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

CONTENTS

Annexes

SECTION A. General description of small-scale project activity

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

Project title: *AB Brasil* Renewable Energy Project
PDD version number: 6
Date: January 30th 2009

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

Purpose of the Project activity

The project activity displaces fossil fuel by using renewable biomass for thermal energy generation at *AB Brasil Indústria e Comércio de Alimentos Ltda*, known as *AB Brasil*, located in *Pederneiras*, state of *Sao Paulo*. The project aims at reducing green-house gas emissions by burning renewable biomass instead of fuel oil.

AB Brasil is a market-leading bakery supply company. The company has two key brands *Fleischmann* and *Mauri*, and they offer a wide range of products under each brand both direct to customers and through a network of distributors. The *AB Brasil* head office is located in *Sao Paulo* and the manufacturing in *Pederneiras*. The *Pederneira's* facility produces both fresh and dried yeast, confectionery mixes and other products in the bakery market[1].

The project activity consists in installing a biomass boiler for the steam generation, to substitute three oil-fired boilers, which generated the steam previously, at *Pederneira's* facility. The oil-fired boiler has been used since 1996.

The steam is used in the productive process and in the sterilize process. *AB Brasil* buys the 'melaço', which is obtained from the sugar cane's juice diluted in water. This mixture is called 'mosto', and it will be sterilized at 121ºC, by the steam produced in the boiler. The steam is used also to cleanup the equipments and the facilities at 80º, and to sterilize the fermenters. The last process that utilizes the steam is the dehydration of the yeast.

Before the implantation of the project activity, the steam was supplied by three boilers that operate by burning fuel oil. The boilers presented the specifications below:

	Manufacturer	Fuel	Starting date	Efficiency (%)	Steam generated (ton/h)
Boiler 1	ATA	Fuel Oil	1996	88 +/- 2	5
Boiler 2	ATA	Fuel Oil	1996	88 +/- 2	5
Boiler 3	AALBorg	Fuel Oil	2003	89,9	10

Table 1 – Oil-fired boiler specifications
Source: Boiler Manual

[1] Source: http://www.abmauri.com/abmauri/abmauri.nsf/dx/overview-brasil.htm (AB Mauri)

As described above, the continuously steam generation is essential to the productive process in *AB Brasil* and the steam's production results in greenhouses gases emissions from burning fuel oil.

To keep the continuously steam generation and minimize the greenhouse gases emissions, *AB Brasil* decided to use a biomass boiler with produced capacity of 15 tones of steam per hour.

The new boiler's manufacturer is *ICAVI – Indústria de Caldeiras Vale do Itajaí S/A* and the *Serraria Santa Barbara Ltda*, a third party company that was contracted to operate the new boiler, and this company will also be responsible for the obtainment and the transportation of the biomass and to feed the boiler.

Reduction of Greenhouse Gas Emissions

The biomass used is compound of residues such as sugar cane bagasse and woodchips. To feed the boiler, a mix of these residues will be made to maintain the same efficiency and the same previously established set up. A test was conducted with the biomass boiler to determine the biomass required to produce the necessary amount of steam. The result was that for three tones of steam, it is required one tone of biomass mixture.

When the biomass is been burned to generate steam, CO_2 is released into the atmosphere. During trees and sugar cane growth, this gas is absorbed by photosynthesis. As the biomass used is considered renewable, the greenhouse gas emissions are zero. Therefore using the biomass will contribute to minimize the greenhouse gas emission, emitted by burning non renewable fuel.

In addition using these residues as fuel also prevent emissions from the biomass that was left to decay in the fields and will avoid the residues accumulation in landfills.

The company is making new contracts to use sugar cane straw as biomass, in the future, which will be part of the mixture. After the approval of the state law number 11241 that regulates the gradual elimination of the practice of burning sugar cane straw, fires are decreasing in the state of Sao Paulo. Previously the straw was burned to facilitate the manual cutting, now it is separated and in the future it will be used to energy generation. It represents a greater use of the energy content of the sugar cane residue; in addition it reduces the greenhouse gas emissions by fire.

Biomass is obtained in the wood industries and sugar and alcohol plants in *Sao Paulo* state, located within a 200 km radius from the *Serraria Santa Barbara's* facility, where a biomass mixture is prepared and put into dumpsters. The filled biomass dumpsters go to *AB Brasil,* located 40 km far from *Serraria Santa Barbara*, where it will be stored and later used in the boiler to generate steam.

The biomass transportation and processing department generated new jobs to the local community. In *AB Brasil* there are 9 employees working in three shifts daily, to keep feeding the boiler and ensure the continuous steam supply.

The oil fired boilers used previously were disabled, two of them that produced 5 tones per hour of steam will be sold as scrap and the third boiler will be maintained in *AB Brasil*'s facility to ensure the steam supply if any problems occur with the biomass boiler or for the maintenance of this.

The oil-fired boiler will be used approximately 12 hours per month for biomass boiler maintenance and another 4 days for corrective maintenance, which totalize 10 days per year. Since the flow meter is located at the steam exit from the biomass boiler, the steam generated by the oil-fired boiler during this period of time will not be counted in the steam control system, so there will be no project emissions.

Sustainable Development:

The oil consumption for the steam generation emits harmful gases to human health and the environment. The project activity avoids the oil consumption and brings a solution for the final destination of these residues, using them in the burning boiler. It contributes to reduces the waste volume generated, therefore reducing the necessary area for its disposal, and minimize the methane gas generation, from the waste decomposition in anaerobic conditions.

AB Brasil concerned about the final destination given to the ashes generated in the boiler, opted to gather it and send it to *Biolandia Ind. e Com. de Composto*, in *Piracicaba*, *Sao Paulo* state. This residue will be transformer into fertilizer.

Thus the implementation of project activity contributes to sustainable development through the use of a clean technology and renewable resources, improving the human life quality and preserving the environment.

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 a project participant (Yes/No)
Brazil (Host)	**AB Brasil Indústria e Comércio de Alimentos Ltda**	**NO**
	Key Consultoria e Treinamento Ltda	**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.		

Table 2 – Party (ies) and entities private/public involved in the *AB Brasil* project activity.

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.:

Southeast, Sao Paulo.

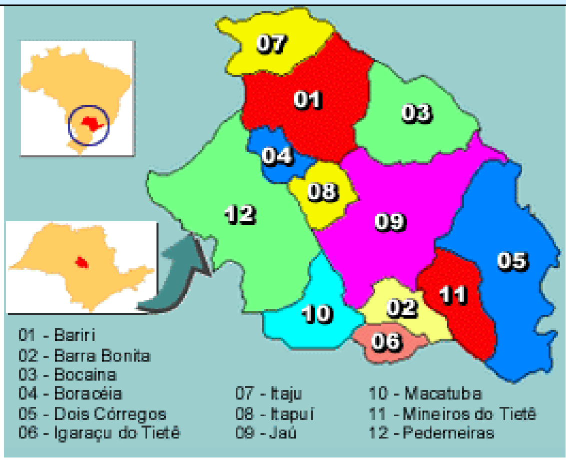
A.4.1.3. City/Town/Community etc.:

Pederneiras

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

Factory located at Tietê Avenue, L-233, Pederneiras city, Sao Paulo state.

Characteristics of Pederneiras



Founded : 1891
Elevation : 475 m
Population : 35.705 habitants
Total Area : 731 km²
Density : 48,84 hab/km²

FIGURE 1.
Political division of Brazil. State of Sao Paulo and Pederneiras municipality. (#12)
(Source: www.citybrazil.com.br)

FIGURE 2. – Project activity coordinates 22º19'52.22''S and 48º43'52.75''O

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

Type (I): Renewable energy projects.
Category C: Thermal energy for the user.

The project is a small scale project activity and falls under the category I.C according to the Annex II of the Simplified Modalities and Procedures for Small-Scale CDM project activities – "Thermal energy for the user".

