3rd MONITORING REPORT

JALLES MACHADO BAGASSE COGENERATION PROJECT (JMBCP)

(CDM Registration Reference Number 0187)
First crediting period: 23 April, 2001 to 22 April, 2008

Monitoring Period:

1 December, 2006 to 22 April, 2008

Prepared by Econergy Brasil Ltda

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Version 2

1. Introduction

This document reports the Emission Reductions (ERs) generated by the Jalles Machado Bagasse Cogeneration Project (hereinafter JMBCP), CDM Registration Reference Number 0187, from 01/12/2006 to 22/04/2008.

This project activity consists of increasing efficiency in the bagasse (a renewable fuel source, residue from sugarcane processing) cogeneration facility at **Usina Jalles Machado S.A**, a Brazilian sugar mill. With the implementation of this project, the mill is able to sell electricity to the national grid, avoiding the dispatch of same amount of energy produced by fossil-fuelled thermal plants to that grid. By that, the initiative avoids CO_2 emissions, also contributing to the regional and national sustainable development.

The JMBCP operation has been monitored in accordance with the requirements of the applicable Monitoring Methodology AM0015 – version 1: "Bagasse-based cogeneration connected to an electricity grid" as described in its Project Design Document and in the procedure RO-09-IND/044-1.

The PP would like to highlight, as it has already been clearly described in the PDD, that bagasse is a fibrous biomass residue obtained as a by-product from sugar cane processing (alcohol and sugar production) at Jalles Machado. Any increase in the bagasse is due to the increase in the demand of ethanol and sugar production.

All the bagasse utilized by JMBCP is produced internally and used in its cogeneration facility (boilers and steam turbines) for steam and power generation. Therefore, no bagasse was bought.

All the bagasse internally produced by JMBCP is internally transported to its cogeneration facility through electrical and/or mechanical conveyor belts which operate using electricity and/or steam generated in the biomass residue cogeneration facility of the own mill.

Therefore, there is neither fossil fuel consumption within the project boundary nor any other fossil fuel consumption attributable to the project activity. Consequently, there is no need to monitor fossil fuel consumption of the project activity.

2. Emission Reductions Calculation Formula

According to the registered PDD, the formulae used to calculate the emission reductions are:

$$\mathbf{ER_y = BE_{thermal,\,y} + BE_{electricity,\,y} - PE_y - L_y}$$
$$\mathbf{BE_{thermal,\,y} = 0}$$
$$\mathbf{PE_y = 0}$$
$$\mathbf{L_y = 0}$$
$$\mathbf{BE_{electricity,\,y} = EF_{electricity} \,.\, EG_y}$$

$$\mathbf{ER_y = EG_y}\ (MWh)\ \mathbf{*}\ \mathbf{EF}_{\boldsymbol{y}}\ (tCO_2e\ /MWh)$$

Then, the ERs generated by the JMBCP are calculated as the net generation from the project during the monitoring period times baseline emission factor.

The baseline grid electricity emission factor (EF_y) is determined ex-post, in a conservative manner, assuming that at the registered PDD the recording frequency is at the validation and yearly after the registration.

In order to calculate the *ex-post* emission factor of the S-SE-CO grid, it was used the approved methodology AM00015, applied to the registered JMBCP.

The ONS supplied raw dispatch data for the S-SE-CO interconnected grid in the form of daily reports and the ONS data as well as the spreadsheet data with the calculation of emission factors have been provided to the DOE based on the most recently data available.

The project activity follows the steps provided by the methodology taking into account the (b) Simple Adjusted OM calculation for the STEP 1, since there would be no available data for applying to the preferred option – *(c) Dispatch Data Analysis OM.* For STEP 2, the option 1 was chosen.

In order to determine the Simple Adjusted OM emission factor ($EF_{OM,\ simple\ adjusted,\ y}$), the following equation was used:

$$EF_{OM,simple\_adjusted,y} = (1-\lambda_y)\frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_j GEN_{j,y}} + \lambda_y \frac{\sum_{i,k} F_{i,k,y}.COEF_{i,k}}{\sum_k GEN_{k,y}}$$, where:

- *Fi,j(or m),y* Is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y;
- *j,m* Refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports from the grid;
- *COEFi,j(or m) y* Is the CO_2 emission coefficient of fuel i (tCO_2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources j (or m) and the percent oxidation of the fuel in year(s) y;
- *GENj(or m),y* Is the electricity (MWh) delivered to the grid by source j (or m); and

$$\lambda_y(\%) = \frac{\text{Number of hours per year for which low - cost/must - run sources are on the margin}}{\text{8760 hours per year}}$$

