CLEAN DEVELOPMENT MECHANISM
PROJECT ACTIVITY MONITORING REPORT

LAGES METHANE AVOIDANCE PROJECT

CDM Registration Reference Number: UNFCCC00000268CDMP

Monitoring Period: 1 Nov 2004 – 31 May 2006

Monitoring Report Number: 01

(Version 01)

July 10, 2006

History of the document

Version	Date	Nature of revision(s)
01	10 Jul 2006	Initial adoption

CLEAN DEVELOPMENT MECHANISM
PROJECT ACTIVITY MONITORING REPORT

CONTENTS

SECTION A. General project activity information

A.1. Title of the project activity:

Lages Methane Avoidance Project (hereafter only Lages Project or Project).

A.2 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)	• Lages Bioenergética Ltda. (Private Entity) as the Special Purpose Company created by Tractebel Energia S.A. to implement the Lages Project	No

A.3. Crediting period:

A.3.1. Crediting period:

The crediting period for this project activity is from 1 November 2004 to 31 October 2014.

A.3.2. Total estimated emission reductions over the crediting period:

Years	Annual estimation of emission reductions in tonnes of CO_2e	Annual estimation of project emissions in tonnes of CO_2e
2004	36,740	512
2005	220,439	3,070
2006	220,439	3,070
2007	220,439	3,070
2008	220,439	3,070
2009	220,439	3,070
2010	220,439	3,070
2011	220,439	3,070
2012	220,439	3,070
2013	220,439	3,070
2014	183,700	2,558
Total estimated reductions / project emissions (tonnes of CO_2e)	**2,204,394**	**30,698**
Total number of crediting years	**10**	**10**
Annual average over the crediting period of estimated reductions / project emissions (tonnes of CO_2e)	**220,439**	**3,070**

A.4. Project activity description and background:

Lages Project's cogeneration facility is located in Lages, State of Santa Catarina, Brazil, whose economy is based on the wood industry using timber from planted forests. The Project is under operation since 23 December 2003 by Lages Bioenergética Ltda., a Special Purpose Company fully owned by Tractebel Energia S.A.[1], specially constituted to build, operate and maintain the Lages Project. Detailed information about the Project is provided in the Project Design Document (PDD) Version 02, dated of 21 September 2005, and other documents, which are available and can be downloaded from the UNFCCC website (http://cdm.unfccc.int/Projects/DB/DNV-CUK1140180495.84/view.html).

The Project is designed to avoid methane emissions from anaerobic digestion in stockpiles (biomass decay) through controlled combustion by cogeneration process, which simultaneously generates electricity and thermal energy (steam) from the wood waste produced from several timber industries that would otherwise be disposed inadequately. The major project activity milestones are presented in the table below.

Date	Milestone
23 Dec 2003	Starting date of the Project
1 Nov 2004	Starting date of the crediting period
26 Jul 2005 – 24 Aug 2005	Period for public comments to the PDD in the UNFCCC website
25 Nov 2005	Brazilian Designated National Authority (DNA) issued the Letter of Approval (LoA) to the Project
14 Feb 2006	Project is validated by Det Norske Veritas (DNV)
24 Mar 2006 – 22 Apr 2006	Period for Executive Board comments
23 Apr 2006	Project is registered

[1] Tractebel Energia S.A. is a subsidiary of Suez Energy S.A., which with Electrabel, Distrigas, Glow, Trigen, among others, constitutes the energy division of the Suez group, resulting one of the world's key player on the energy & environment businesses.

SECTION B. Monitoring of the CDM project activity

B.1. Monitoring report:

B.1.1. Monitoring reports associated with this project activity:

This is the first monitoring report associated with this project activity.

Report number	Monitoring period		Resulting emission reductions (tonnes of CO_2e)	Verifying DOE
	From	To		
01	1 Nov 2004	31 May 2006	277,768	DNV

B.1.2. Monitoring report period:

The period covered in this monitoring report is from 1 November 2004 to 31 May 2006. The monitoring report period is within the bounds of the crediting period noted in Section A.3.1. This monitoring report does not cover any period of time covered by a previous monitoring report.

B.1.3. Emission reductions achieved over the monitoring period:

The emission reductions achieved over the designated monitoring period are **277,768 tonnes of CO_2e**.

This amount is around 20% lower than the 349,028 tonnes of CO_2e which were estimated to be reduced according to the PDD in the same period. This difference is basically due to lower load factor of the cogeneration plant during this period, consequently consuming and treating a wood waste amount lower than that estimated in the PDD.

B.2. Methodologies applied:

B.2.1. Baseline methodology applied during the monitoring period:

The Project uses Small-Scale Baseline Methodology AMS III.E Version 07 entitled "Avoidance of methane production from biomass decay through controlled combustion".

AMS III.E Version 07 is applicable for Lages Project as it states that "The baseline scenario is the situation where, in the absence of the project activity, biomass or other organic matter is left to decay". This accurately represents the baseline scenario in the Lages Project case as presented in the PDD. Furthermore, Lages Project directly emits less than 15 kilotonnes of carbon dioxide equivalent annually, as presented in the Section D.4.

B.2.2. Monitoring methodology applied during the monitoring period:

The Project uses Small-Scale Monitoring Methodology AMS III.E Version 07 entitled "Avoidance of methane production from biomass decay through controlled combustion".

The AMS III.E Version 07 is applicable to project activities which avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay as a result of anthropogenic activity, which is the Lages Project case.

B.3. Monitoring plan:

B.3.1. Development and appropriateness of the monitoring plan:

The "Lages Methane Avoidance Project Monitoring Plan – Version 02" from September 2005 was developed based on the approved monitoring methodology identified in the Section B.2.2.

B.3.2. Implementation of the monitoring plan:

During the monitoring period identified in the Section A.3.1, the project participant implemented the validated Monitoring Plan that was part of the project documents evaluated by the Designated Operational Entity (DOE) during the validation process.

B.3.3. Revisions to the monitoring plan:

The "Lages Methane Avoidance Project Monitoring Plan" was submitted on July 2005 to the DOE for validation. The document was revised on September 2005 based on clarifications and corrective actions requested by DNV. The Version 02 of the Monitoring Plan was validated along with the entire project activity on 14 February 2006.

B.4. Monitored data:

The key data monitored at the project activity are listed in the Section D.3 of the PDD and in the Monitoring Plan. The project activity data were collected in accordance with the registered PDD and are shown in the following items. All necessary evidences to verify these data have been presented to the DOE for verification.

B.4.1. Fuel – Amounts of wood waste (ID1, ID2, ID3 and ID4 of the PDD Section D.3):

To accurately calculate the emission reductions (ERs) from avoided methane emissions during the operation of the Lages Project, the amounts of wood waste consumed ($QC_{biomass}$) and purchased are monitored continuously and totalized on an annual basis, as presented in the table below. Each source of wood waste (Battistella, Sofia and Spot Market) is treated separately and the methane emissions avoided from each source are calculated using the small-scale methodology AMS III.E at the end of each calendar year based on the characteristics of the wood waste supplier and the wood waste piles avoided through the use by Lages Project. Additionally, the Annex 1 present the wood waste amounts consumed and purchased from each supplier during the monitoring period.