This methodology applies to renewable energy technologies that supply user with thermal energy that displaces fossil fuels, stating that thermal generation capacity shall be less than 45 MW.

The *AB Brasil* boiler is expected to run at 7 tones of steam per hour, and its maximum capacity is 15 tones of steam per hour. According to the data provided by the manufacturer the boiler produces **11.6 MW** and the calculations, are demonstrated in section B.2 in this report. As the boiler capacity is lower than 45 MW, the project activity falls under this small scale methodology.

The renewable biomass that replaces fossil fuel in the project activity is woodchips from sawmill and pulp and paper industry, and sugar cane bagasse from sugar and alcohol plants, located within a 200 km radius from *Serraria Santa Barbara*, where the biomass mixture is prepared.

Figure 3 - Woodchips

Figure 4 – Biomass mixture

40 m³ dumpsters are left in each industry or plant, where they are supplied with the residues from these industries. The dumpsters are collected by a truck and a logistic system was arranged for the continuous boiler supply in AB Brasil.

The truck carries the biomass dumpster to the *Serraria Santa Barbara*'s facility, located in Agudos on KM 320 - Marechal Rondon. The sugar cane bagasse and the woodchips, brought from industries and plants, are at first weighted and then unloaded from the truck to a biomass storage area. The biomass is placed on an automated conveyor belt, so that will have a mixture of bagasse and woodchip in order to maintain the boiler regulation. The conveyor belt carries the biomass into chipper equipment, so no clogging problems will occur.

This mixture is placed in dumpsters and carries to *AB Brasil*'s facility, located at 40 km away from *Serraria Santa Barbara*. Biomass is stored inside the dumpsters that are allocated in a reserved area for the biomass storage. *AB Brasil* can store 8 dumpsters daily. The empty dumpsters, those that have already been used in the process, are removed and brought back to industries and plants, to be refilled. This system allows the continuous boiler supply.

The biomass dumpster is carried by the truck to the boiler shed. The biomass is unloaded inside a compartment that can be high raised, allowing the biomass falls on to a screw controller until an automated conveyor belt, which feeds the silos. The silos are controlled by two devices: the low-level, which turn on the equipment and the high-level, which shut down the equipment.

The silos have six screw feeders, which control the biomass that falls on to a burning base system. These screw feeders and the burning base, are both responsible for the steam generation and they are controlled by a boiler set point. So if the boiler is scheduled to work with 9 bar pressure, the screw feeders and the burning base are shut down when the pressure reaches 9.3 bar pressure and turn on again when the pressure goes to 8.7 bar pressure.

The figure below shows the boiler shed, the biomass shed and the control room that was built to the project activity implantation.

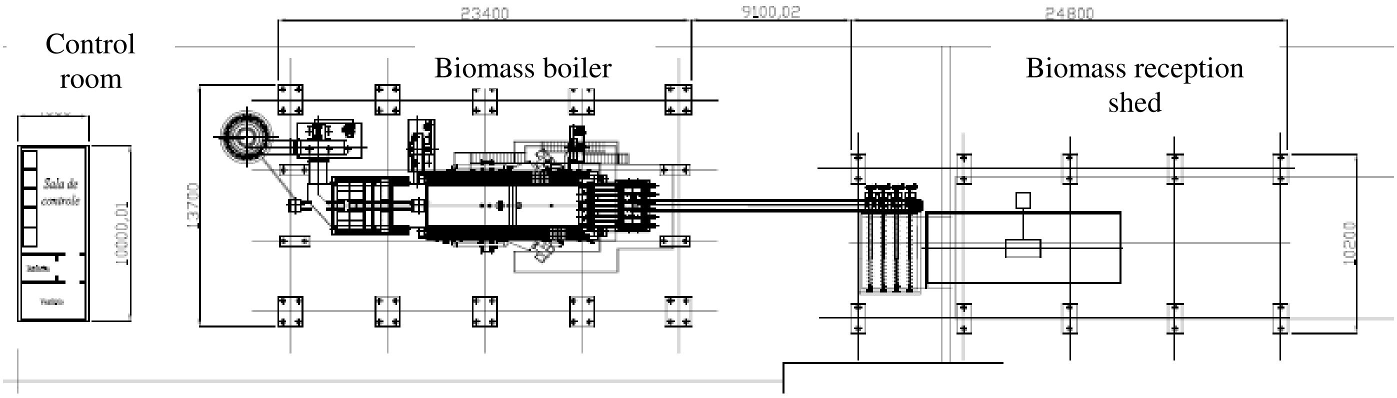


Figure 5 – Layout biomass boiler, biomass reception shed and control room.

The boiler operation system consists of 9 employees, who work in three shifts. Work shifts are composed of: one supervisor and two boiler operators. All employees must have graduated from high school, and they received a forty hours of boiler operator's course and 20 hours of trainee.

AB Brasil's facility in Pederneiras complies with environmental and safety regulations and has all pertaining operating licenses. In order to verify if the new technology, that substitute fuel oil, ensures environmental safety, its environmental impacts were evaluated and described below.

The project activity does not change the land use, as well as not interfere with the habitat of any species of fauna and flora, since the biomass have already being planted for industrial production and the steam generation occurs inside the *AB Brasil´*s property. Regarding air pollution, in the state of Sao Paulo, the emissions control occurs mainly for sulfur oxides, which are practically absent in the biomass boiler. Since biomass is renewable, the CO_2 emitted in its burn is compensated by the absorption of this gas during the plants growth, resulting in zero emissions of CO2.

The application of this technology does not interfere with water reservoirs or groundwater, therefore are no changes in water quality. The ashes generated in the biomass burning will be collected and send it to *Biolandia Ind. e Com. de Composto*, in *Piracicaba*, *Sao Paulo* state. This residue will be transformer into fertilizer, avoiding soil or water contamination and residues accumulation in landfills.

After this evaluation was observed that the project activity ensures environmental safety for the region where the project is located and for the region where the biomass is being explored.

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

Year	Estimated annual CO2 emission reductions
1st year : 2009*	9922
2nd year : 2010	11907
3rd year : 2011	11907
4th year : 2012	11907

5th year : 2013	11907
6th year : 2014	11907
7th year : 2015	11907
8th year : 2016	11907
9th year : 2017	11907
10th year : 2018	11907
11th year : 2019**	1985
Total estimated reductions (tonnes of CO2 e)	**119069**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period ($tCO_{2\,e}$)	**11907**

Obs: * Considering only 10 months in 2009.
Obs:** Considering only 2 months in 2019.

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

There is no current funding from Annex 1 countries involved in the project.

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

Following the Appendix C to the simplified modalities and procedures for the small scale CDM project activities, we could verify that the described project activity is unique within *AB Brasil's* operation and is not a part of a larger project.

This project activity is not a debundled component of a larger project activity as there is no registered small scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology;
- Registered within the previous 2 years;
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

SECTION B. Application of baseline and monitoring methodology

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

The applied baseline methodology is AMS-I.C: 'Thermal Energy for the User with or without Electricity', Type I – Renewable Energy Projects, version 13.

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

The applied baseline methodology is AMS-I.C: 'Thermal Energy for the User with or without Electricity', Type I – Renewable Energy Projects, version 13, which states, as a condition of its applicability, that the thermal energy generation capacity of the project does not exceed 45 MW.

The project activity falls under this category because it comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuels.

Project Thermal Capacity Calculation:

Based on data provided by the manufacturer, the net installed thermal capacity for the new boiler is calculated as follows:

Parameter	Value	Unity
Operating Pressure	9	kg/cm^2
Steam Temperature	181.2	ºCelsius
Steam Enthalpy	664.51	kcal /kg
Boiler Steam Capacity	15	Ton/h

Table 2 – Parameters from biomass boiler

Boiler Thermal Capacity = (15 ton/h)*(664.51 kcal/kg)*(1000 kg/ton)/(10^6 Gcal/kcal) = 10 Gcal/h

Conversion Factor Gcal to MWh = 1.163

Boiler Thermal Capacity = (10 Gcal/h)*(1.163 MWh/Gcal) = 11.6 MW

Hence, the installed capacity is lower than 45 MW.

