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# VERIFICATION / CERTIFICATION REPORT

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## “LAGES METHANE AVOIDANCE PROJECT” IN BRAZIL

UNFCCC REGISTRATION REF. No. 0268

VERIFICATION PERIOD:  
1 JUNE 2006 TO 31 MAY 2007

REPORT N°.2007-1084

REVISION No. 01

DET NORSKE VERITAS



## VERIFICATION / CERTIFICATION REPORT

|  |   |
|--|---|
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| Approved by:<br>Einar Telnes<br>Director | Organisational unit:<br>DNV Certification, International<br>Climate Change Services |
| Client:<br>Lages Bioenergética Ltda      | Client ref.:<br>Gabriel Mann dos Santos   |

DET NORSKE VERITAS  
DNV CERTIFICATION AS

Veritasvegen 1  
N-1322 Høvik  
Norway  
Tel: +47 6757 9900  
Fax: +47 6757 9911  
<http://www.dnv.com>

### Summary:

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions of the "Lages Methane Avoidance Project" in Brazil (UNFCCC Registration Ref. No. 0268) for the period 1 June 2006 to 31 May 2007.

In our opinion, the GHG emission reductions reported for the project in the monitoring report of 26 June 2007 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS III.E Version 07 and the monitoring plan and formulae given in the Project Design Document of 21 September 2005.

As requested by the Executive Board (EB34 report, paragraph 43g of 14 September 2007), the verification report of 10 July 2007 was modified to incorporate the additional information submitted to the EB during the request for review process.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the "Lages Methane Avoidance Project" in Brazil during the period from 1 June 2006 to 31 May 2007 amount to 274 958 tonnes of CO<sub>2</sub> equivalent.

|  |                 |                               |  |
|--|-----------------|-------------------------------|--|
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| Report title:<br>“Lages Methane Avoidance Project” in Brazil                 |                 |                               |  |
| Work carried out by:<br>Felipe Lacerda Antunes, Luis Filipe Aboim<br>Tavares |                 |                               |  |
| Work verified by:<br>Einar Telnes  |                 |                               |  |
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***Abbreviations***

|                   |   |
|-------------------|---|
| CAR               | Corrective Action Request   |
| CDM               | Clean Development Mechanism   |
| CEF               | Carbon Emission Factor  |
| CER               | Certified Emission Reduction(s)   |
| CH <sub>4</sub>   | Methane   |
| CO <sub>2</sub>   | Carbon dioxide  |
| CO <sub>2</sub> e | Carbon dioxide equivalent   |
| DNV               | Det Norske Veritas  |
| DNA               | Designated National Authority   |
| ERU               | Emission Reduction Units(s)   |
| FAR               | Forward Action Request  |
| GHG               | Greenhouse gas(es)  |
| GWP               | Global Warming Potential  |
| INMETRO           | Instituto Nacional de Metrologia, Normalização e Qualidade Industrial<br>(Metrology National Institute) |
| IPCC              | Intergovernmental Panel on Climate Change   |
| MP                | Monitoring Plan   |
| N <sub>2</sub> O  | Nitrous oxide   |
| NGO               | Non-governmental Organisation   |
| ODA               | Official Development Assistance   |
| PDD               | Project Design Document   |
| UNFCCC            | United Nations Framework Convention for Climate Change  |



## 1 INTRODUCTION

Lages Bioenergética Ltda has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification and certification of emission reductions generated by the “Lages Methane Avoidance Project” and reported for the period 1 June 2006 to 31 May 2007. This report contains the findings from the verification and a certification statement for the certified emission reductions.

### 1.1 Objective

Verification is the periodic independent review and *ex post* determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined verification period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Lages Methane Avoidance Project” for the period 1 June 2006 to 31 May 2007.

### 1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a high level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that the reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

The verification team has, based on the recommendations in the Validation and Verification Manual /11/, and employed a risk-based approach, focusing on the identification of significant reporting risks and verifying the mitigation measures for these.

### 1.3 “Lages Methane Avoidance Project”

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 project is not claiming any emission reductions from the electricity grid displacement.

This electricity is supplied to the local distribution company, and the thermal energy from the cogeneration is supplied to industrial clients in the vicinity of the projects. Only emission reductions for the avoidance of methane emissions are claimed by the project.



According the Baseline of “Lages Methane Avoidance Project” the main supplier of waste wood biomass is the neighbour wood industries Battistella (38%) and Sofia (16%), and other distant waste suppliers on spot market (46%). In 2007, after a huge crisis, the quantity of wood processed by Sofia decreased significantly. In this situation, the two major suppliers became Battistella and Multiform, the latest considered as part of the spot market. Although the production of waste wood from Battistella and Sophia has decreased, there has been an increase in the consumption of wood waste from the spot market, resulting in an increase in the total quantity of wood processed.

Some particularities were assumed in the validated PDD. The Battistella source has a large passive amount of wood waste biomass, which reaches more than 5 meter deep, and according Table 6.2 Reference Manual of 1996 IPCC Revised Guidelines the MCF here applies a value of 0.8. This practice is likely to continue. For the waste wood biomass from Sofia and the spot market, the MCF was considered as the default value of 0.4.

The amount of wood waste biomass received is measured through the purchase receipts and checked against the calibrated truck scale at the entrance of the Tractebel-Lages facilities. The carbon emission reductions are calculated through the dynamic scale at the entrance of the boiler of Tractebel-Lages. Due to the above described conditions related to the different MCF for waste wood biomass from Battistella, the amount of carbon emission reduction due to Battistella is calculated proportionally, considering the percentage of waste wood biomass from Battistella receipts.