Fuel – Amounts of wood waste					
Year	Month	ID1	ID2	ID3	ID4
		$QC_{biomass}$	Purchased from	Purchased from	Purchased from Spot

			Battistella		Sofia		Market	
		(tonnes) [A]	(tonnes)	(%) [B]	(tonnes)	(%) [C]	(tonnes)	(%) [D]
2004	11	14,456.00	5,301.55	49.64%	2,129.60	19.94%	3,249.49	30.42%
	12	13,698.00	3,869.69	43.50%	2,986.23	33.57%	2,039.63	22.93%
	Total	28,154.00	-	-	-	-	-	-
2005	1	12,291.00	3,225.77	45.51%	2,525.26	35.62%	1,337.51	18.87%
	2	10,779.00	3,429.30	44.00%	2,809.35	36.05%	1,555.18	19.95%
	3	12,007.00	2,996.70	32.40%	3,523.95	38.10%	2,728.63	29.50%
	4	14,517.00	3,695.58	36.58%	3,003.12	29.72%	3,404.63	33.70%
	5	12,615.00	5,592.04	48.59%	3,106.53	26.99%	2,811.01	24.42%
	6	12,736.00	6,443.77	50.20%	3,421.31	26.65%	2,971.69	23.15%
	7	12,896.00	8,358.87	56.82%	3,075.90	20.91%	3,276.16	22.27%
	8	12,487.00	7,566.75	54.00%	3,288.53	23.47%	3,157.07	22.53%
	9	14,072.00	5,280.65	56.44%	730.22	7.80%	3,345.90	35.76%
	10	6,163.00	4,567.76	45.36%	1,501.93	14.92%	3,999.65	39.72%
	11	5,194.00	4,720.66	43.62%	1,477.77	13.65%	4,624.69	42.73%
	12	15,326.00	5,127.86	42.78%	2,105.74	17.57%	4,753.00	39.65%
	Total	141,083	-	-	-	-	-	-
2006	1	8,673.00	6,760.87	51.81%	1,991.40	15.26%	4,296.20	32.92%
	2	10,635.00	6,431.14	48.34%	1,197.40	9.00%	5,675.60	42.66%
	3	15,452.00	6,414.17	41.90%	1,627.92	10.63%	7,266.57	47.47%
	4	16,880.00	5,475.80	36.33%	1,342.63	8.91%	8,254.22	54.76%
	5	17,636.00	6,274.80	31.54%	1,764.53	8.87%	11,852.79	59.59%
	Total	69,276.00	-	-	-	-	-	-

In order to calculate the annual wood waste amount consumed ($QC_{biomass}$) from each source (Battistella, Sofia and Spot Market) as presented in the table below, the percentages of wood waste purchased from each source in a given month are applied to the total amount consumed in the respective month (which is measured accurately by a dynamic balance installed in the entrance of the combustion chamber of the boiler) and the obtained values are totalized annually.

Fuel – Amounts of wood waste				
Year	Month	Battistella	Sofia	Spot Maket
		$QC_{biomass}$ [E=A*B]	$QC_{biomass}$ [F=A*C]	$QC_{biomass}$ [G=A*D]
		(tonnes)	(tonnes)	(tonnes)
2004	11 to 12	13,134.35	7,480.77	7,538.88
2005	1 to 12	65,688.57	34,999.02	40,395.42
2006	1 to 5	27,804.43	6,991.99	34,479.57

The wood waste amounts effectively treated under the Project ($QT_{biomass}$), which is used to calculate the baseline methane emissions, is calculated discounting the wood waste amounts were previously consumed in the Battistella and Sofia old boilers and applying the discount factor of 1% due to spontaneous combustion in the Battistella pile. These values were validated by DNV and used in the registered PDD. The table below presents the wood waste amounts treated under the Lages Project.

Fuel – Amounts of wood waste

Year	Month	Battistella			Sofia		Spot Market
		$QT_{biomass}$ [H=E-I-J]	Wood waste burned for own consumption [I]	Wood waste burned spontaneously in the pile [J=R*(E-I)]	$QT_{biomass}$ [K=F-L]	Wood waste burned for own consumption [L]	$QT_{biomass}$ [M=G]
		(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
2004	11 to 12	7,617.41	5,440.00	76.94	5,080.77	2,400.00	7,538.88
2005	1 to 12	32,718.08	32,640.00	330.49	20,599.02	14,400.00	40,395.42
2006	1 to 5	14,062.39	13,600.00	142.04	991.99	6,000.00	34,479.57

B.4.2. Default values (ID5 of the PDD Section D.3):

All of the parameters and emission factors used to calculate the emission reductions are available in the PDD and were previously validated by DNV during the validation process of the project activity. The values of these parameters and emission factors were also monitored during the monitoring period using the associated references and all of them continue in place, as presented in the table below.

Default values				
ID5				
Parameter	**Value**	**Unit**	**Data source**	**Comment**
MCF [N]	0.8 (Battistella) 0.4 (Sofia) 0.4 (Spot Market)	(fraction)	IPCC[2], Table 6-2, pg. 6.8	Default value of 0.4 is applied to wood waste supplied by Sofia and Spot Market. IPCC default value of 0.8 for unmanaged deep waste site (≥ 5 meters of depth) is applied to wood waste supplied by Battistella.
DOC [O]	0.3	(fraction)	IPCC[2], Table 6-3, pg. 6.9	Waste is 100% compounded by wood. Default value is applied.
DOC_F [P]	0.77	(fraction)	IPCC[2], pg. 6.9	Default value is applied.
F [Q]	0.5	(fraction)	IPCC[2], pg. 6.5	Default value is applied.
Wood waste burned for own consumption	32,640 (Battistella) 14,400 (Sofia)	t/year	Suppliers	Wood waste amounts were consumed in the Battistella and Sofia old boilers before the Lages Project implementation.

Default values
ID5

[2] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual.

Parameter	Value	Unit	Data source	Comment
Discount factor due to spontaneous combustion in the pile [R]	0.01 (Battistella)	(fraction)	Estimation presented in the PDD	This discount factor was assumed to be 1% of the wood waste amount that otherwise would be dumped and left to decay in the baseline scenario for Battistella, that is, the 1% of the difference between the consumed amount supplied by Battistella and what was previously burned in its old boilers to produce steam.
$E_{biomass}$ [S]	7.746E-3	TJ/t	UNIPLAC	Considered 1,850 kcal/kg (7,746 kJ/kg), which is default value to wood waste in the Lages region, according to values reported in the UNIPLAC study, and was the value validated in the PDD. This value is more conservative than that obtained from samples analyzed periodically in laboratory.
CH_4bio_comb [T]	30	$kgCH_4/TJ$	IPCC[2], Table 1-7, pg. 1.35	Default value according to AMS III.E is 300 $kgCH_4/TJ$, which is based on general IPCC default value. However, 30 $kgCH_4/TJ$ is used since this is the specific IPCC default value to energy industry.
N_2Obio_comb [U]	4	kgN_2O/TJ	IPCC[2], Table 1-8, pg. 1.36	Default value according to AMS III.E is 4 kgN_2O/TJ, which is based on IPCC default value.
CH_4_GWP [V]	21	tCO_2e/tCH_4	UNFCCC[3]	Official value.
N_2O_GWP [W]	310	tCO_2e/tN_2O	UNFCCC[3]	Official value.
D_{diesel} [X]	8.8E-4	t/l	ANP	According to Portaria nº 310 of Dec 27th, 2001 of the Brazilian Petroleum Agency (ANP) the value is around 880 kg/m^3.
VEF_CO_2 [Y]	1.097 3,172.31	$kgCO_2/km$ $kgCO_2/t$	IPCC[2], Table 1-32, pg. 1.75	Default values for US heavy duty diesel vehicles, uncontrolled. These are conservative values.
VEF_CH_4 [Z]	6.0E-5 0.18	$kgCH_4/km$ $kgCH_4/t$	IPCC[2], Table 1-32, pg. 1.75	Default values for US heavy duty diesel vehicles, uncontrolled. These are conservative values.
VEF_N_2O [AA]	3.1E-5 0.09	kgN_2O/km kgN_2O/t	IPCC[2], Table 1-32, pg. 1.75	Default values for US heavy duty diesel vehicles, uncontrolled. These are conservative values.