It is assumed that all the low-cost/must-run plants produce zero net emissions.

$$\frac{\sum_{i,k} F_{i,k,y}.COEF_{i,k}}{\sum_k GEN_{k,y}} = 0 \ (tCO_2e/GWh)$$

Using appropriate information for $F_{i,j,y}$ and $COEF_{i,j}$, the OM emission factor was determined.

$$EF_{grid,OM-adj,2007} = (1-\lambda_{2007}) \times \frac{\sum_j EG_{j,2007} \times EF_{EL,j,2007}}{\sum_j EG_{j,2007}} = 0.4548 \ tCO_2/MWh$$

A Build Margin emission factor also needs to be determined, using the following equation:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y}.COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Electricity generation in this case means 20% of total generation in the most recent year (2007), as the 5 most recently built plants generate less than such 20%. Calculating such factor:

$$EF_{BM,2007} = 0.0709 \ \text{tCO}_2\text{/MWh}$$

Finally, the electricity baseline emission factor is calculated through a weighted-average formula, considering both the OM and the BM, being the weights 50% and 50%, according to the registered PDD. That gives:

$$EF_{electricity,2007} = \frac{EF_{OM} + EF_{BM}}{2} = \frac{0.4548 + 0.0709}{2} = 0.2628 \ \text{tCO}_2\text{/MWh}$$

$ER_{electricity}$ = EG_y * 0.2628 (in tCO_2e)

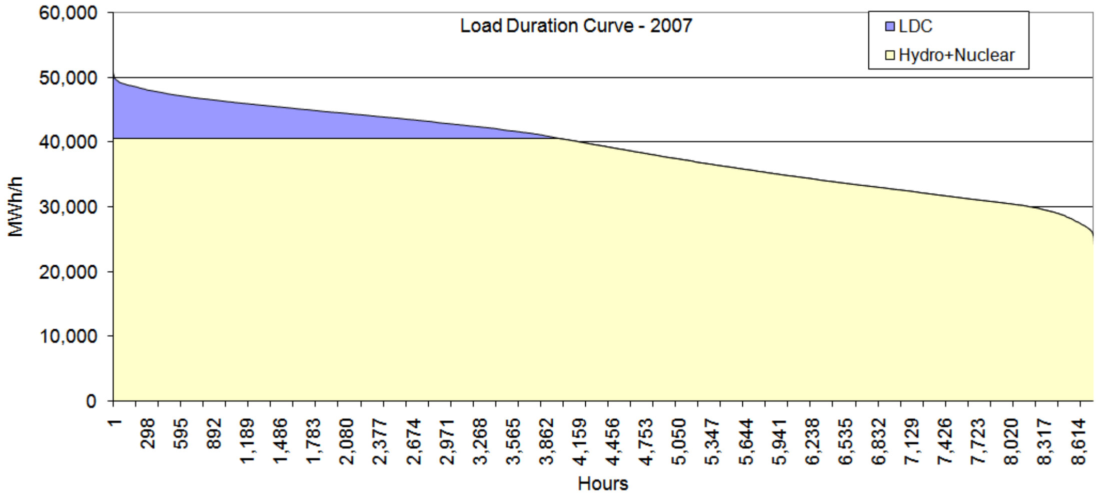
The following table presents summary data used for emission factor calculation.

Prepared by AgCert, EcoAdvance, Ecoinvest, Econergy, Ecosecurities and MGM

Source: Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do SIN (daily reports from Jan. 1, 2007 to Dec. 31, 2007)

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid

Baseline	$EF_{OM,2007}$ [tCO_2/MWh]		λ_{2007}		**EF_{2007}[tCO_2/MWh] all other projects**
2007	1.0000		0.5452		
	$EF_{OM, simple-adjusted}$ [tCO_2/MWh]		$EF_{BM,ex-post}$ [tCO_2/MWh]		**0.2628**
	0.4548		0.0709		
	Weights_wind and solar projects		Weights_all other projects		EF_{2007} [tCO_2/MWh] wind and solar
	w_{OM} =	0.75	w_{OM} =	0.50	
	w_{BM} =	0.25	w_{BM} =	0.50	0.359



The spreadsheet containing all the detailed data and information for the calculation of the emission factor of the grid presented in the table above is also available for the DOE selected for this current verification process.

