and small merchants around the factory was also established. However, there may be problems regarding supply continuity due to hazardous weather, low harvests or lack of suppliers in Teresina´s specific case. Even though boilers may consume other types of biomass, it would be necessary to reconfigure raw material supply. The experimental option for malt waste from the factory itself may be a pioneering alternative, although it is still in its study stage.

The incentive from the CDM was seriously considered in the decision to proceed with the project activity.

Evidence that AmBev seriously considered the CDM in the decision to proceed with the project was presented as evidenced in a minutes of meeting among the AmBev's managers to discuss the biomass project under the CDM eligibility on 10 April 2004.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

As the project activities refers to the substitution of old fuel fired boilers for new biomass ones in both sites.
This methodology applies, as there is already a historic fuel oil consumption record for the previous years, as already mentioned in item A.2. For greater precision regarding the prevented fuel oil consumption amount, option was made for calculating base line emissions through monitoring the amount of steam produced by the biomass boiler in order to later convert it into fuel oil consumption. The prevented oil consumption figure will be calculated from this, just as the emissions in CO_2e/year, as would happen in the base line by multiplying by the emission factor.

However, as there is an estimated residual consumption of fuel oil for emergency cases, these related emissions were discounted as project emissions.

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

Data / Parameter:	FOC - Fuel oil consumption
Data unit:	Kg
Description:	The quantity of fuel oil BPF 03 A (FAG) and BPF 01A (FTE) consumed at old boilers on FAG and FTE prior to the project implementation during the three historical years
Source of data used:	On-site measurements
Value applied:	FAG 03A: 12,564,030 (2002), 11,029,200 (2003) and 11, 917,490 (2004) FTE 01A: 4,759,369 (2002), 4,191,660 (2003) and 4,707,885 (2004)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The amount of fuel oil 03A consumed by each boiler in FAG and 01 A in FTE was daily measured by AMBEV by a ruler of visual measurement and recorded at the fuel oil control sheet at each site. These data can be checked in AMBEV´s SAP system and cross checked with historic purchase receipts. The ruler of visual measurement was chosen as the equipment to be used for fuel oil measurement because in both sites the fuel oil meters are not correctly calibrated. Being so, AMBEV adopted the visual measurement as the most correct way to meter its fuel oil consumption in both sites.
Any comment:	This oil consumption applies to calculate baseline emissions

Data / Parameter:	Boilers efficiency
Data unit:	-
Description:	Energy efficiency of project fuel oil fired boilers
Source of data used:	Calculated based on onsites' temperatures measurements and %CO2
Value applied:	For Agudos: 88% For Teresina 89%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The boilers efficiency were calculated according on-sites measurements' % average boiler CO2 and Δt Difference between smokestack at ambient temperatures (ºC) based on literature tables of combustion performance and Dry saturated steam.
Any comment:	

Data / Parameter:	NCVi
Data unit:	Kcal/kg
Description:	Net calorific value of fuel oils consumed by baseline and project´s fuel oil fired boilers
Source of data used:	2006 National Energy Net (BEN) – Executive Summary page 60 tablel 36 Fuels Density and Net Calorific Power
Value applied:	9590
Justification of the choice of data or description of measurement methods and procedures actually	The National Energy Net (Balanço Energético Nacional) is the official energy data reference in Brazil through Mines and Energy Ministry (MME) and will be fixed for the whole crediting period.

applied :	
Any comment:	

Data / Parameter:	EF
Data unit:	Kg/GJ
Description:	Carbon emission factor of residual fuel oils BPF 01 A and 03 A for combustion of the fuel oils used in baseline and in project activity for heat generation used in industrial processes
Source of data used:	2006 IPCC Guidelines for residual fuel oil V2_1_Ch1, page 23
Value applied:	21.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	The international source suitable for this data is the 2006 IPCC Guidelines. 2006 IPCC Guidelines default value for residual fuel oil V2_1_Ch1, page 23was used because accurate and reliable local or national data is not available. This number is considered conservative.
Any comment:	

Data / Parameter:	Steam production and fuel oil consumption
Data unit:	-
Description:	The average ratio between steam production and fuel oil consumption in the baseline (2002, 2003 and 2004) for both sites according to on-site boiler's efficiency
Source of data used:	On-site information for both sites
Value applied:	14
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value was calculated based on baseline boiler's efficiency, Eas – Saturated Steam Enthalph in Kcal/Kg, Ev – Vaporization enthalpy in Kcal / Kg, T – Steam Title, Ea – Water enthalpy in Kcal/Kg and NCVi.
Any comment:	