B.4.3. On-site transportation (ID6 of the PDD Section D.3):

[3] Climate Change 1995, The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, pg. 26.

The amount of diesel oil used inside the Lages Project was monthly monitored through the invoices emitted by the proper supplier and amounts already stored (initial and final inventory) and is presented in the table below.

On-site transportation		
Year	Month	ID6
		Q_{diesel} [AB]
		(liters)
2004	11	3,844.60
	12	4,003.95
	Total	7,848.55
2005	1	3,911.56
	2	3,047.70
	3	4,152.25
	4	5,484.20
	5	4,586.63
	6	4,547.89
	7	4,088.99
	8	3,036.12
	9	5,067.02
	10	3,913.21
	11	3,672.39
	12	4,755.67
	Total	50,263.63
2006	1	4,199.51
	2	3,363.39
	3	4,020.80
	4	3,975.70
	5	4,170.53
	Total	19,729.93

B.4.4. Off-site transportation (ID7 and ID8 of the PDD Section D.3):

The data about the round trip distance between the wood waste suppliers and the Lages Project site and the truck capacity were monitored and are presented in the table of the Annex 1. The weighted average round trip distance and truck capacity of all active wood waste suppliers to Lages Project site which are necessary to calculate the emissions from the off-site transportation are presented below.

Off-site transportation			
Year	Month	ID7	ID8
		$AVD_{biomass}$ [AC]	$TC_{biomass}$ [AD]
		(km)	(tonnes)
2004	11 to 12	10.2	13.7
2005	1 to 12	5.6	13.4
2006	1 to 5	12.3	13.8

B.4.5. Ash transportation (ID9 and ID10 of the PDD Section D.3):

The data about the round trip distance between the Lages Project site and ash disposal site and the truck capacity were monitored and are presented in the table below. During the monitoring period, the ash produced by the project activity was transported from Lages Project to Jorge Lacerda Thermoelectric Power Plant, in Capivari de Baixo municipality, State of Santa Catarina, to be disposed in an appropriate manner.

Ash transportation			
Year	Month	ID9	ID10
		AVD_{ash} [AE]	TC_{ash} [AF]
		(km)	(tonnes)
2004	11 to 12	680.0	28.0
2005	1 to 12	680.0	28.0
2006	1 to 5	680.0	28.0

B.4.6. Ash production (ID11 of the PDD Section D.3):

The amount of ash produced by Lages Project was monthly monitored and is presented in the table below.

Ash production		
Year	Month	ID11
		Q_{ash} [AG]
		(tonnes)
2004	11	56.51
	12	565.22
	Total	621.73
2005	1	559.34
	2	167.85
	3	80.97
	4	766.67
	5	205.14
	6	308.30
	7	404.01
	8	557.50
	9	564.20
	10	971.28
	11	224.79
	12	723.32
	Total	5,533.37
2006	1	705.13
	2	303.41
	3	712.46
	4	827.88
	5	673.18
	Total	3,222.06

SECTION C. Equations and calculation methods

The equations presented in the AMS III.E methodology (Version 07) and in the PDD were used to determine the baseline emissions, project activity emissions, leakages and emission reductions during the monitoring period.

C.1. Baseline equations and calculation methods:

The methane emission factor is calculated as follows:

$$CH_4\_IPCC_{decay} = (MCF*DOC*DOC_F*F*16/12)$$

where,

- $CH_4\_IPCC_{decay}$: IPCC CH_4 emission factor for decaying biomass in the region of the project activity (tCH_4/t);
- MCF: Methane correction factor (fraction);
- DOC: Degradable organic carbon (fraction);
- DOC_F: Fraction DOC dissimilated to landfill gas (fraction);
- F: Fraction of CH_4 in landfill gas (fraction).

The baseline methane emissions from biomass decay are calculated using the formulae below:

$$BE_y = QT_{biomass}*CH_4\_IPCC_{decay}*CH_4\_GWP$$

where,

- BE_y: Baseline methane emissions from biomass decay (tCO_2e/year);
- $QT_{biomass}$: Quantity of biomass treated under the project activity (t/year);
- CH_4_GWP: Global Warming Potential for CH_4 (tCO_2e/tCH_4).

C.2. Project activity equations and calculation methods:

The emissions due to the project activity within the project boundary comprise:

- CH_4 emissions and N_2O emissions due to combustion of the wood waste (PE_y);
- CO_2, CH_4 and N_2O emissions due to on-site wood waste transportation.

The formulae presented in the AMS III.E (Version 07) to calculate the emissions of CH_4 and N_2O of the project activity considers only the emissions from the wood waste combustion as presented below:

$$PE_y = QC_{biomass}*E_{biomass}(CH_4bio\_comb*CH_4\_GWP+N_2Obio\_comb*N_2O\_GWP)/10\text{^}6$$

where,

- PE_y: Project activity emissions ($ktCO_2e$/year);
- $QC_{biomass}$: Quantity of biomass consumed by the project activity (t/year);
- $E_{biomass}$: Energy content of biomass (TJ/t);
- CH_4bio_comb: CH_4 emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion ($kgCH_4$/TJ);
- CH_4_GWP: Global Warming Potential for CH_4 (tCO_2e/tCH_4);
- N_2Obio_comb: N_2O emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kgN_2O/TJ);
- N_2O_GWP: Global Warming Potential for N_2O (tCO_2e/tN_2O).

Emissions from on-site transportation (OT_GHG_y) are calculated using the following equation:

$$OT\_GHG_y = Q_{diesel}*D_{diesel}*(VEF\_CO_2+VEF\_CH_4*CH_4\_GWP+VEF\_N_2O*N_2O\_GWP)/10\text{^}6$$

where,

- OT_GHG_y: Emissions from on-site transportation ($ktCO_2e$/year);
- Q_{diesel}: Diesel oil consumption (l/year);
- D_{diesel}: Diesel oil density (t/l);
- VEF_CO_2: CO_2 emission factor for trucks ($kgCO_2$/t);
- VEF_CH_4: CH_4 emission factor for trucks ($kgCH_4$/t);
- CH_4_GWP: Global Warming Potential for CH_4 (tCO_2e/tCH_4);
- VEF_N_2O: N_2O emission factor for trucks (kgN_2O/t);
- N_2O_GWP: Global Warming Potential for N_2O (tCO_2e/tN_2O).

C.3. Leakage equations and calculation methods:

The two sources of leakage are related to the off-site wood waste transportation and ash transportation that is produced in the wood waste combustion process.

Emissions from off-site wood waste transportation are calculated using the following equation:

$$BT\_GHG_y = QC_{biomass}/TC_{biomass}*AVD_{biomass}*(VEF\_CO_2+VEF\_CH_4*CH_4\_GWP+VEF\_N_2O*N_2O\_GWP)/10\text{^}6$$

where,

- BT_GHG_y: Emission from off-site transportation ($ktCO_2e$/year);
- $QC_{biomass}$: Quantity of biomass consumed by project activity (t/year);

- $TC_{biomass}$: Truck average capacity for biomass transportation (t);
- $AVD_{biomass}$: Average round trip distance to biomass supply sites (km);
- VEF_CO_2: CO_2 emission factor for trucks ($kgCO_2$/km);
- VEF_CH_4: CH_4 emission factor for trucks ($kgCH_4$/km);
- CH_4_GWP: Global Warming Potential for CH_4 (tCO_2e/tCH_4);
- VEF_N_2O: N_2O emission factor for trucks (kgN_2O/km);
- N_2O_GWP: Global Warming Potential for N_2O (tCO_2e/tN_2O).