B.3. Description of the project boundary:

The project activity limit defined by the methodology I.C "Energy for thermal user with or without electricity," is the physical, geographic site where the renewable energy is generated. According to this definition the project activity limit includes the part of *AB Brasil's* facility where biomass boiler is located.

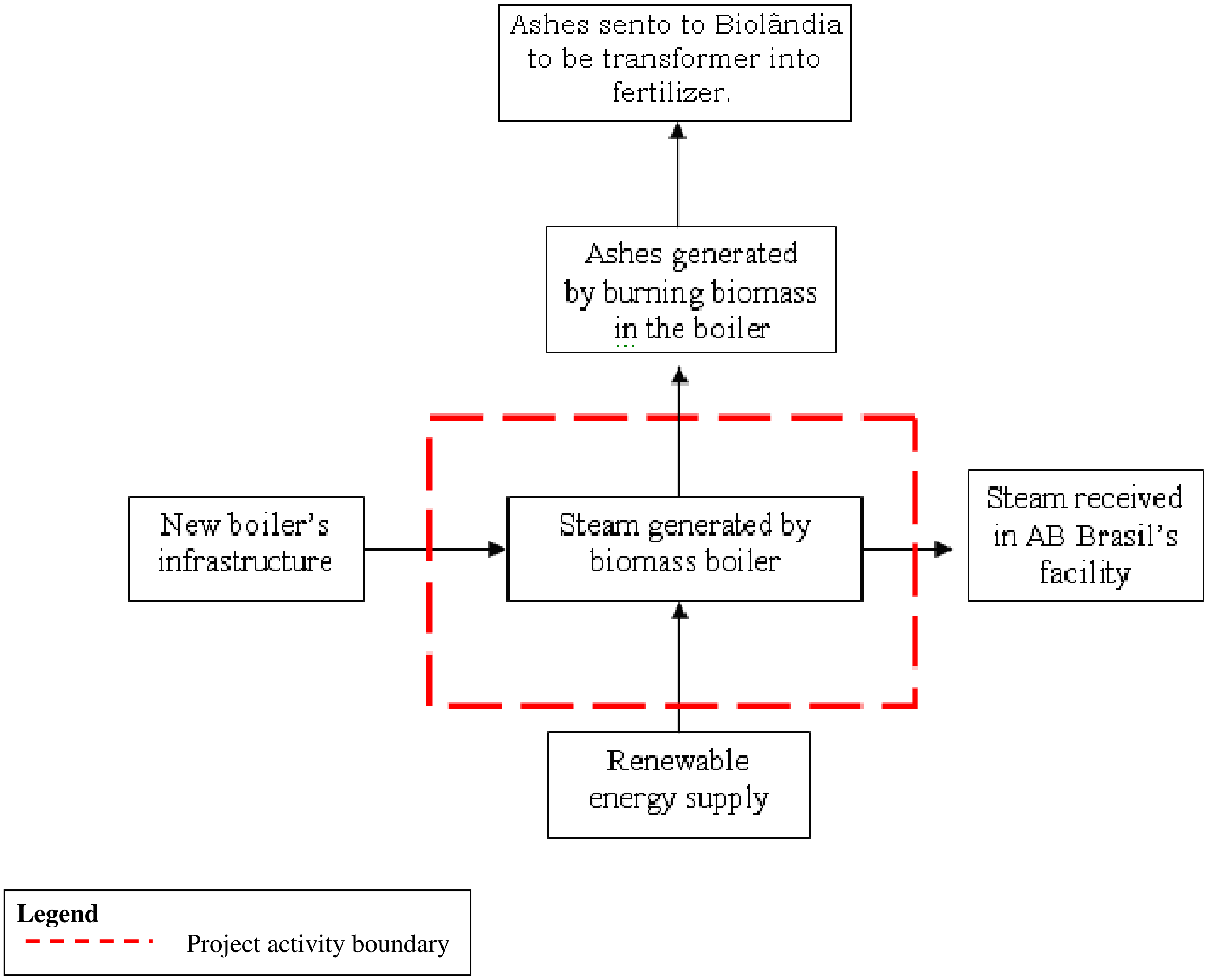


Figure 6 – Project boundary's flowchart.

B.4. Details of baseline and its development:

Baseline description:

The project activity aims to replace the fossil fuel for biomass for the steam generation. According to the AMS-I.C methodology chosen for the project activity, the baseline is the fuel consumption that would have been used in the absence of activity of the project times an emission coefficient for the fossil fuel displaced.

In the absence of the project activity the technology to be used, to ensure the steam supply, would be the oil-fired boiler, which has already been used. This is the most appropriate baseline, since the oil-fired boiler was a common technology in the *AB Brasil's* facility and would not be necessary infrastructure investments.

The fossil fuel oil used previously is the oil BPF 2A, a kind of fuel oil usually utilized to produce steam or heat for thermal energy. This fuel is a fraction obtained from petroleum ditillation, either as a distillate or a residue. The fuel oil is classified into seven classes, from 1A to 7A, according to its boiling temperature, composition and purpose. The boiling point, ranging from 175 to 600 °C, and carbon chain length, 20 to 70 atoms, of the fuel increases with number. Viscosity also increases with fuel oil number.

For the baseline calculations, the most recent historical records of fossil fuel consumption and the amount of steam produced were analyzed, from 2005 to 2006, and the values are presented in the table below:

Year	Annual steam consumption (ton/year)	Oil consumption (ton/year)		
		Boiler 1	Boiler 2	Boiler 3
2005	52,181	3,775		
2006	54,250	4,387		

Table 3 – Annual oil and steam consumption by *AB Brasil*'s facility

AB Brasil's facility already reaches its maximum physical limit, what indicates that the company will not increase the steam amount. To estimate the net quantity of steam supplied by the project activity per year, a mean of the historical data was calculated as follow: (52,181 + 54,250) / 2, resulting in 53,215.5 tons of steam per year or 6.07 tons per hour.

The baseline emissions are obtained by the annual steam quantity produced times an oxidation factor, times the CO2 emission factor from fuel oil, and dividing the product by the efficiency of the oil boiler that would have been used in the absence of the project activity.

IPCC default values for emission factors, as well as other parameters used in the baseline calculations, are presented in the following table:

Variable	Emission Factor	Value	Units	Reference
EF C_{FO}	Carbon emission factor for fuel oil	21.1	tC/TJ FO	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy (Table 1.4 on Page 1.23)
$OXID_{FO}$	Oxidation Factor for fuel oil	1	Not Applicable	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy (Table 1.4 on Page 1.23)
η_{FO}	Boiler efficiency using fossil fuel	90	%	Highest measured of the oil-fired boiler technical information

Table 4 – IPCC Emission factors utilized in the baseline calculations

In order to convert the carbon emissions for fuel oil to CO_2 emissions, it has to be multiplied by a factor of 44/12. Thus, the utilized fuel oil emission factor is obtained as follows:
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EF $CO_{2,FO}$ = 21.1 tC/TJ FO x 44/12
EF $CO_{2,FO}$ = 77.36 tCO2/TJ FO

Where:

EF $CO_{2,FO}$ = the CO_2 emission factor per unit of energy of the fuel that would have been used in the absence of the project activity in (tCO_2 / TJ), obtained from IPCC default emission factors.

The emissions of this project are considered null, since biomass is a renewable fuel. During its growth period, the sugar cane and the trees planted reabsorbs the carbon emitted during the biomass combustion.

Efficiency of the baseline plant (η_{FO}) was determined as the efficiency of the existing oil-fired boiler, as specified in the manufacturer's technical manual. The efficiency utilized is 90%.