Data / Parameter:	λ - Carbon fraction actually oxidized in combustion
Data unit:	
Description:	λ is used to calculate GHG emissions
Source of data used:	2006 IPCC Guidelines V2_1_Ch1, page 23
Value applied:	0.99
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Baseline emissions:

BLE = FOC * NCVi * EF * λ
In which:
BLE - Baseline emissions
FOC - Fuel oil consumption in conventional boiler
NCVi – Fuel oils Net Calorific Value
EF - Emission factor
λ - Carbon fraction actually oxidized in combustion

- Average 2002, 2003 and 2004 BPF 03 A oil consumption in FAG = 11,837 .
- Average 2002, 2003 and 2004 BPF 01 A oil consumption in FTE = 4,553
- NCVi = 9,590 kcal/kg
- Conversion factor - 1 kcal = 0.000000004186 TJ

Energy Consumption in TJ/year = FOC * NCVi* 0.000000004186

2. Emission in ton $C0_2e$ are estimated as from energy in TJ

    - EF - emission factor (t C/TJ) - Fuel oil = 21.1
    - λ = 0.99
    - Molecular weight ratio between CO2/C: 44/12

Emissions ton C/year = Energy Consumption (TJ/year)* EF * λ

Emissions ton CO_2e/year = Emissions of ton C/year * 44/12 = 36,402 tCO2e in FAG **and 14,002 tCO2e in FTE**

Project emissions:

PBE = FOC * NCVi * EF * λ
In which:
PBE – Project Emissions within boundaries
FOC - Fuel oil consumption in conventional boiler
NCVi – Fuel oils Net Calorific Value
EF - Emission factor
λ - Carbon fraction actually oxidized in combustion

- BPF 01 A oil consumption expectancy expressed in kg/year: ex 60,000 kg for FAG and FTE
- NCV1 = 9,590 kcal/kg
- Conversion factor - 1 kcal = 0.000000004186 TJ

Energy Consumption in TJ/year = FOC * NCV* 0.000000004186

3. Emission in ton $C0_2e$ are estimated as from energy in TJ

    - EF - emission factor (t C/TJ) - Fuel oil = 21.1
    - λ = 0.99
    - Molecular weight ratio between CO2/C: 44/12

Emissions ton C/year = Energy Consumption (TJ/year)* EF * λ

Emissions ton CO_2e/year = Emissions of ton C/year * 44/12 = **185 tCO2e for both sites**

Leakage emissions:

According to the category I.C. Thermal Energy for the User, leakage would occur if the old equipment were transferred to another activity, which does not occur in both sites. In FTE the baseline boilers were transferred to AMBEV´s Cuiabá branch, however these boilers are burning biomass instead of fuel oil. Being so, there is no leakage. In FAG the baseline boilers shall remain at the factories as alternative to the biomass boiler. A possibility would only be if the biomass boilers ceased operating. This, however, would be accounted by project emissions as the amount of fuel oil used at the steam generation plant during crediting period.

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

FAG:

Years	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2007*	31	6,067	0	6,036
2008	185	36,402	0	36,218
2009	185	36,402	0	36,218
2010	185	36,402	0	36,218
2011	185	36,402	0	36,218
2012	185	36,402	0	36,218
2013	185	36,402	0	36,218
2014	185	36,402	0	36,218
2015	185	36,402	0	36,218
2016	185	36,402	0	36,218
2017*	154	30,335	0	30,181
Total (tonnes of CO_2 e)	1,845	364,022	0	362,177

*As the crediting period starts on Nov 07 and ends on nov2017, the baseline and project emissions considered the periods from Nov07-Dec07 (2months) and the period Jan17-Oct17 (10 months).

FTE:

Years	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2007*	31	2,334	0	2,303
2008	185	14,002	0	13,817
2009	185	14,002	0	13,817
2010	185	14,002	0	13,817
2011	185	14,002	0	13,817
2012	185	14,002	0	13,817
2013	185	14,002	0	13,817
2014	185	14,002	0	13,817
2015	185	14,002	0	13,817
2016	185	14,002	0	13,817
2017*	154	11,668	0	11,514
Total (tonnes of CO_2 e)	1,845	140,018	0	138,173

*As the crediting period starts on Nov 07 and ends on nov2017, the baseline and project emissions considered the periods from Nov07-Dec07 (2months) and the period Jan17-Oct17 (10 months).