Emissions from ash transportation are calculated using the following equation:

$$AT\_GHG_y = Q_{ash}/TC_{ash}*AVD_{ash}*(VEF\_CO_2+VEF\_CH_4*CH_4\_GWP+VEF\_N_2O*N_2O\_GWP)/10\text{^}6$$

where,

- AT_GHG_y: Emission from ash transportation ($ktCO_2e$/year);
- Q_{ash}: Quantity of ash produced by the project activity (t/year);
- TC_{ash}: Truck average capacity for ash transportation (t);
- AVD_{ash}: Round trip distance to disposal site (km);
- VEF_CO_2: CO_2 emission factor for trucks ($kgCO_2$/km);
- VEF_CH_4: CH_4 emission factor for trucks ($kgCH_4$/km);
- CH_4_GWP: Global Warming Potential for CH_4 (tCO_2e/tCH_4);
- VEF_N_2O: N_2O emission factor for trucks (kgN_2O/km);
- N_2O_GWP: Global Warming Potential for N_2O (tCO_2e/tN_2O).

Therefore, the leakage emissions (LE_y) are the sum of the emissions from off-site transportation (BT_GHG_y) and from ash transportation (AT_GHG_y):

$$LE_y = BT\_GHG_y+AT\_GHG_y$$

C.4. The sum of C.2 and C.3 representing the total project activity emissions equation:

As a small-scale project activity, Lages Project shall directly emit less than 15 ktonnes CO_2e/year, according to established by AMS III.E (Version 07). The total project activity emissions (PE_{y_total}) are obtained by sum of PE_y with OT_GHG_y (from Section C.2) and with LE_y (from Section C.3):

$$PE_{y\_total} = PE_y+OT\_GHG_y+LE_y$$

C.5. Emission reductions equations and calculation methods:

The emission reductions due to the project activity (ER_y) is obtained by the difference between BE_y and PE_{y_total} in tCO_2e/year:

$$ER_y = BE_y - PE_{y\_total}$$

SECTION D. Emission reductions

D.1. Baseline emissions:

The baseline emissions presented in the tables below were obtained when applying the monitored data in the Section B.4 to the equations presented in the Section C.1.

IPCC CH_4 emission factor for decaying biomass (CH_4_IPCCdecay)						
Wood waste suppliers	IPCC CH_4 emission factor for decaying biomass (CH_4_$IPCC_{decay}$) [AH=N*O*P*Q*AI]	Methane correction factor (MCF) [N]	Degradable organic carbon (DOC) [O]	Fraction DOC dissimilated to landfill gas (DCO_F) [P]	Fraction of CH_4 in landfill gas (F) [Q]	16/12 [AI]
	(tCH_4/t)	(fraction)	(fraction)	(fraction)	(fraction)	(fraction)
Battistella	0.1232	0.8	0.3	0.77	0.5	1.33
Sofia	0.0616	0.4	0.3	0.77	0.5	1.33
Spot Market	0.0616	0.4	0.3	0.77	0.5	1.33

BATTISTELLA SUPPLY				
Baseline methane emissions from biomass decay (BE_y)				
Year	Baseline methane emissions from biomass decay (BE_y) [AJ=H*AH*V]	Quantity of biomass treated under the project activity* ($QT_{biomass}$) [H]	IPCC CH_4 emission factor for decaying biomass (CH_4_$IPCC_{decay}$) [AH]	GWP for CH_4 (CH_4_GWP) [V]
	(tCO_2e/year)	(t/year)	(tCH_4/t)	(tCO_2e/tCH_4)
2004	19,708	7,617.41	0.1232	21
2005	84,648	32,718.08	0.1232	21
2006	36,382	14,062.39	0.1232	21
2007	0	0.00	0.1232	
2008	0	0.00	0.1232	
2009	0	0.00	0.1232	
2010	0	0.00	0.1232	
2011	0	0.00	0.1232	
2012	0	0.00	0.1232	
2013	0	0.00	0.1232	
2014	0	0.00	0.1232	
Total	**140,738**	54,397.88	-	-

*The annual wood waste treated under the project activity is the total of wood waste consumption of the Lages Project less the wood waste burned by Battistella and Sofia for own consumption in their old boilers and less the wood waste burned spontaneously in the Battistella pile.

SOFIA SUPPLY				
Baseline methane emissions from biomass decay (BE_y)				
Year	Baseline methane emissions from biomass decay (BE_y) [AK=K*AH*V]	Quantity of biomass treated under the project activity* ($QT_{biomass}$) [K]	IPCC CH_4 emission factor for decaying biomass (CH_4_$IPCC_{decay}$) [AH]	GWP for CH_4 (CH_4_GWP) [V]
	(tCO_2e/year)	(t/year)	(tCH_4/t)	(tCO_2e/tCH_4)
2004	6,572	5,080.77	0.0616	21
2005	26,647	20,599.02	0.0616	21
2006	1,283	991.99	0.0616	21
2007	0	0.00	0.0616	
2008	0	0.00	0.0616	
2009	0	0.00	0.0616	
2010	0	0.00	0.0616	
2011	0	0.00	0.0616	
2012	0	0.00	0.0616	
2013	0	0.00	0.0616	
2014	0	0.00	0.0616	
Total	**34,503**	26,671.78	-	-

SPOT MARKET SUPPLY				
Baseline methane emissions from biomass decay (BE_y)				
Year	Baseline methane emissions from biomass decay (BE_y) [AL=M*AH*V]	Quantity of biomass treated under the project activity* ($QT_{biomass}$) [M]	IPCC CH_4 emission factor for decaying biomass ($CH_4\_IPCC_{decay}$) [AH]	GWP for CH_4 (CH_4_GWP) [V]
	(tCO_2e/year)	(t/year)	(tCH_4/t)	(tCO_2e/tCH_4)
2004	9,752	7,538.88	0.0616	21
2005	52,256	40,395.42	0.0616	21
2006	44,603	34,479.57	0.0616	21
2007	0	0.00	0.0616	
2008	0	0.00	0.0616	
2009	0	0.00	0.0616	
2010	0	0.00	0.0616	
2011	0	0.00	0.0616	
2012	0	0.00	0.0616	
2013	0	0.00	0.0616	
2014	0	0.00	0.0616	
Total	**106,611**	82,413.87	-	-

Baseline methane emissions from biomass decay (BE_y)				
Year	Baseline methane emissions from biomass decay (BE_y) [AM=AJ+AK+AL]	Battistella Supply [AJ]	Sofia Supply [AK]	Spot Market Supply [AL]
	(tCO_2e/year)	(tCO_2e/year)	(tCO_2e/year)	(tCO_2e/year)
2004	36,033	19,708	6,572	9,752
2005	163,551	84,648	26,647	52,256
2006	82,268	36,382	1,283	44,603
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
Total	**281,851**	140,738	34,503	106,611

D.2. Project activity emissions:

The project activity emissions presented in the tables below were obtained when applying the monitored data in the Section B.4 to the equations presented in the Section C.2.