3. Dispatched energy to the grid in the Monitoring Periods

Date (DD.MM.YY)		Amount of energy sold to the grid	Invoice Number	Date of the invoice
From	To			
01.12.2006	31.12.2007	off-crop season	-	-
01.01.2007	31.01.2007	off-crop season	-	-
01.02.2007	28.02.2007	off-crop season	-	-
01.03.2007	31.03.2007	off-crop season	-	-
01.04.2007	30.04.2007	off-crop season	-	-
01.05.2007	31.05.2007	3.942.000	153211	18.06.2007
01.05.2007	31.05.2007	985.000	153212	18.06.2007
01.05.2007	31.05.2007	1,283.384	153213	18.06.2007
01.06.2007	30.06.2007	8.346.000	154414	10.07.2007
01.06.2007	30.06.2007	878.787	154415	10.07.2007
01.07.2007	31.07.2007	725.410	156489	14.08.2007
01.07.2007	31.07.2007	8,625.000	156490	14.08.2007
01.08.2007	31.08.2007	6,864.303	157802	12.09.2007
01.09.2007	30.09.2007	7,489.779	159024	08.10.2007
01.10.2007	31.10.2007	1,331.844	160493	13.11.2007
01.10.2007	31.10.2007	5,051.000	160494	13.11.2007
01.10.2007	31.10.2007	1,263.000	160495	13.11.2007
01.11.2007	30.11.2007	6,428.195	1138	17.12.2007
01.12.2007	31.12.2007	off-crop season	-	-
01.01.2008	31.01.2008	off-crop season	-	-
01.02.2008	29.02.2008	off-crop season	-	-
01.03.2008	31.03.2008	off-crop season	-	-
01.04.2008	30.04.2008	5,620.160	7494	39582
TOTAL		**58,833.862**		

Invoices are available with the project participants and are also available with Bureau Veritas Certification, which was the DOE selected for this current verification process.

There are months where no sugar cane harvest is done. During these months, no energy is produced by the cogeneration system of the mill and, therefore, no electricity was sold to the grid. For these cases, the expression "*off-crop season*" was used in the table above.

It is important to clarify that, in some cases, more than one invoice could be issued considering the same period and/or month. The reason why this may happen is usually related to specific terms and reasons of the contract (PPA – Power Purchase Agreement), which establishes different monetary values per MWh for different amount of energy.

4. ERs Generated in the Monitoring Periods

Calculation of Emission Reductions					
Description	Unit	2006	2007	2008	TOTAL
Electricity Supply	MWh	0.000	53,213.702	3,768.996	56,982.698
Baseline Emission Factor	tCO_2e/MWh	-	0.2628	0.2628	-
Emission Reductions	**tCO_2e**	**0.000**	**13,984.561**	**990.492**	**14,975.053**

In accordance with the formula in section 2, the JMBCP has in the monitoring periods generated:

ERs = 56,982.698 MWh * 0.2628 tCO_2e/MWh = 14,975.053 tCO_2e
ERs = 14,975 tCO_2e

5. Additional information

5.1. Electricity discounted in April 2008

The first crediting period of JMBCP is between 23/04/2001 and 22/04/2008. For contractual and accounting reasons, the energy invoices are emitted monthly. In April, the last month of the first crediting period, just the electricity dispatched to the grid between 01/04/2008 to 22/04/2008 is claimed to emission reduction. Thus, it was discounted the electricity dispatched to the grid between 23/04/2008 and 30/04/2008.

Days in April	Electricity dispatched in April 2008
1	17.277
2	19.539
3	63.960
4	21.478
5	0.000
6	0.000
7	0.000
8	79.552
9	260.758
10	188.549
11	245.386
12	313.307
13	354.758
14	329.578
15	193.578
16	9.891
17	230.248
18	248.620
19	345.511
20	296.589
21	274.797
22	275.620
23	316.449
24	280.044
25	314.031
26	300.850
27	254.399
28	102.788
29	191.665
30	90.938
TOTAL	5,620.160

The amount of electricity generated between 23/04/2008 and 30/04/2008 was discounted from the April's energy invoice, according to the table below:

Description	Unit	Year From 01/01/2008 To 30/04/2008	TOTAL
Metered Electricity Supply	MWh	5,620.160	
Electricity discounted	MWh	1,851.164	
TOTAL		3,768.996	3,768.996

5.2. The project shall not increase the bagasse production in the facility

Jalles Machado produces internal report with accumulated data for each year. The graph and table below show that sugar cane crushing and bagasse production are correlated variables. The correlation factor is 0.987. There was the increase in the bagasse production due to only the increase in the sugar cane crushed.