Aggregate FTE+FAG:

Years	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2007*	62	8,401	0	8,339
2008	369	50,404	0	50,035
2009	369	50,404	0	50,035
2010	369	50,404	0	50,035
2011	369	50,404	0	50,035
2012	369	50,404	0	50,035
2013	369	50,404	0	50,035
2014	369	50,404	0	50,035
2015	369	50,404	0	50,035
2016	369	50,404	0	50,035
2017*	308	42,003	0	41,696
Total (tonnes of CO_2 e)	3,690	504,041	0	**500,350**

*As the crediting period starts on Nov 07 and ends on nov2017, the baseline and project emissions considered the periods from Nov07-Dec07 (2months) and the period Jan17-Oct17 (10 months).

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

B.7.1 Data and parameters monitored:

Data / Parameter:	Steam

Data Unit:	tonnes
Description:	The total and separated quantity of steam produced by biomass and fuel oil BPF 01A boilers at each site
Source of data to be used:	On-site measurements
Value of data:	To be registered
Description of measurement methods and procedures to be applied:	The amount of steam produced by each boiler at project sites will be measured by the followings monitoring procedures: FAG: An electric-meter Vortex is used to measure total steam generated either by biomass and fuel oil boilers. Daily the boilers technician supervisor registers the values metered of steam produced at a steam control sheet. The steam produced only by fuel oil is calculated according to fuel oil consumption and boiler´s efficiency (14 kg of steam per 1 kg of fuel oil). The difference between the total steam measured and the calculated steam produced by fuel oil results in the amount of steam produced by biomass. These 3 data - total, fuel oil and biomass steam production - are monthly and annually consolidated. FTE: Two controls were established: 1) 1 meter of steam outflow type orifice plate at biomass boiler 2) 2 meters of steam outflow type orifice plate at fuel oil boilers. Daily the boilers technician supervisor registers the values metered of steam produced by each boiler at a steam control sheet and sum the amount of steam to calculate the total quantity produced. These data are monthly and annually consolidated.
QA/QC procedures to be applied:	The consistency of metered net heat generation should be cross-checked with the quantity of biomass and/or fossil fuels fired (e.g. check whether the net heat generation divided by the quantity of fuel fired results in a reasonable thermal efficiency that is comparable to previous years).
Any comment:	

Data / Parameter:	Fuel Oil Consumption – FOC
Data Unit:	Tonnes
Description:	The quantity of the fuel oil 01A used at project sites to firing up and maintenance needs
Source of data to be used:	On-site measurements
Value of data:	To be registered
Description of measurement methods and procedures to be applied:	The amount of fuel oil 01A consumed by each boiler at project sites will be measured by the followings monitoring procedures: FAG: Two controls were established: 1) Tank1: capacity of 30 tonnes and 2) Tank3: capacity of 100 tonnes. Daily, at each shift, the tanks 1 and 3 are verified and the BPF oil consumption is registered at the fuel oil control sheet. These data are then monthly and annually consolidated. FTE: Two controls were established: 1) Tank1: capacity of 13 tonnes and 2) Tank2: capacity of 135 tonnes. Hourly, the tanks 1 and 2 are verified. Daily a net mass balance is calculated to know the BPF oil consumption and this value is registered at the fuel oil control sheet. These data are then monthly and annually

	consolidated. Additional to tanks measurements in both sites there will be an extra control of BPF 01A by the purchase receipts. In case of FAG it will be available at boilers operator office and in FTE it will be available with the Environmental Manager of the facility.
QA/QC procedures to be applied:	Cross-check purchase receipts with the quantity of fuel oil consumed at each site.
Any comment:	This parameter applies to calculate Project Emissions.

Data / Parameter:	Biomass Consumption – BC
Data Unit:	Tonnes
Description:	The quantity of biomass burnt in the boilers at project sites
Source of data to be used:	On-site measurements
Value of data:	To be registered
Description of measurement methods and procedures to be applied:	The amount of biomass burnt by each boiler at project sites will be monitored by the followings procedures: FAG: Two controls were established: 1) Purchase receipts will be kept at biomass boilers operator´s office and 2) Daily the trucks that leave the biomass storage site are weighed and recorded along as with the biomass type. The daily data are monthly and annually consolidated. FTE: The cubic volume of each babaçu husk truck is calculated at the entrance of the facility. This data is daily registered at the biomass control sheet and then monthly and annually consolidated.
QA/QC procedures to be applied:	Cross-check purchase receipts with the quantity of biomass consumed at Agudos.
Any comment:	

B.7.2 Description of the monitoring plan:

An overall monitoring plan is being applied to both sites because project activities are the same type, category and technology/measure. All monitoring data will be electronically kept for two years after the end of crediting period at each site.