Project activity emissions (PE_y)							
Year	Project activity emissions (PE_y) [AN=A*S*(T*V+U*W)/10^6]	Quantity of biomass consumed by project activity ($QC_{biomass}$) [A]	Energy content of biomass ($E_{biomass}$) [S]	CH_4 emission factor for biomass and waste combustion (CH_4bio_comb) [T]	GWP for CH_4 (CH_4_GWP) [V]	N_2O emission factor for biomass and waste combustion (N_2Obio_comb) [U]	GWP for N_2O (N_2O_GWP) [W]
	($ktCO_2e$/year)	(t/year)	(TJ/t)	($kgCH_4$/TJ)	($tCO_2e/t\ CH_4$)	(kgN_2O/TJ)	(tCO_2e/tN_2O)
2004	0.408	28,154.00	7.7460E-03	30	21	4	310
2005	2.044	141,083.00	7.7460E-03	30	21	4	310
2006	1.003	69,276.00	7.7460E-03	30	21	4	310
2007	0.000	0.00					
2008	0.000	0.00					
2009	0.000	0.00					
2010	0.000	0.00					
2011	0.000	0.00					
2012	0.000	0.00					
2013	0.000	0.00					
2014	0.000	0.00					
Total	**3.455**	238,513.00	-	-	-	-	-

Emissions from on-site transportation (OT_GHG_y)								
Year	Emissions from on-site transportation (OT_GHG_y) [AO=AB*X*(Y+Z*V+AA*W)/10^6]	Diesel oil consumption (Q_{diesel}) [AB]	Diesel oil density (D_{diesel}) [X]	CO_2 emission factor for trucks (VEF_CO_2) [Y]	CH_4 emission factor for trucks (VEF_CH_4) [Z]	GWP for CH_4 (CH_4_GWP) [V]	N_2O emission factor for trucks (VEF_N_2O) [AA]	GWP for N_2O (N_2O_GWP) [W]
	($ktCO_2e$/year)	(l/year)	(t/l)	($kgCO_2$/t)	($kgCH_4$/t)	(tCO_2e/tCH_4)	(kgN_2O/t)	(tCO_2e/tN_2O)
2004	0.022	7,848.55	8.800E-04	3,172.31	0.18	21	0.09	310
2005	0.142	50,263.63	8.800E-04	3,172.31	0.18	21	0.09	310
2006	0.056	19,729.93	8.800E-04	3,172.31	0.18	21	0.09	310
2007	0.000							
2008	0.000							
2009	0.000							
2010	0.000							
2011	0.000							
2012	0.000							
2013	0.000							
2014	0.000							
Total	**0.219**	77,842.11	-	-	-	-	-	-

D.3. Leakage emissions:

The leakage emissions presented in the tables below were obtained when applying the monitored data in the Section B.4 to the equations presented in the Section C.3.

Emissions from off-site transportation (BT_GHG_y)									
Year	Emissions from off-site transportation (BT_GHG_y) [AP=A/AD*AC*(Y+Z*V+AA*W)/10^6]	Quantity of biomass consumed by project activity ($QC_{biomass}$) [A]	Truck average capacity for biomass transportation ($TC_{biomass}$) [AD]	Average round trip distance to biomass supply sites ($AVD_{biomass}$) [AC]	CO_2 emission factor for trucks (VEF_CO_2) [Y]	CH_4 emission factor for trucks (VEF_CH_4) [Z]	GWP for CH_4 (CH_4_GWP) [V]	N_2O emission factor for trucks (VEF_N_2O) [AA]	GWP for N_2O (N_2O_GWP) [W]
	($ktCO_2e$/year)	(t/year)	(t)	(km)	($kgCO_2$/km)	($kgCH_4$/km)	(tCO_2e/tCH_4)	(kgN_2O/km)	(tCO_2e/tN_2O)
2004	0.023	28,154.00	13.7	10.2	1.097	6.0E-05	21	3.1E-05	310
2005	0.065	141,083.00	13.4	5.6	1.097	6.0E-05	21	3.1E-05	310
2006	0.068	69,276.00	13.8	12.3	1.097	6.0E-05	21	3.1E-05	310
2007	0.000	0.00							
2008	0.000	0.00							
2009	0.000	0.00							
2010	0.000	0.00							
2011	0.000	0.00							
2012	0.000	0.00							
2013	0.000	0.00							
2014	0.000	0.00							
Total	**0.157**	238,513.00	-	-	-	-	-	-	-

Emissions from ash transportation (AT_GHG_y)									
Year	Emissions from ash transportation (AT_GHG_y) [AQ=AG/AF*AE*(Y+Z*V+AA*W)/10^6]	Quantity of ash produced by the project activity (Q_{ash}) [AG]	Truck average capacity for ash transportation (TC_{ash}) [AF]	Round trip distance to disposal site (AVD_{ash}) [AE]	CO_2 emission factor for trucks (VEF_CO_2) [Y]	CH_4 emission factor for trucks (VEF_CH_4) [Z]	GWP for CH_4 (CH_4_GWP) [V]	N_2O emission factor for trucks (VEF_N_2O) [AA]	GWP for N_2O (N_2O_GWP) [W]
	($ktCO_2e$/year)	(t/year)	(t)	(km)	($kgCO_2$/km)	($kgCH_4$/km)	(tCO_2e/tCH_4)	(kgN_2O/km)	(tCO_2e/tN_2O)
2004	0.017	621.73	28.0	680.0	1.097	6.0E-05	21	3.1E-05	310
2005	0.149	5,533.37	28.0	680.0	1.097	6.0E-05	21	3.1E-05	310
2006	0.087	3,222.06	28.0	680.0	1.097	6.0E-05	21	3.1E-05	310
2007	0.000								
2008	0.000								
2009	0.000								
2010	0.000								
2011	0.000								
2012	0.000								
2013	0.000								
2014	0.000								
Total	**0.252**	9,377.16	-	-	-	-	-	-	-

Leakage emissions (LE_y)			
Year	Leakage emissions (LE_y) [AR=AP+AQ]	Emissions from off-site transportation (BT_GHG_y) [AP]	Emissions from ash transportation (AT_GHG_y) [AQ]
	($ktCO_2e$/year)	($ktCO_2e$/year)	($ktCO_2e$/year)
2004	0.040	0.023	0.017
2005	0.214	0.065	0.149
2006	0.155	0.068	0.087
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000
2011	0.000	0.000	0.000
2012	0.000	0.000	0.000
2013	0.000	0.000	0.000
2014	0.000	0.000	0.000
Total	**0.409**	0.157	0.252

D.4. The sum of D.2 and D.3 representing the total project activity emissions:

The total project activity emissions presented in the table below were obtained when applying the values calculated in the Sections D.2 and D.3 to the equation presented in the Section C.4.

Total project activity emissions (PE_{y_total}) *[sum of D.2 and D.3]*				
Year	**Total project activity emissions (PE_{y_total}) [AS=AN+AO+AR]**	**Project activity emissions (PE_y) [AN]**	**Emissions from on-site transportation (OT_GHG_y) [AO]**	**Leakage emissions (LE_y) [AR]**
	($ktCO_2e$/year)	**($ktCO_2e$/year)**	**($ktCO_2e$/year)**	**($ktCO_2e$/year)**
2004	0.470	0.408	0.022	0.040
2005	2.399	2.044	0.142	0.214
2006	1.214	1.003	0.056	0.155
2007	0.000	0.000	0.000	0.000
2008	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	0.000
2011	0.000	0.000	0.000	0.000
2012	0.000	0.000	0.000	0.000
2013	0.000	0.000	0.000	0.000
2014	0.000	0.000	0.000	0.000
Total	**4.084**	3.455	0.219	0.409

D.5. The difference between D.1 and D.4 representing the project activity emission reductions:

The project activity emission reductions presented in the table below were obtained when applying the values calculated in the Sections D.1 and D.4 to the equation presented in the Section C.5.