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 additionality of the project activity was evaluated and reported in accordance with the steps of the "Tool for Assessment and Demonstration of Additionality (version 5)" and in accordance with the rules and procedures of the CDM project activity on a small scale.

Step 1. Identification of alternatives to the project activity consistent with mandatory laws and regulations

Step 1.a – Define alternatives to the project activity:

AB Brasil used fuel oil in the boiler, which is petroleum derived. This fossil fuel emits hazardous air pollutants in its burning, mainly sulphur oxides and particulate material. The fuel oil would have been used in the absence of project activity, since its technology is known and has already the necessary infrastructure. This alternative defines the first scenario that will be evaluated.

The second scenario is the project activity without the CDM incentive, which uses a mixture of woodchip and sugar cane bagasse to generate steam. The bagasse is a byproduct of sugar and alcohol industry resulting from the sugar cane milling. The woodchip is the residues from wood industry.

Step 1.b - *Consistency with mandatory applicable laws and regulations:*

There is no restriction or applicable laws that prevent the fuel oil consumption in the steam generation. Furthermore, they are not required environmental permits relating to the GHG emissions reduction, or more specifically, a license requiring that the company should replace the fuel oil used in the boiler.

The sugar cane bagasse generated in the sugar and alcohol industry and the woodchip from the wood industries used in the boiler are considered class II residues - not dangerous and not inert. According to CONAMA 23/96 [2], residues class II can be used with the purpose of recycling or reuse, after an authorization from State Environment Department. The *AB Brasil* has a license to operate the boiler using biomass, from CETESB – Sanitation Environmental Company of Sao Paulo State.

The woodchip comes from several local industries, which explore wood from reforestation areas that have environmental license for such activity.

Step 2. Investment analysis

Not considered under the analysis, since step 3 was chosen.

Step 3. Barrier analysis

Sub-Step 3a. Identify barriers that would prevent the implementation of the project activity

For the proposed project activity, the following barriers were identified:

- Technical barriers
- Infrastructure barriers
- Logistic barriers
- Other barriers

Technical Barriers

1) Oil fired boiler.

Since this fuel has already a know technology and has been successfully used for eight years in the industry, there are no technical barriers to this scenario.
Besides that the fuel oil composition is homogeneous, which facilitates the boiler's regulation control, therefore the burning will have less variation.

2) Steam generation from woodchip and bagasse, without the CDM incentive.

Woodchip and sugar cane bagasse have fuels characteristics less satisfactory when they are compared to fuel oil. This biomass presents low calorific value, low density and high moisture percentage. Therefore to feed the boiler, a larger biomass quantity is necessary to generate the same amount of steam that would be generated with less fossil fuel.

When the biomass is wet its efficiency decreases. *Pederneiras* is located in center of Sao Paulo state and has a tropical climate in which the months between October to March [3] have a considerable mean precipitation values, and have a dried biomass becomes a substantial barrier.

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[2] Source : http://www.mma.gov.br/port/conama/res/res96/res2396.html (**Brazilian Ministry of Environment**)

[3] Source : http://www.ciiagro.sp.gov.br (**Sao Paulo State - Center of Weather Information**)

Biomass has more heterogeneous form and composition, consequently it has a larger variation in the burning, and the boiler's regulation control is more difficulty, comparing with fuel oil.

The calorific value for woodchip is 2.500 kcal / kg [4] and for sugar cane bagasse, with 50% moisture, is 2.257 kcal / kg [5], while for fuel oil the calorific value is10.409 kcal / kg [6].

Technical and safety training was also an important component for the development of the project activity and it was required for all personnel involved with the boiler operation.

Besides all these problems the project developer had also to get used to burn with the biomass, resulting in loss of production, due to the time of adaptation with these new biomass.

Logistic Barriers

1) Oil fired boiler.

No logistic barriers were identified to this scenario.

2) Steam generation from woodchip and bagasse, without the CDM incentive.

The biomass transport to *AB Brasil*'s facility faces difficulties in its continuous supply. The geographical dispersion and the different productive capacities from the many biomass sources are a barrier to implement the project activity.

The project activity requires a supply plan to ensure the biomass continuous supply. A complex supply biomass chain had to be developed, following the steps:

- biomass collection from industrial waste in the region;
- transport of all biomass dumpsters to Agudos;
- biomass processing in Agudos, to maintain the regulation standards and boiler performance;
- transport to *AB Brasil*'s facility, in Pederneiras;
- biomass storage in Pederneiras.

Infrastructure Barriers

1) Oil fired boiler.

The local infrastructure is already prepared to generate steam with fuel oil, therefore no infrastructure barriers were identified to this scenario.

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[4] Source: http://sbrtv1.ibict.br/upload/sbrt5912.pdf?PHPSESSID=88b1b4d2cd3443f5ba7c6b29362aed16 (**Brazilian Technical Answers**)

[5] Source: *http://moodle.cefetgo.br/file.php/45/Poder_calorifico_de_Combustiveis.htm* (**National Energetic Balance** – Ministry of Energy)

[6] CAETANO, L.; DUARTE, L. A.; **Comparative study of systems burning fuel oil between wood-fired systems**, Polytechnic Institute, Nova Friburgo, 2004

2) Steam generation from woodchip and bagasse, without the CDM incentive.

To implement the project activity, *AB Brasil*'s facility had to provide a biomass stored area. In this area the biomass dumpsters are left by the trucks and it will be stored before its use in the boiler.

To implant the new boiler *AB Brasil* had to make available an area, with 320.52 m², for the shed boiler, which includes a biomass boiler and all necessary equipment as chimneys, exhaust, fans and silos. Another shed was constructed in order to receive the biomass before it goes to feed the boiler, with 252.96 m². This shed comprises a biomass compartment, allowing the biomass falls on an automated conveyor belt, which feeds the boiler silos.

Next to the boiler shed was built a control room that contains all necessary equipment to control the boiler, with 40m². The boiler control is made by a control monitor that indicates all parameters in the boiler showed in the figure below.

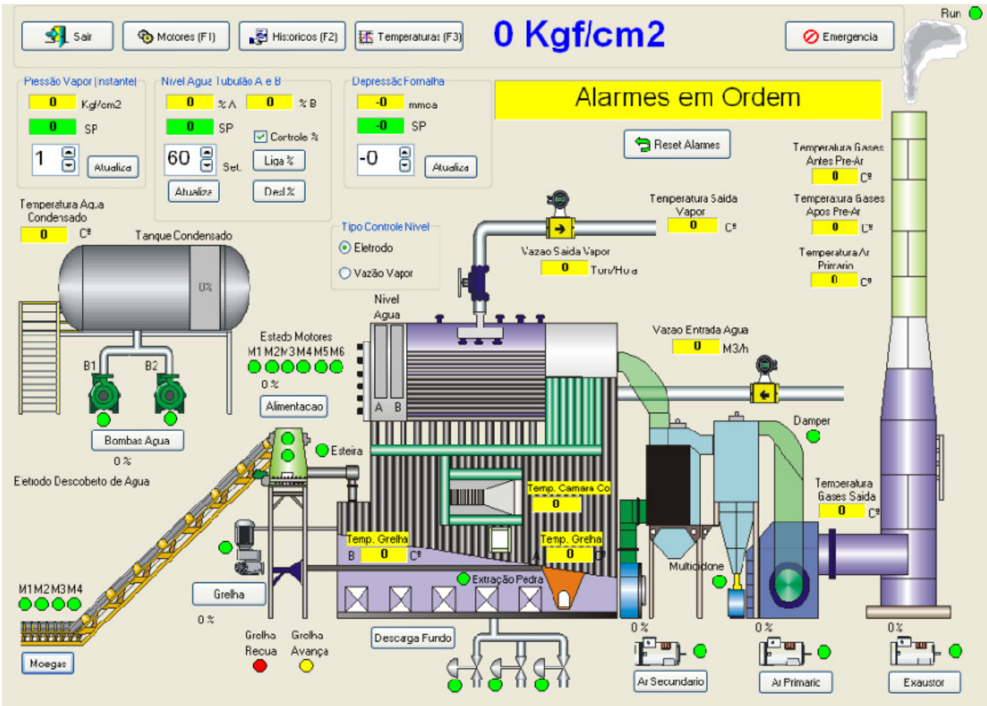

Figure 7 – Control Monitor

The difficulties to develop, install, operate and maintain a biomass-fired boiler and this extra infrastructure are superior to the difficulties of continuing using an oil-fueled boiler. Thus, without the CDM incentives, these technical and technological barriers could have prevented the use of biomass as fuel.