In both branches AMBEV will buy the steam generated by boilers partners. Details of biomass, fuel oil consumption and steam production control systems are described below:

Biomass receipt and Consumption control: In FAG: Biomass trucks are individually weighed and specified by type at storage center when the triturated biomass is ready for Agudos boiler consumption. This data is recorded at a local spreadsheet. Then it is compared with the biomass purchasing bills (Notas Fiscais), which are kept at Flamax office in Cordeirópolis. Daily data recorded locally is monthly consolidated at Agudos biomass invoice spreadsheet which is cross-checked with purchase receipts. Biomass operator is responsible for ensuring the biomass consumption rate regarding the beer and soft drink volume produced. In FTE the cubic volume of each truck load of babaçu husks is calculated on factory´s entrance and recorded at local spreadsheet. Daily data is monthly consolidated at Teresina biomass invoice spreadsheet.

Fuel oil consumption control: In FAG there are 2 fuel oil storage tanks of 30,000 and 100,000 litres of capacity. (as fuel oil density is 1, then 1 litre of fuel oil is equal to 1 kg). The technical service team performs daily control of volumes received and of the volume in the storage tank so as to quantify the volume consumed daily.The tanks are daily checked through the ruler of visual measurement and oil consumption is recorded at a fuel oil control spreadsheet. The fuel oil purchase bills are kept at Flamax office in Cordeirópolis. Daily data is monthly consolidated at Agudos biomass invoice spreadsheet which is cross-checked with purchase receipts. In FTE there are 2 fuel oil storage tanks of 13 and 135 tonnes of capacity. The technical service team performs daily control of volumes received and of the volume in the storage tank so as to quantify the volume consumed daily.The tanks are daily checked through the ruler of visual measurement and oil consumption is recorded at a fuel oil control spreadsheet. The fuel oil purchase bills are recorded at AMBEV SAP system. Daily data is monthly consolidated at Teresina biomass invoice spreadsheet which is cross-checked with purchase receipts registered on SAP system.

Steam production control: FAG: The operator performs daily meter by the Vortex meter Foxboro Model: 83WT08535STJAN – series number: 04490085 and records the difference between the accumulated amount to the previous day in local steam consumption spreadsheet. This is the total steam generated either by biomass and fuel oil boilers. The steam produced only by fuel oil is calculated according to fuel oil consumption and boiler´s efficiency (14 kg of steam per 1 kg of fuel oil). The difference between the total steam measured and the calculated steam produced by fuel oil results in the amount of steam produced by biomass. These 3 data - total, fuel oil and biomass steam production - are monthly consolidated at Agudos biomass invoice spreadsheet.

FTE: Two controls were established: 1) 1 meter of steam outflow type orifice plate at biomass boiler 2) 2 meters of steam outflow type orifice plate at fuel oil boilers. Daily the boilers technician supervisor registers the values metered of steam produced by each boiler at a steam control sheet and sum the amount of steam to calculate the total quantity produced. These data are monthly and annually consolidated at Teresina biomass invoice spreadsheet .

Monitoring plan management responsibilities are described as follows:

1) Engineering Managers –Responsible to organize monitoring data and undertake periodic internal audits in project´s operations to check if boiler´s operators and technical service team are following the monitoring plan, project performance reviews and corrective actions.
2) Flamax (FAG) is responsible for biomass and fuel oil consumption control along with steam production. Alusid is responsible for biomass consumption and steam production only. The fuel oil consumption in FTE is AMBEV´s engineering manager responsibility. Flamax and Alusid are also responsible for boilers' emissions monitoring, operation, maintenance, calibration, training crew and for the final disposal of residues generated by the boilers.

Initial training was required for biomass boilers operators according to Brazilian regulation NR13. In FTE the operators were trained by SENAI PI/Lençóis. In FAG they were trained by JR Martorini Engenharia de segurança do Trabalho Ltda.

The calibration instruments make part of a computer management system, whose all measuring and safety equipments are predicted at Calibration Instruments Plan.

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

CDM – Executive Board

>>26/04/2007 Ingrid Person /Maxambiental.