Emission reductions due to the project activity (ER_y) *[difference between D.1 and D.4]*			
Year	**Emission reduction due to the project activity (ER_y) [AT=AM-AS]**	**Baseline methane emissions from biomass decay (BE_y) [AM]**	**Total project activity emissions (PE_{y_total}) [AS]**
	(tCO_2e/year)	**(tCO_2e/year)**	**(tCO_2e/year)**
2004	35,563	36,033	470
2005	161,151	163,551	2,399
2006	81,054	82,268	1,214
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
Total	**277,768**	281,851	4,084

Annex 1 – Wood waste by supplier

CONSUMED AMOUNTS IN 2004

Wood waste suppliers	Status (Active/Non-active)	Round trip distance to Lages Project (km) [AW]	Truck Capacity (tonnes) [AX]	Consumed wood waste amount (tonnes/month)												Total consumed amount (tonnes/year) [A]	Travels (un./year) [AY=A/AX]	Total travelled distance (km/year) [AZ=AW*AY]
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Lages region																		
Battistella	Active	2.0	15.0											7,175.53	5,958.82	13,134.35	876	1,751
Sofia	Active	4.0	14.5											2,882.36	4,598.41	7,480.77	516	2,064
Boa Esperança	Active	50.0	14.0											2,461.30	1,504.10	3,965.40	283	14,162
Edeschons	Active	5.0	14.0											116.89	545.79	662.68	47	237
Janderson	Active	16.0	12.5											54.79	38.30	93.09	7	119
Madbras	Active	40.0	6.0											43.96	0.00	43.96	7	293
Madebampi	Active	10.0	9.0											621.79	537.17	1,158.96	129	1,288
Madeireira Lajes	Active	4.0	9.0											99.71	0.00	99.71	11	44
Madepar	Active	5.0	14.0											128.46	38.33	166.79	12	60
MJ Madeiras	Active	5.0	8.0											395.34	359.45	754.79	94	472
Pandolfo	Active	3.0	8.0											39.25	85.36	124.61	16	47
Pinusbras	Active	5.0	9.0											405.95	0.00	405.95	45	226
Polese	Active	26.0	7.0											11.38	10.84	22.22	3	83
Righez	Active	50.0	15.0											19.30	21.44	40.74	3	136
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
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-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
Total				**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**14,456.00**	**13,698.00**	**28,154.00**	**2,050**	**20,980**

Weighted average round trip distance to Lages Project [AC=AZ/AY] = **10.2** km
Weighted average truck capacity [AD=A/AY] = **13.7** tonnes

PURCHASED AMOUNTS IN 2004

Wood waste suppliers	Purchased wood waste amount (tonnes/month)																								Total purchased amount (tonnes/year)	
	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec			
Lages region																										
Battistella		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	5,301.55	49.64%	3,869.69	43.50%	9,171.24	46.85%
Sofia		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	2,129.60	19.94%	2,986.23	33.57%	5,115.83	26.13%
Boa Esperança		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	1,818.50	17.03%	976.77	10.98%	2,795.27	14.28%
Edeschons		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	86.36	0.81%	354.44	3.98%	440.80	2.25%
Janderson		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	40.48	0.38%	24.87	0.28%	65.35	0.33%
Madbras		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	32.48	0.30%	0.00	0.00%	32.48	0.17%
Madebampi		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	459.40	4.30%	348.84	3.92%	808.24	4.13%
Madeireira Lajes		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	73.67	0.69%	0.00	0.00%	73.67	0.38%
Madepar		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	94.91	0.89%	24.89	0.28%	119.80	0.61%
MJ Madeiras		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	292.09	2.73%	233.43	2.62%	525.52	2.68%
Pandolfo		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	29.00	0.27%	55.43	0.62%	84.43	0.43%
Pinusbras		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	299.93	2.81%	0.00	0.00%	299.93	1.53%
Polese		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	8.41	0.08%	7.04	0.08%	15.45	0.08%
Righez		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	14.26	0.13%	13.92	0.16%	28.18	0.14%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Total	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**10,680.64**	**100.00%**	**8,895.55**	**100.00%**	**19,576.19**	**100.00%**

CONSUMED AMOUNTS IN 2005

Wood waste suppliers	Status (Active/Non-active)	Round trip distance to Lages Project (km) [AW]	Truck Capacity (tonnes) [AX]	Consumed wood waste amount (tonnes/month)												Total consumed amount (tonnes/year) [A]	Travels (un./year) [AY=A/AX]	Total travelled distance (km/year) [AZ=AW*AY]
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Lages region																		
Battistella	Active	2.0	15.0	5,593.24	4,742.78	3,890.18	5,310.01	6,129.12	6,393.19	7,327.61	6,743.05	7,941.77	2,795.72	2,265.44	6,556.45	65,688.57	4,379	8,758
Sofia	Active	4.0	14.5	4,378.61	3,885.38	4,574.63	4,315.04	3,404.89	3,394.45	2,696.42	2,930.55	1,098.21	919.27	709.18	2,692.39	34,999.02	2,414	9,655
Boa Esperança	Active	50.0	14.0	0.00	0.00	0.00	1,138.99	0.00	0.00	0.00	0.00	194.65	166.96	185.97	522.86	2,209.43	158	7,891
Edeschons	Active	5.0	14.0	255.94	113.14	116.95	92.48	39.69	31.81	32.58	46.44	42.94	12.57	30.15	46.54	861.22	62	308
Janderson	Active	16.0	12.5	88.95	0.00	69.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	158.54	13	203
Madbras	Active	40.0	6.0	98.80	124.03	102.39	10.83	0.00	0.00	0.00	0.00	0.00	3.21	0.00	0.00	339.25	57	2,262
Madebampi	Active	10.0	9.0	652.03	418.76	388.14	246.81	117.52	124.54	55.33	56.60	112.00	49.80	64.05	238.34	2,523.92	280	2,804
Madeireira Lajes	Active	4.0	9.0	0.00	55.96	100.46	54.72	59.69	58.28	130.51	59.11	20.26	0.00	11.56	69.68	620.23	69	276
Madepar	Active	5.0	14.0	92.21	196.08	653.71	1,752.86	1,496.06	1,409.93	1,265.98	1,479.31	2,357.57	918.98	730.30	1,178.69	13,531.69	967	4,833
MJ Madeiras	Active	5.0	8.0	742.36	568.12	619.22	490.20	392.07	277.48	128.48	127.71	65.15	86.71	148.03	628.44	4,273.97	534	2,671
Pandolfo	Active	3.0	8.0	34.89	165.62	397.51	300.86	357.55	108.99	338.25	385.01	667.81	248.12	193.68	647.53	3,845.81	481	1,442
Pinusbras	Active	5.0	9.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Polese	Active	26.0	7.0	27.29	7.23	8.10	13.38	9.77	9.00	0.00	0.00	0.00	0.00	0.00	0.00	74.77	11	278
Righez	Active	50.0	15.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Araupel	Active	160.0	30.0	0.00	0.00	0.00	26.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.06	1	139
Claudio Paes	Active	60.0	17.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.41	20.41	1	72
Flora Pinus	Active	16.0	4.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.89	5.89	1	24
Indupinho	Active	100.0	16.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.35	42.35	3	265
Indusflora	Active	30.0	10.0	0.00	0.00	24.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.98	2	75
Jose Altenir	Active	60.0	15.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.67	0.00	0.00	0.00	0.00	14.67	1	59
Lopes	Active	100.0	15.0	0.00	0.00	0.00	0.00	40.05	62.25	134.83	124.56	21.76	0.00	0.00	0.00	383.46	26	2,556
Martins	Active	16.0	8.0	0.00	54.50	223.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	278.03	35	556
Mengatto	Active	5.0	8.0	326.67	279.48	355.28	398.50	238.24	81.28	85.59	0.00	461.29	267.97	295.42	1,089.20	3,878.90	485	2,424
Multiform	Active	2.0	16.0	0.00	0.00	0.00	0.00	32.18	513.70	467.97	234.62	392.71	278.74	253.77	565.16	2,738.84	171	342
Pisani	Active	18.0	14.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	341.92	208.97	207.33	618.49	1,376.72	98	1,770
Sart	Active	60.0	15.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.12	20.06	69.98	3.00	0.00	145.17	10	581
Tributto	Active	30.0	11.0	0.00	167.91	482.33	366.27	298.19	271.10	232.46	233.25	333.90	135.99	82.68	330.79	2,934.87	267	8,004
Turbina	Active	130.0	16.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.44	72.79	86.23	5	701
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
-																0.00	0	0
Total				**12,291.00**	**10,779.00**	**12,007.00**	**14,517.00**	**12,615.00**	**12,736.00**	**12,896.00**	**12,487.00**	**14,072.00**	**6,163.00**	**5,194.00**	**15,326.00**	**141,083.00**	**10,529**	**58,948**