Other barriers

1) Oil fired boiler.

There are no other barriers identified to this scenario.

2) Steam generation from woodchip and bagasse, without the CDM incentive.

AB Brasil established a contract that guarantees the biomass supply by *Serraria Santa Barbara*, which will be responsible for the biomass collection and transportation and the boiler feeding. As all the necessary steam in the production process comes from the biomass boiler, *AB Brasil* takes the risk of having a cut of steam supply if any problems occur with the *Serraria Santa Barbara*.

Besides that, even with the contract, problems of discontinuity in the biomass supply can occur due to the harvest break and seasonality of biomass. The boiler can consume other kind of biomass, but it would demand a logistic reset of renewable fuel supply.

Sub-Step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

According to the barriers analyses described above, the second proposed scenario that is the project activity faces technical barriers, logistic barriers, infrastructure barriers and other barriers.

The first scenario that is the fuel oil for steam generation did not show any of the identified barriers.

Step 4. Common Practice Analysis

Sub-step 4a. Analyze other activities similar to the proposed project:

According to the "State Energy Head Office" [7], made by the Secretary of Energy, Water and Sanitation of the Sao Paulo State, the energy demand has grown in the Sao Paulo state. Analyzing the consumption by source data in 1970, and comparing them with 2004 data, in the graphic below, it is noticed that even with increased consumption by other energy sources still prevails the oil use.

[7] Secretary of Energy, Hydric Resources and Sanitation of Sao Paolo State – "**State Energetic Matrix**", 2007 Report.

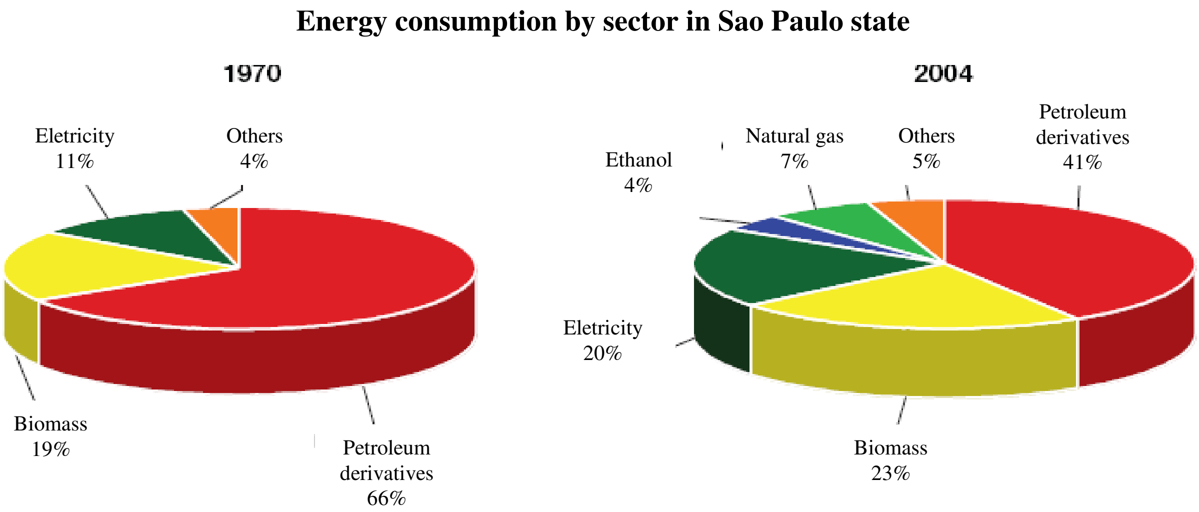

Figure 8 – Energy consumption by sector

The technology used in the project activity is spreading in all Brazil. The biomass boiler has been modified and improved to increase its efficiency. According to Macedo[8] this type of boiler is used in the pulp and paper industry, the sugar and alcohol industry and in the vegetable oils production. These industries use wood and vegetable products in their production processes, and the residues generated becomes fuel for energy generation. As the residues are generated in the same industry, it becomes easier to obtain biomass, because there is no third party supply dependence or logistic difficulties.

Sub-step 4b. Discuss any similar options that are occurring:

Greenhouse gases emissions from Brazil are one of the largest in the world[9]. The land-use practices (e.g. deforestation) are having the effect of substantially upping Brazil's relative emissions rank: the ranking of its cumulative emissions from 1950 to 2000 rise from 18th to 5th [10].

Concern about that, the Brazilian's energy sector is trying to minimize its emissions. Brazil has a big potential for using biomass. But to change the national matrix energetic from a developing country will affected directly its economy. Therefore the CDM incentive is increasing new opportunities to switch fuel and consequently decreases greenhouse gas emissions.

As a result, project scenario is considered additional.

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[8] Macedo, I.C. – "Electric generation from biomass in Brazil: opportunities and development", MCT Report, July 2001.

[9] Source: **Climate Analysis Indicators Tool** (CAIT) Version 4 (Washington, DC : World Resources Institute)

[10] PARKER, L. **Greenhouse Gas Emission: Perspectives on the Top 20 Emitters and Developed versus Developing Nations**, April 2007.

B.6. Emission Reductions:

B.6.1. Explanation of methodological choices:

As described in section A.4.2, in the chosen methodology is the AMS – I.C., the baseline of the project activity is calculated according to the fuel oil amount needed to produce the same amount of steam that would be produced in the absence of the biomass boiler.

This methodology was chosen because the project activity consists of renewable energy technology, providing thermal energy to *AB Brasil*, replacing the fuel oil, and the generation capacity specified by the manufacturer is less than 45 MW.

As per the selected methodology, baseline emissions for thermal generation shall be calculated as described below:

$$BEy = HGy * EF\ CO_{2,FO} * OXID_{FO} / \eta_{FO}$$

Where:

BEy	**=**	Baseline emissions in year y
HGy	**=**	Net quantity of steam/heat supplied by the project activity in year y in TJ
EF $CO_{2,FO}$	**=**	Emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2/TJ). A default IPCC emission factor was utilized, as explained in section B.4 of this document.
$OXID_{FO}$	=	IPCC default oxidation factor for fossil fuels (OXID = 1)
η_{FO}	=	the efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

And,

$$HGy = P_{steam,y} * Enthalpy * 0.0041868\ \text{MJ/kcal/10 00}$$

Where:

$P_{steam, y}$	=	Steam produced by the biomass boiler in year y, in metric tones
Enthalpy	=	Heat content of the steam produced by the biomass boiler, as specified by the Manufacturer
0.0041868	=	Conversion factor for mega joules to kilocalories

To estimate the steam produced by the biomass boiler was considered that the biomass boiler will run 355 days per year, since this boiler stops for maintenance 10 days per year.

Efficiency of the baseline plant was determined as the efficiency of the existing oil-fired boiler, as specified in the manufacturer's technical manual. The efficiency utilized is 90%.

According to the Glossary of CDM terms, the leakage for small scale project activity is defined as the net change of anthropogenic emissions by sources of greenhouse gases (GHG) which occurs outside the project boundary, and which is measurable and attributable to the CDM project activity.

Since the project boundary includes only the physical site where the renewable energy is generated, and the supply of biomass comes from the outside of project boundary, the transportation of biomass supply is considered as leakage. The emission caused during the transportation in two routes, as described below, will be included in the calculation.