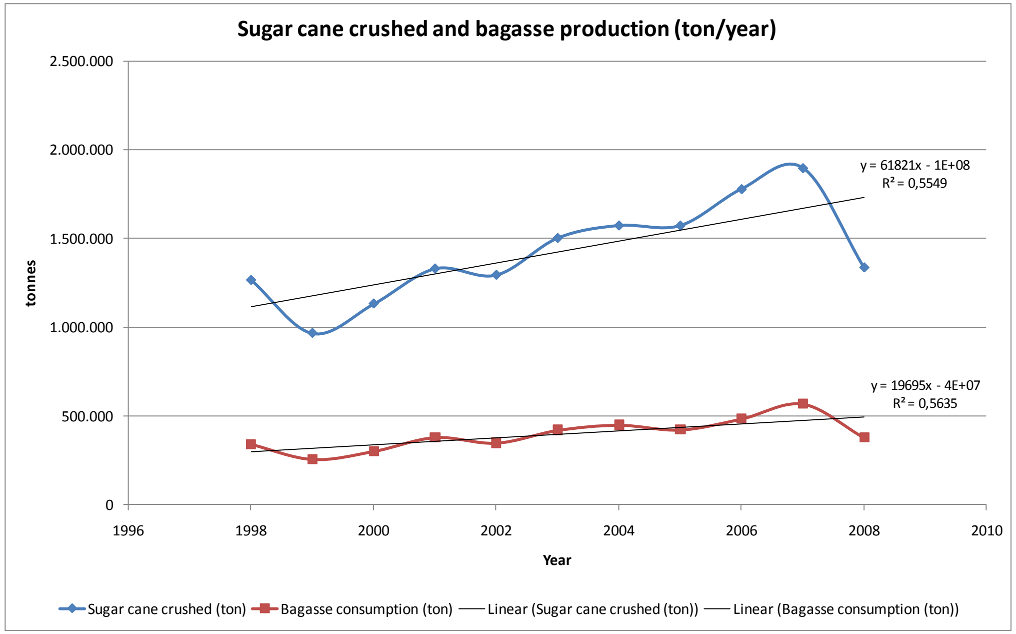


Figure 1 - Sugar cane crushed and bagasse production

Year	Before the project activity			After the project activity							
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sugar cane crushed (ton)	1,267,438	967,236	1,133,747	1,332,158	1,296,575	1,505,126	1,576,053	1,575,562	1,781,961	1,900,849	1,338,413
Bagasse consumption (ton)	343,017	258,323	303,665	381,624	350,341	421,964	451,191	424,383	486,078	569,978	380,258

Therefore, the project activity did not increase the bagasse production.

5.3. The bagasse at the project facility should not be stored for more than one year

The bagasse produced in the facility is used to generate steam and electricity. A small amount of bagasse is stored from one crop season to another, to start up the boilers in the beginning of a new crop season.

Year	Before the project activity			After the project activity							
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sugar cane crushed (ton)	1,267,438	967,236	1,133,747	1,332,158	1,296,575	1,505,126	1,576,053	1,575,562	1,781,961	1,900,849	1,338,413
Bagasse production (ton)	353,017	268,323	313,665	391,624	360,341	431,964	461,191	434,383	496,078	579,978	390,258
Bagasse consumption (ton)	343,017	258,323	303,665	381,624	350,341	421,964	451,191	424,383	486,078	569,978	380,258
Bagasse stored to next crop season (ton)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Crop season (days)	207	154	182	222	190	190	180	180	227	212	135
Bagasse consumption per day	1,657.09	1,677.42	1,668.49	1,719.03	1,843.90	2,220.86	2,506.62	2,357.68	2,141.31	2,688.57	2,816.73
Days using bagasse from previous year	6.03	5.96	5.99	5.82	5.42	4.50	3.99	4.24	4.67	3.72	3.55

According to the table above, 10,000 tonnes of bagasse are stored per year for the next crop season for boiler start up. This amount is enough only for approximately 5 days of operation.