Weighted average round trip distance to Lages Project [AC=AZ/AY] = **5.6** km
Weighted average truck capacity [AD=A/AY] = **13.4** tonnes

PURCHASED AMOUNTS IN 2005

Purchased wood waste amount (tonnes/month)

Wood waste suppliers	Jan		Feb		Mar		Apr		May		Jun	
Lages region												
Battistella	3,225.77	45.51%	3,429.30	44.00%	2,996.70	32.40%	3,695.58	36.58%	5,592.04	48.59%	6,443.77	50.20%
Sofia	2,525.26	35.62%	2,809.35	36.05%	3,523.95	38.10%	3,003.12	29.72%	3,106.53	26.99%	3,421.31	26.65%
Boa Esperança	0.00	0.00%	0.00	0.00%	0.00	0.00%	792.70	7.85%	0.00	0.00%	0.00	0.00%
Edeschons	147.61	2.08%	81.81	1.05%	90.09	0.97%	64.36	0.64%	36.21	0.31%	32.06	0.25%
Janderson	51.30	0.72%	0.00	0.00%	53.61	0.58%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Madbras	56.98	0.80%	89.68	1.15%	78.87	0.85%	7.54	0.07%	0.00	0.00%	0.00	0.00%
Madebampi	376.04	5.30%	302.79	3.88%	298.99	3.23%	171.77	1.70%	107.22	0.93%	125.53	0.98%
Madeireira Lajes	0.00	0.00%	40.46	0.52%	77.39	0.84%	38.08	0.38%	54.46	0.47%	58.74	0.46%
Madepar	53.18	0.75%	141.78	1.82%	503.57	5.44%	1,219.93	12.07%	1,364.96	11.86%	1,421.09	11.07%
MJ Madeiras	428.14	6.04%	410.78	5.27%	477.00	5.16%	341.16	3.38%	357.71	3.11%	279.68	2.18%
Pandolfo	20.12	0.28%	119.75	1.54%	306.21	3.31%	209.39	2.07%	326.22	2.83%	109.85	0.86%
Pinusbras	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Polese	15.74	0.22%	5.23	0.07%	6.24	0.07%	9.31	0.09%	8.91	0.08%	9.07	0.07%
Righez	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Araupel	0.00	0.00%	0.00	0.00%	0.00	0.00%	18.14	0.18%	0.00	0.00%	0.00	0.00%
Claudio Paes	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Flora Pinus	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Indupinho	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Indusflora	0.00	0.00%	0.00	0.00%	19.24	0.21%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Jose Altenir	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Lopes	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	36.54	0.32%	62.74	0.49%
Martins	0.00	0.00%	39.41	0.51%	172.19	1.86%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Mengatto	188.40	2.66%	202.08	2.59%	273.68	2.96%	277.34	2.75%	217.36	1.89%	81.92	0.64%
Multiform	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	29.36	0.26%	517.76	4.03%
Pisani	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Sart	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Tributto	0.00	0.00%	121.41	1.56%	371.55	4.02%	254.91	2.52%	272.06	2.36%	273.25	2.13%
Turbina	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%
Total	**7,088.54**	**100.00%**	**7,793.83**	**100.00%**	**9,249.28**	**100.00%**	**10,103.33**	**100.00%**	**11,509.58**	**100.00%**	**12,836.77**	**100.00%**

Wood waste suppliers	Jul		Aug		Sep		Oct		Nov		Dec		Total purchased amount (tonnes/year)	
Lages region														
Battistella	8,358.87	56.82%	7,566.75	54.00%	5,280.65	56.44%	4,567.76	45.36%	4,720.66	43.62%	5,127.86	42.78%	61,005.71	47.09%
Sofia	3,075.90	20.91%	3,288.53	23.47%	730.22	7.80%	1,501.93	14.92%	1,477.77	13.65%	2,105.74	17.57%	30,569.61	23.60%
Boa Esperança	0.00	0.00%	0.00	0.00%	129.43	1.38%	272.79	2.71%	387.51	3.58%	408.93	3.41%	1,991.36	1.54%
Edeschons	37.16	0.25%	52.11	0.37%	28.55	0.31%	20.54	0.20%	62.82	0.58%	36.40	0.30%	689.72	0.53%
Janderson	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	104.91	0.08%
Madbras	0.00	0.00%	0.00	0.00%	0.00	0.00%	5.24	0.05%	0.00	0.00%	0.00	0.00%	238.31	0.18%
Madebampi	63.12	0.43%	63.51	0.45%	74.47	0.80%	81.37	0.81%	133.47	1.23%	186.41	1.56%	1,984.69	1.53%
Madeireira Lajes	148.88	1.01%	66.33	0.47%	13.47	0.14%	0.00	0.00%	24.09	0.22%	54.50	0.45%	576.40	0.44%
Madepar	1,444.15	9.82%	1,660.02	11.85%	1,567.60	16.75%	1,501.47	14.91%	1,521.78	14.06%	921.86	7.69%	13,321.39	10.28%
MJ Madeiras	146.56	1.00%	143.31	1.02%	43.32	0.46%	141.67	1.41%	308.47	2.85%	491.51	4.10%	3,569.31	2.76%
Pandolfo	385.85	2.62%	432.04	3.08%	444.04	4.75%	405.38	4.03%	403.59	3.73%	506.44	4.23%	3,668.88	2.83%
Pinusbras	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Polese	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	54.50	0.04%
Righez	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Araupel	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	18.14	0.01%
Claudio Paes	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	15.96	0.13%	15.96	0.01%
Flora Pinus	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	4.61	0.04%	4.61	0.00%
Indupinho	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	33.12	0.28%	33.12	0.03%
Indusflora	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	19.24	0.01%
Jose Altenir	0.00	0.00%	16.46	0.12%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	16.46	0.01%
Lopes	153.81	1.05%	139.78	1.00%	14.47	0.15%	0.00	0.00%	0.00	0.00%	0.00	0.00%	407.34	0.31%
Martins	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	211.60	0.16%
Mengatto	97.63	0.66%	0.00	0.00%	306.72	3.28%	437.82	4.35%	615.58	5.69%	851.87	7.11%	3,550.40	2.74%
Multiform	533.83	3.63%	263.28	1.88%	261.12	2.79%	455.41	4.52%	528.80	4.89%	442.02	3.69%	3,031.58	2.34%
Pisani	0.00	0.00%	0.00	0.00%	227.35	2.43%	341.43	3.39%	432.03	3.99%	483.73	4.04%	1,484.54	1.15%
Sart	0.00	0.00%	58.49	0.42%	13.34	0.14%	114.34	1.14%	6.26	0.06%	0.00	0.00%	192.43	0.15%
Tributto	265.17	1.80%	261.74	1.87%	222.02	2.37%	222.19	2.21%	172.29	1.59%	258.71	2.16%	2,695.30	2.08%
Turbina	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	28.00	0.26%	56.93	0.47%	84.93	0.07%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Total	**14,710.93**	**100.00%**	**14,012.35**	**100.00%**	**9,356.77**	**100.00%**	**10,069.34**	**100.00%**	**10,823.12**	**100.00%**	**11,986.60**	**100.00%**	**129,540.44**	**100.00%**