The first route is the transport of sugar cane bagasse and woodchips to *Serraria Santa Barbara*, which the average distance, considering the main suppliers, is 100 km. The second route is the transport from *Serraria Santa Barbara*, where the biomass is processed, placed in dumpsters and carried out to *AB Brasil*'s facility, located at 40 km away from *Serraria Santa Barbara*. Then the estimated traveled will be 280km, the round trip.

The biomass transportation is made by trucks and emissions of diesel combustion in this transportation will be considered leakage. The emission factor was calculate based on the emission factor for heavy duty diesel vehicles from 2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy, and also based on the biomass truck average fuel consumption in liter/km, the diesel density in kg/liter from Brazilian National Energy Balance and the net calorific value of diesel in TJ/ 10^3 tones. For the calculations was utilized the values below:

EF $CO_{2\ diesel}$ = (The biomass truck average fuel consumption in liter/km * the diesel density in kg/liter * the net calorific value of diesel in TJ/ 10^3 tones * 74.1 tCO_2/ TJ)
EF $CO_{2\ diesel}$ = (0.5 liter/km * 0.84 kg/liter * 43.3 TJ/10^3 tones * 74.1 tCO_2 / TJ)
EF $CO_{2\ diesel}$ = 1.348 tCO_2/km

To attend the AB Brasil's steam demand, the total volume of biomass was estimated, based on previous test at the project site and described below, resulting in 140m^3 per day, which means 3.5 biomass trucks round trip daily, given that one truck can carry up to 40m^3.

As described in the item A.2, a test was conducted with the biomass boiler to determine the biomass required to produce the necessary amount of steam. The result was that for three tones of steam, it is required one tone of biomass mixture. Based on the historical data calculated in the item B.4 the tons of steam estimated per hour are 6.07 and the daily demand is145 tons. Each biomass dumpster has 40m^3 and weights approximately 14 tons, which produces 40.5 tons of steam per biomass dumpster. Approximately 3.5 biomass dumpster result in 147 tons per day what meets the demand.

The leakage for the biomass transportation shall be calculated as described below:

$$Leakage = (80\ km + RT_{supplier}) * Q_{daily} * Q_{transportation} * EF\ CO_{2},_{diesel}$$

Where:

$RT_{supplier}$ = Traveled distance from biomass suppliers to *Serraria Santa Barbara*
80 km = Traveled distance from *Serraria Santa Barbara* to Pederneiras and Pederneiras to *Serraria Santa Barbara* in kilometers.
Q_{daily} = Daily quantity of round trip traveled by biomass trucks.
$Q_{transportation}$ = Quantity of days in an year that the biomass transportation occurs
EF $CO_{2\ diesel}$ = Emission factor per unit of energy of the fuel that is used in the trucks for the biomass transportation.

There are no project emissions (PEy).

Thus, emission reductions (ERy) are calculated as follows:

$$ERy = BEy - PEy - Leakage$$

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

Data / Parameter:	**$P_{steam,\ y}$**
Data Unit:	Tones/year
Description:	Steam generated from biomass boiler during each year y
Source of data used:	Data estimated from historical steam consumption at the facility
Value applied:	51,757.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	Estimated steam consumed at the site, based on historical consumption
Any comment:	

Data / Parameter:	**Enthalpy**
Data Unit:	Kcal/kg
Description:	Steam enthalpy of the oil-fired boiler
Source of data used:	Data as supplied by the boiler manufacturer
Value applied:	664.51
Justification of the choice of data or description of measurement methods and procedures actually applied:	Reference, so from this data, the amount of steam, in thermal units, can be estimated for each year y.
Any comment:	

Data / Parameter:	**η_{FO}**
Data Unit:	%
Description:	Efficiency of the oil-fired boiler
Source of data used:	Data as supplied by the boiler manufacturer
Value applied:	90
Justification of the choice of data or description of measurement methods and procedures actually applied:	Efficiency, determined as the most likely scenario in the absence of the project activity, for the baseline emission calculations. This is the highest measured between the three oil-fired boilers utilized previously.
Any comment:	

Data / Parameter:	**$EF\ C_{FO}$**
Data Unit:	tC /TJ
Description:	Carbon emission factor of fuel oil that would be burned in the absence of this project
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy (Table 1.4 on Page 1.23)
Value applied:	21.1
Justification of the choice of data or description of measurement methods and procedures actually applied:	For conservativeness a default IPCC emission factor for fuel oil was selected in the baseline emission calculation.
Any comment:	

Data / Parameter:	**$EF\ CO_{2,FO}$**
Data Unit:	tCO_2 /TJ
Description:	Carbon dioxide emission factor of fuel oil that would be burned in the absence of this project
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy (Table 1.4 on Page 1.23) and conversion factor for C to CO_2 of 44/12.
Value applied:	77.36
Justification of the choice of data or description of measurement methods and procedures actually applied:	For conservativeness a default IPCC emission factor for fuel oil was selected in the baseline emission calculation. **$EF\ CO_{2,FO}$ =** 21.1 tC/TJ FO x 44/12 **$EF\ CO_{2,FO}$** = 77.36 tCO2/TJ FO
Any comment:	

Data / Parameter:	**$OXID_{FO}$**
Data Unit:	Not applicable
Description:	IPCC recommended oxidation factor for fuel oil

Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy (Table 1.4 on Page 1.23)
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied:	For conservativeness a default IPCC oxidation value for fuel oil was selected in the baseline emission calculation.
Any comment:	

Data / Parameter:	$RT_{supplier}$
Data Unit:	km
Description:	Traveled distance from biomass suppliers to *Serraria Santa Barbara* in kilometers, the round trip
Source of data used:	Data estimated based on the distance from the main biomass suppliers to *Serraria Santa Barbara*
Value applied:	200
Justification of the choice of data or description of measurement methods and procedures actually applied:	The distance traveled is known and available, estimated by the main route from the biomass suppliers to *Serraria Santa Barbara*, to be conservative.
Any comment:	

Data / Parameter:	Q_{daily}
Data Unit:	Times per day
Description:	Daily quantity of round trip traveled by biomass trucks.
Source of data used:	Data estimated by the amount of biomass utilized per day in the biomass boiler
Value applied:	3.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data estimated by calculation of biomass utilized per day in the boiler to supply the necessary amount of steam.
Any comment:	

Data / Parameter:	$Q_{transportation}$
Data Unit:	days
Description:	Quantity of days in an year that the biomass transportation occurs
Source of data used:	Data estimate by the days that the biomass boiler is working
Value applied:	355
Justification of the choice of data or	Data estimated by the days the biomass boiler is working, considering that boiler will be stopped for maintenance for 10 days per year.

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

Data / Parameter:	**EF $CO_{2,diesel}$**
Data Unit:	tCO_2 /km
Description:	Carbon dioxide emission factor of diesel that is used in the trucks for the biomass transportation.
Source of data used:	Data calculated. The emission factor was calculate based on the emission factor for diesel from 2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 2 – Energy, and also based on the biomass truck average fuel consumption in liter/km, the diesel density in kg/liter from Brazilian National Energy Balance and the net calorific value of diesel in TJ/ 10^3 tones.
Value applied:	1,348
Justification of the choice of data or description of measurement methods and procedures actually applied:	For conservativeness was selected in the baseline emission calculation a default IPCC emission factor for diesel, the biomass truck average fuel consumption in liter/km, the diesel density in kg/liter from Brazilian National Energy Balance and the net calorific value of diesel in TJ/ 10^3 tones.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Baseline emissions are calculated for the crediting period based on the amount of steam generated by the project activity, the emission factor of the fossil fuel and the efficiency of the oil-fired boiler.

To estimate the steam produced by the biomass boiler was considered that the biomass boiler will run 355 days per year, since this boiler stops for maintenance 10 days per year.