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:

28/11/2004

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

30 y 0 m

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:

Not applicable

C.2.1.2. Length of the first crediting period:

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

The crediting period will start on 01/11/2007, or on the date of registration of the CDM project activity, whichever is later

C.2.2.2. Length:

10 y 0 m

SECTION D. Environmental impacts

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

Possible environmental impacts were analyzed by CETESB – State Environmental Sewage technology Company in FAG (SP) and by SEMAR - – State Environmental Protection Agency in FTE.

In FAG the project activity granted an Operational License on November 1st, 2005, number 7001801, process number 07/00631/04.
In FTE the Operation Licence was performed with factory´s renewal process number D000327/07–002627/06.

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:.

No environmental assessments were required by state environmental authorities for any of the project sites. However, in Agudos, to obtain the Operational License, AMBEV had to make a NOx emissions

reduction plan and a particulate emission monitoring to attend the pre requirements of the License. The plan was presented and CETESB gave the OL. The level of particulate emissions was already in conformity with national regulations. In FTE no plan was required.

SECTION E. Stakeholders' comments

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

According to the Brazilian legislation, CDM project activities must send a letter with description of the project activity and an invitation for comments by the local stakeholders. On February and March 2007 letters with confirmation receipts were sent to local stakeholders explaining project activities. However, according to Brazilian DNA these letters needed to be resent to comprise the explanation of project´s sustainable development contribution to the host country. Being so, on 23rd October 2007, letters including this description were resent to local stakeholders:

For Agudos´s branch (FAG):
- Brazilian NGOs Forum and Local Social Association (Fórum Brasileiro de ONGs e Movimentos Sociais para o Meio Mambiente e o Desenvolvimento – FBMOS), on October 23rd , 2007;
- Agudos City hall, on October 23rd , 2007;
- Technology and Environmental sanitation Company (Companhia de Tecnoologia e Saneamento Ambiental – CETESB), on October 24th , 2007;
- Public prosecution service of the State of São Paulo (Ministério Público do Estado de São Paulo) on October 23rd , 2007;
- State Environmental Secretariat (Secretaria Estadual de Meio Ambiente), on October 23rd , 2007;
- Agudos Municipal Chamber (Câmara Municipal de Agudos), on October 23rd , 2007;
- The Municipal Environment and Agriculture Secretariat (Secretaria de Agricultura e Meio Ambiente de Agudos), on October 23rd, 2007.

For Teresina´s branch (FTE):
- Brazilian NGOs Forum and Local Social Association (Fórum Brasileiro de ONGs e Movimentos Sociais para o Meio Mambiente e o Desenvolvimento – FBMOS), on 23rd October, 2007;
- Teresina City hall, on 23rd October, 2007;
- Brazilian Environment and Renewable Natural Resources Institute – Federal Environmental Authority Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA), on 23rd October, 2007;
- Public prosecution service of the State of Piauí (Ministério Público do Estado do Piauí) on 23rd October, 2007;
- Teresina Municipal Chamber (Câmara Municipal de Teresina), on23rd October, 2007;
- Boiler´s operational partner (Alusid Geração de Vapor Ltda), on 23rd October, 2007;
- Local stakeholder – Carolina Silva Nursery (creche Carolina Silva), on 22nd October, 2007;
- Local stakeholder – Areia´s Neighborhood Residents' Association, on 22ndOctober, 2007;
- Environment and Cultural Protect Center of Operational Support (Centro de Apoio Operacional de Defesa do Meio Ambiente e do Patrimônio Cultural) , on 23rd October, 2007;
- Secretaria de Meio Ambiente e Recursos Naturais, on 23rd October, 2007;

E.2. Summary of the comments received:

The only comments received were from:
CETESB - the legal environmental authority in the State of São Paulo, on March 5th, 2007. CETESB states that the project is environmentally friendly, by the reasons of fossil fuels substitution and its

contribution to a better local air quality due to less local pollutants in the air. However, the technical note from CETESB requires attention to particulate emissions and suggests the evaluation of a control equipment implementation. In addition to that, calls special attention to contaminants that may be burnt within the biomass.

Environmental Secretariat of São Paulo – the legal authority sent a letter on March, 26th, 2007approving the project according to another CETESB technical analysis of the project.

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

CETESB´s response was communicated to facility's Manufacturing Manager and AMBEV´s Engineering Department (CEGEN) and was recorded with project documentation.
A particulate emissions monitoring plan was implemented.

Annex 1
CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is required for project activities.

Annex 3

BASELINE INFORMATION

Information regarding baseline is all described in item B1 .

Annex 4

MONITORING INFORMATION

Information regarding monitoring is all described in item B7.