CONSUMED AMOUNTS IN 2006

Wood waste suppliers	Status (Active/Non-active)	Round trip distance to Lages Project (km) [AW]	Truck Capacity (tonnes) [AX]	Consumed wood waste amount (tonnes/month)												Total consumed amount (tonnes/year) [A]	Travels (un./year) [AY=A/AX]	Total travelled distance (km/year) [AZ=AW*AY]
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Lages region																		
Battistella	Active	2.0	15.0	4,494	5,141	6,474	6,132	5,563								27,804.43	1,854	3,707
Sofia	Active	4.0	14.5	1,324	957	1,643	1,504	1,564								6,991.99	482	1,929
Boa Esperança	Active	50.0	14.0	314	1,044	2,359	3,514	3,029								10,260.20	733	36,644
Edeschons	Active	5.0	14.0	40	57	73	73	43								285.84	20	102
Janderson	Active	16.0	12.5	0	0	0	0	0								0.00	0	0
Madbras	Active	40.0	6.0	0	0	0	0	0								0.00	0	0
Madebampi	Active	10.0	9.0	154	119	116	153	93								633.92	70	704
Madeireira Lajes	Active	4.0	9.0	49	23	46	0	0								117.54	13	52
Madepar	Active	5.0	14.0	783	1,281	1,864	1,879	1,646								7,451.89	532	2,661
MJ Madeiras	Active	5.0	8.0	301	261	346	187	232								1,327.99	166	830
Pandolfo	Active	3.0	8.0	280	357	438	265	419								1,759.78	220	660
Pinusbras	Active	5.0	9.0	0	0	0	0	0								0.00	0	0
Polese	Active	26.0	7.0	0	0	0	0	0								0.00	0	0
Righez	Active	50.0	15.0	0	0	0	0	0								0.00	0	0
Araupel	Active	160.0	30.0	0	0	0	0	0								0.00	0	0
Claudio Paes	Active	60.0	17.0	0	68	164	243	326								801.88	47	2,830
Flora Pinus	Active	16.0	4.0	15	9	13	17	30								83.54	21	334
Indupinho	Active	100.0	16.0	0	0	0	0	0								0.00	0	0
Indusflora	Active	30.0	10.0	0	0	0	0	0								0.00	0	0
Jose Altenir	Active	60.0	15.0	0	0	0	0	0								0.00	0	0
Lopes	Active	100.0	15.0	0	0	0	0	0								0.00	0	0
Martins	Active	16.0	8.0	0	0	0	0	0								0.00	0	0
Mengatto	Active	5.0	8.0	0	98	0	447	1,048								1,593.78	199	996
Multiform	Active	2.0	16.0	307	681	998	1,855	2,910								6,751.26	422	844
Pisani	Active	18.0	14.0	298	192	256	30	0								776.35	55	998
Sart	Active	60.0	15.0	0	0	0	0	0								0.00	0	0
Tributto	Active	30.0	11.0	277	326	379	285	399								1,666.14	151	4,544
Turbina	Active	130.0	16.0	38	21	27	0	0								86.90	5	706
Alceir de Jesus	Active	60.0	28.0	0	0	218	261	280								758.35	27	1,625
Jaquirana	Active	360.0	14.0	0	0	0	0	25								24.80	2	638
Madebins	Active	180.0	20.0	0	0	38	34	28								99.44	5	895
-																0.00	0	0
-																0.00	0	0
Total				**8,673.00**	**10,635.00**	**15,452.00**	**16,880.00**	**17,636.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**69,276.00**	**5,026**	**61,700**

Weighted average round trip distance to Lages Project [AC=AZ/AY] = **12.3** km
Weighted average truck capacity [AD=A/AY] = **13.8** tonnes

PURCHASED AMOUNTS IN 2006

Wood waste suppliers	Purchased wood waste amount (tonnes/month)																						Total purchased amount (tonnes/year)	
	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec			
Lages region																								
Battistella	6,760.87	51.81%	6,431.14	48.34%	6,414.17	41.90%	5,475.80	36.33%	6,274.80	31.54%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	31,356.78	40.92%
Sofia	1,991.40	15.26%	1,197.40	9.00%	1,627.92	10.63%	1,342.63	8.91%	1,764.53	8.87%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	7,923.88	10.34%
Boa Esperança	473.00	3.62%	1,305.45	9.81%	2,337.26	15.27%	3,137.66	20.82%	3,416.73	17.18%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	10,670.11	13.92%
Edeschons	59.98	0.46%	70.77	0.53%	72.41	0.47%	65.58	0.44%	48.35	0.24%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	317.09	0.41%
Janderson	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Madbras	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Madebampi	231.24	1.77%	148.92	1.12%	114.89	0.75%	136.28	0.90%	104.43	0.52%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	735.76	0.96%
Madeireira Lajes	73.34	0.56%	28.26	0.21%	45.77	0.30%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	147.37	0.19%
Madepar	1,177.32	9.02%	1,602.39	12.04%	1,846.42	12.06%	1,677.58	11.13%	1,856.54	9.33%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	8,160.27	10.65%
MJ Madeiras	453.27	3.47%	326.29	2.45%	343.28	2.24%	167.23	1.11%	261.80	1.32%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	1,551.87	2.03%
Pandolfo	421.38	3.23%	446.63	3.36%	434.02	2.84%	236.81	1.57%	473.05	2.38%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	2,011.87	2.63%
Pinusbras	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Polese	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Righez	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Araupel	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Claudio Paes	0.00	0.00%	85.20	0.64%	162.37	1.06%	217.40	1.44%	368.17	1.85%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	833.14	1.09%
Flora Pinus	22.87	0.18%	11.11	0.08%	12.86	0.08%	15.08	0.10%	33.37	0.17%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	95.29	0.12%
Indupinho	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Indusflora	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Jose Altenir	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Lopes	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Martins	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Mengatto	0.00	0.00%	122.97	0.92%	0.00	0.00%	399.32	2.65%	1,182.38	5.94%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	1,704.67	2.22%
Multiform	461.80	3.54%	852.08	6.40%	988.45	6.46%	1,656.40	10.99%	3,282.78	16.50%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	7,241.51	9.45%
Pisani	448.05	3.43%	240.62	1.81%	253.40	1.66%	27.17	0.18%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	969.24	1.26%
Sart	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Tributto	416.21	3.19%	408.13	3.07%	375.70	2.45%	254.51	1.69%	450.00	2.26%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	1,904.60	2.49%
Turbina	57.74	0.44%	26.73	0.20%	26.90	0.18%	0.00	0.00%	0.00	0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	111.37	0.15%
Alceir de Jesus	0.00	0.00%	0.00	0.00%	215.61	1.41%	233.13	1.55%	315.41	1.59%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	764.15	1.00%
Jaquirana	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	27.97	0.14%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	27.97	0.04%
Madebins	0.00	0.00%	0.00	0.00%	37.23	0.24%	30.06	0.20%	31.80	0.16%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	99.09	0.13%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
-		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%		0.00%	0.00	0.00%
Total	**13,048.47**	**100.00%**	**13,304.14**	**100.00%**	**15,308.66**	**100.00%**	**15,072.65**	**100.00%**	**19,892.12**	**100.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**0.00**	**0.00%**	**76,626.04**	**100.00%**