Baseline emissions in the year *y* are calculated as follows:

$$BEy = HGy * EF\ CO_{2,FO} * OXID_{FO} / \eta_{FO} \quad \textbf{(1)}$$

Where:

EF $CO_{2,FO}$ = 77.36 tCO_2/TJ

And:

$$HGy = P_{steam,y} * Enthalpy * 0.0041868 \text{ MJ/kcal/1000} \quad \textbf{(2)}$$

$P_{steam,y}$ **=** 51,757.5 tone/year (considering that the biomass boiler runs 355 days per year)
Enthalpy **=** 664.51 kcal/kg

From equation (2)

HGy **=** 51,757.5 tone/year * 664.51 kcal/kg tCO_2*0.0041868 MJ/kcal / 1000
HGy = 143.99 TJ/year

Emission reductions are then calculated from equation (1)

BEy = 143.99 TJ/year * 77.36 tCO_2* 1 / 90%
BEy = 12.376 tCO_2/year

BEm = 1.031,33 tCO_2/month

The leakage for the biomass transportation is calculated as described below:

$$Leakage = (80\ km + RT_{supplier}) * Q_{daily} * Q_{transportation} * EF\ CO_{2,diesel}$$

Where:

$RT_{supplier}$ = 200 km
Q_{daily} = 3.5 times
$Q_{transportation}$ = 355 days
EF CO_2 $_{diesel}$ = 1.348 tCO_2/km

Leakage **=** (200 km + 80 km) * 3.5 * 355 * 1.348 tCO_2/km
Leakage **=** 468.82 tCO2/year

Leakage = 39.07 tCO2/month

Thus, emission reductions (ERy) are calculated as follows:

$$ERy = BEy - PEy - Leakage$$

BEy = 12,376 tCO_2/year
PEy = 0 tCO_2/year
Leakage **=** 468.82 tCO_2/year

ERy = 12,376 tCO_2/year - 0 tCO_2/year – 468.82 tCO_2/year
ERy = 11,907 tCO_2/year

ERm = 992.25 tCO_2/month

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

Year	Project scenario GHG emissions estimative (tCO2e)	Baseline scenario GHG emissions estimative (tCO2e)	Leakage estimative (tCO2e)	Total GHG emission reduction (tCO2e)
2009	0	10313	391	9922
2010	0	12376	469	11907
2011	0	12376	469	11907
2012	0	12376	469	11907
2013	0	12376	469	11907
2014	0	12376	469	11907
2015	0	12.376	469	11907
2016	0	12.376	469	11907
2017	0	12.376	469	11907
2018	0	12376	469	11907
2019	0	2063	78	1985
Total (tCO2e)	**0**	**123,758**	**4,688**	**119,069**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	$P_{steam, y}$
Data Unit:	Tones
Description:	Amount of steam generated by a biomass boiler in the project scenario during year *y*
Source of data used:	Steam consumption records. Measurements will be taken manually from the steam flow meter.
Value of data:	Continuous data
Description of measurement methods and procedures to be applied	The steam data is controlled by an AB Brasil's employee from the Department of Maintenance, which takes the steam flow meter measurements daily, registers it manually in a worksheet and then registers the data in a steam production control electronic system.
QA/QC procedures to be applied	Data will be archived electronically.
Any comment:	

Data / Parameter:	$FC_{BIOMASS,y}$
Data Unit:	Tones
Description:	Amount of renewable biomass consumed at the boiler in year *y*
Source of data used:	Biomass consumption records. Measurements will be taken by weight.

Value of data:	Continuous values
Description of measurement methods and procedures to be applied	Biomass used to feed the boiler will be monitored at the AB Brasil's entrance by weighting.
QA/QC procedures to be applied	The scale will be calibrated based on INMETRO standards (Brazilian institute for metrology and calibration), and the data will be record manually and electronically.
Any comment:	

Data / Parameter:	**$BC_{WOODCHIP,y}$**
Data Unit:	Tones
Description:	Amount of woodchip consumed at the boiler in year *y*
Source of data used:	Woodchip consumption records. Measurements will be taken by weight.
Value of data:	Continous values
Description of measurement methods and procedures to be applied	Woodchip used to feed the boiler will be monitored at *Serraria Santa Barbara's* entrance by weighting.
QA/QC procedures to be applied	The scale will be calibrated based on INMETRO standards (Brazilian institute for metrology and calibration), and the data will be record manually and electronically.
Any comment:	

Data / Parameter:	**$BC_{BAGASSE,y}$**
Data Unit:	Tones
Description:	Amount of sugar cane bagasse consumed at the boiler in year *y*
Source of data used:	Sugar cane bagasse consumption records. Measurements will be taken by weight.
Value of data:	Continuous values
Description of measurement methods and procedures to be applied	Sugar cane bagasse used to feed the boiler will be monitored at *Serraria Santa Barbara*'s entrance by weighting.
QA/QC procedures to be applied	The scale will be calibrated based on INMETRO standards (Brazilian institute for metrology and calibration), and the data will be record manually and electronically.
Any comment:	

Data / Parameter:	**Q_{daily}**
Data Unit:	Times per day
Description:	Daily quantity of round trip traveled by biomass trucks.
Source of data used:	Biomass trucks records. Measurements will be taken by counting all biomass trucks used in the biomass transportation
Value of data:	Daily
Description of	Biomass trucks will be monitored at the AB Brasil's entrance by counting all

measurement methods and procedures to be applied	biomass trucks used in the biomass transportation and registering in a manual worksheet
QA/QC procedures to be applied	The data will be record manually and electronically.
Any comment:	

Data / Parameter:	$Q_{transportation}$
Data Unit:	days
Description:	Quantity of days in an year that the biomass transportation occurs
Source of data used:	Biomass trucks records. Measurements will be taken by registering the date of each biomass truck arrive at AB Brasil.
Value of data:	Daily
Description of measurement methods and procedures to be applied	At AB Brasil's entrance the biomass trucks will be monitored by registering the date in a manual worksheet.
QA/QC procedures to be applied	The data will be record manually and electronically.
Any comment:	

Data / Parameter:	$RT_{supplier}$
Data Unit:	km
Description:	Traveled distance from biomass suppliers to *Serraria Santa Barbara*
Source of data used:	Supplier distance records. The data will be monitored based on the distance from the main biomass suppliers to *Serraria Santa Barbara*
Value of data:	Monthly
Description of measurement methods and procedures to be applied	The data will be monitored, according to the receipts of sugar cane bagasse and woodchips sent from *Serraria Santa Barbara* to AB Brasil, monthly, that include the suppliers address, and the distance between the supplier and *Serraria Santa Barbara*.
QA/QC procedures to be applied	The data will be record manually and electronically.
Any comment:	

B.7.2 Description of the monitoring plan:

All data monitored and required for verification and issuance will be kept for a minimum of two years after the end of the crediting period or the last issuance of CER's for this project activity, whichever occurs late, as specified in the item B.7 of the Guidelines for Completing the Simplified Project Design Document (CDM-SSC-PDD) and The Form for Proposed New Small Scale Methodologies (CDM-SSC-NM) version 05.

According to the applied small scale methodology type I, category C., the monitoring plan for the *AB Brasil*'s project includes monitoring the amount of thermal energy produced where the simplified baseline is based and the amount of biomass fuel input.

The Environment Department from *AB Brasil* is responsible for the training of monitoring personnel. First all the monitoring personnel received instructions about the monitoring equipments and then they were instructed to follow the procedures for monitoring, measurements and reporting as described below.

The woodchip and the sugar cane bagasse are collected from industries and plants, as described in section A.4.2. Periodically, trucks go to gather the dumpsters and take all the accumulated biomass to *Serraria Santa Barbara*, located in Agudos. There a biomass mixture is made and put into the dumpsters that go to *AB Brasil's* facility, located 40 km far from *Serraria Santa Barbara.*

Serraria Santa Barbara weights each type of biomass separately when it is received. The weight is registered in receipts that are sent to *AB Brasil* monthly. The receipts are separately in sugar cane bagasse's receipts and woodchip's receipts. At *AB Brasil,* all receipts from sugar cane bagasse are registered in a sugar cane bagasse electronic worksheet located at public folders in *AB Brasil's* server, and also all receipts from woodchip are registered in a woodchip electronic worksheet located at public folders in *AB Brasil's* server. This same worksheet includes a column to control the suppliers, the distance traveled by the trucks to *Serraria Santa Barbara*. In case a new supplier is included in the biomass supply, the distance traveled by the truck will be estimated and included in the worksheet.

Arriving at *AB Brasil's* facility, the trucks storage the biomass dumpster in a reserved storage area, on the right side of the facility's entrance. This area was properly adapted to receive the biomass dumpsters and also to keep the empty dumpsters before they follows to the *Serraria Santa Barbara* to be refill. The biomass is stored for no more than one day and then it follows to be weighted.

At the entrance of the AB Brasil's facility, the trucks are weighted in a calibrated scale and the data is registered manually in a worksheet by an employee that works at the factory's entrance. This same worksheet includes two others column, one to control the total number of trucks that arrives in AB Brasil daily, and another one to control the date that each trucks arrive. The truck drivers are oriented to head to the boiler shed and unload the biomass dumpster in a compartment. After the trucks been unloaded, it follows to the scale, where it will be weighted again and registered manually in a worksheet. With these two values the net quantity biomass is obtained.

All data collected are sent daily to the environmental technician, who will registered the data in a biomass weight control electronic system located at public folders in *AB Brasil's* server. This information is update daily.

The steam production is controlled by an AB Brasil's employee from the Department of Maintenance, which takes the steam flow meter measurements daily, registers it manually in a worksheet and then registers the data in a steam production control electronic system stored at public folders in *AB Brasil's* own server. This information is update daily. Besides this monitoring system *AB Brasil* is developing a software to monitor electronically the steam production full time.

The flow meter only measures the amount of steam leaving the biomass boiler. In case the backup oil-fired boiler is activated due to maintenance of the biomass boiler, steam production will not be measured by this system but for another flow meter located at oil-fired boiler.

Serraria Santa Barbara is responsible for the maintenance and calibration of the equipments linked to the steam production. The calibration of these equipments will be made annually and it will be verified if the accuracy is within the *Serraria Santa Barbara's* standard. For a preventive maintenance an inspection is made in all equipments linked to the steam production by an engineer annually that emits a report with the maintenance needs to be executed by the maintenance personnel. The boiler operator during its journey will made a corrective maintenance of the need equipment.

AB Brasil is responsible for the maintenance and calibration of the scale used for the biomass weighting. The calibration of this equipment will be made annually and it will be verified if the accuracy is within the *AB Brasil's* standard. For a preventive maintenance an inspection is made in the scale by an engineer annually that emits a report with the maintenance needs to be executed by the maintenance personnel. The employee from the Department of Maintenance during its journey will made a corrective maintenance of the need equipment.

Calibration certificates as well as maintenance records for the equipment utilized in the project activity will be kept at the project site for a minimum of 2 years after the end of the crediting period.

There are no uncertainties in the monitoring process. The only identified uncertainty is in the calibration equipment that it is in the calibration certificated.

All data collected from monitoring the project activity will be compiled and checked by Mr. José Luiz Theodoro, manager of Quality, Safety and Environment at *AB Brasil*.

Quality assurance of the steam data is performed by comparing monthly values gathered from AB Brasil's steam system control and *Serraria Santa Barbara* system control. If data show any inconsistency or unexpected values an investigation will be performed and documented to determine if the abnormal values must be discarded from the monitored data. This procedure will be carried out by Mr. José Luiz Theodoro.

Annually there is an internal audit to verify if the GHG project is in the compliance with operational requirements and when a non conformity is identified a corrective action is applied. Any employee that works in the project activity can identify a non conformity and emit a corrective action form. The corrective action form will be sent to the responsible of the Environmental Department, Mr. José Luiz Theodoro that will apply the corrective action.

Additional information of the monitoring plan is included in Annex 4 of this document.

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

Application of the baseline and monitoring methodology was concluded on 30/09/2007
Contact information:

Company	Key Consultoria e Treinamento Ltda
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Country	Brazil

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Key Consultoria e Treinamento Ltda is a project participant.

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:

October 2007

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

20 years, according to the suppliers.

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 01/05/2009, or on the date of registration of the CDM project activity, whichever is later.

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:

The project activity does not generate environmental impacts that need to be monitored.

SECTION E. Stakeholders' comments

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

Letters were sent to the local stakeholders regarding the project activity.

Following is a list of the contacted stakeholders:

- Municipal City Hall of *Pederneiras,*
- Municipal Assembly of *Pederneiras, Sao Paulo* state;
- Company of Environmental Sanitation Technology (CETESB);
- Office of the National Attorney-General, *Brasilia - DF*;
- Office of the Attorney-General of *Sao Paulo*;
- Neighboring Communities of Pederneiras; and
- The Brazilian Forum of NGOs.

E.2. Summary of the comments received:

The Pederneiras's mayor, Ms Irvana Maria Bertolini Camarinha, has sent a letter to compliment the project participants for the Clean Development Mechanism project initiative.

She comments that projects displacing fossil fuels by using biomass should be supported and imitated, because they bring benefits to the quality of the local resident's health, as well as the environment, reducing harmful pollutants and greenhouse gases.

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

One comment had been received at the time of project validation and since there was no suggestion to improve or change the project, the comment was archived in AB Brasil's electronic system.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	AB Brasil Ind. e Com. de Alimentos Ltda.
Street/P.O.Box:	Av. Tietê, L-233
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Represented by:	José Luiz
Title:	Quality, Environmental and Safety Manager
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project has received no public funding.

Annex 3

BASELINE INFORMATION

Not applicable

Annex 4

MONITORING INFORMATION

Data to be collected in order to monitor emissions reduction, and how this data will be archived:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1. $P_{steam,y}$	*Amount of steam generated by a biomass-fueled boiler in the project scenario during year y*	*Monitored in the project activity from steam meter located at the biomass boiler exit.*	*Metric tons*	*M*	*Daily*	*100%*	*Paper / Eletronic*	-
2.. $FC_{BIOMASS,y}$	*Amount of renewable mix biomass consumed at the boiler in year y*	*Measurements from biomass weight used to feed the biomass boiler.*	*Metric tons*	*M*	*Continous*	*100%*	*Paper / Electronic*	-
3. $BC_{WOODCHIP,y}$	*Amount of woodchip consumed at the boiler in year y*	*Measurements from woodchip weight used to feed the biomass boiler.*	*Metric tons*	*M*	*Continous*	*100%*	*Paper / Electronic*	-
4. $BC_{BAGASSE,y}$	*Amount of sugar cane bagasse consumed at the boiler in year y*	*Measurements from sugar cane bagasse weight used to feed the biomass boiler.*	*Metric tons*	*M*	*Continous*	*100%*	*Paper / Eletronic*	-
5. Q_{daily}	*Daily quantity of round trip traveled by biomass trucks*	*Measurements will be taken by counting all biomass trucks used in the biomass transportation*	*Times per day*	*M*	*Daily*	*100%*		
6. $Q_{transportation}$	*Quantity of days in an year that the biomass transportation occurs*	*Measurements will be taken by registering the date of each biomass truck arrive at AB Brasil.*	*Day*	*M*	*Daily*	*100%*		
7. $RT_{supplier}$	*Traveled distance from biomass suppliers to Serraria Santa Barbara*	*The data will be monitored based on the distance from the main biomass suppliers to Serraria Santa Barbara*	*km*	*C*	*Monthly*	*100%*	*Paper/Electronic*	