Another particularity was that Battistella and Sofia used on own process steam generators using waste wood biomass, without any electricity generation prior to the implementation of the “Lages Methane Avoidance Project”. Due to this, the baseline considered a discount 32 640 ton CO<sub>2</sub>/year for Battistella and 14 400 ton CO<sub>2</sub>/year for Sofia. Also, the baseline considered the spontaneous combustion of waste wood biomass on the Battistella pile, due to internal oxidation reactions, and 1% is discounted from the amount of waste wood biomass available to use as fuel in the boiler. All of the above considerations evidence the conservativeness of the project and is adequately considered in the monitoring plan and report.

## 2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These reductions were assessed for the methane avoidance of wood waste biomass, and included:

- i) Lages Monitoring Plan Workbook of 2006 and 2007 with the amount of wood waste biomass purchased and consumed in the boiler, including the distance average of waste wood biomass transport, distance of ash transport to the disposal site and the consumption of diesel oil on internal transport of waste wood biomass;
- ii) Relation of biomass receipts for biomass bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on the spot market from June 2006 to May 2007, and cross check of a sample of 2% of these receipts;
- iii) Monthly report of waste wood biomass consumed as fuel in the boiler/turbo generator set from November 2004 to May 2006;

**Verification team**

|                        |            |  |
|------------------------|------------|--|
| Felipe Lacerda Antunes | DNV Brazil | Team Leader                              |
| Luis Filipe Tavares    | DNV Brazil | CDM Verifier, waste expert               |
| Einar Telnes           | DNV Norway | Technical reviewer, Energy Sector Expert |

**Duration of verification**

|                       |                         |
|-----------------------|-------------------------|
| Preparations:         | 22 June 2007            |
| On-site verification: | 26 – 27 June 2007       |
| Reporting:            | From 02 to 06 July 2007 |

**2.1 Review of Documentation**

The monitoring report of 26 June 2007 /1/ for the period 1 June 2006 to 31 May 2007 was assessed with the follow support documentation: a) Lages Monitoring Plan Workbook of 2006 and 2007 /7/, b) Relation of biomass receipts bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on spot market from June 2006 to May 2007 /8/, c) Monthly report of consumed as fuel on boiler/turbo generator set from June 2006 to May 2007 /9/.

In addition, the project's Project Design Document (PDD) /3/, in particular the monitoring plan contained in the PDD, the Det Norske Veritas Certification Ltd. – DNV Validation Report 2005-0935 Rev 3 of 14 February 2006 /4/ and the Det Norske Veritas Certification Ltd. – DNV: Verification Report 2006-1233 Rev 1 of 05 August 2006 /5/ were assessed.

As requested by the Executive Board (EB34 report, paragraph 43g of 14 September 2007) the verification report of 10 July 2007 was modified to incorporate the additional information submitted to the EB during the request for review process, i.e.:

- The assessment on the project boundary changes due to the additional wood suppliers and the verification that the new biomass residues would be left to decay in the absence of project activity.

The monitoring report of 18 June 2007 /2/ has been made publicly available on the CDM website on 20 June 2007.

**2.2 Site Visit**

On 26 - 27 June 2007, DNV carried out a site visit at Lages Bioenergética Ltda in Lages municipality, Santa Catarina State. During this visit, DNV verified that the actual implementation of the project was as described in the PDD. This included in particular the verification of the effectiveness of the biomass consumption to feed the turbo generation facility.

The verification of reported data was carried out by means of:

- Checking report of Lages Monitoring Plan Workbook of 2006 and 2007 with the amount of wood waste biomass purchased and consumed in the boiler, including the distance average of waste wood biomass transport, and the consumption of diesel oil on internal transport of waste wood biomass, and transport of ash to landfill of Jorge Lacerda Thermoelectric Power Plant on Capivari de Baixo municipality.
- Checking the relation of biomass receipts bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on spot market from June 2006 to May 2007. It was



- sampled to verify the compliance with the commercial legislation. The scale used to weight the trucks and biomass from third mills is calibrated by INMETRO.
- Checking the monthly report of waste wood biomass consumed as fuel on boiler/turbo generator set from June 2006 to May 2007;
  - Confirming the aggregation of monthly reports issued by Lages Bioenergética Ltda;
  - Verifying the effectiveness of the data quality assurance and control.

## 2.3 Reporting of Findings

The verification was able to verify that the GHG emission reductions reported for the project in the monitoring report of 26 June 2007 are fairly stated. However, one corrective action request (CAR) was identified related to the use of emission factors. The new version of the CDM Monitoring Report /1/ resolved this CAR.

## 3 VERIFICATION FINDING

This section summarises the findings from the verification of the emission reductions reported for the “Lages Methane Avoidance Project” in Brazil for the period 1 June 2006 to 31 May 2007. The findings of the verification are documented in more detail in the verification checklist given in Appendix A.

### 3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

No previous CAR or FAR were identified with regards to remaining issues from the first verification of “Lages Methane Avoidance Project”.

### 3.2 Project Implementation

The project was implemented as described on PDD and the plant is composed by a boiler AZ 200 MAX manufactured by Dedini with capacity of 120 ton/h steam, fed with waste wood biomass, and a generator manufactured by Alston Power Brasil Ltda, Model SGHW 1250 C4 BA with capacity of 28 MW, at a nominal tension of 13.8 kV. The boiler has installed a “washing gases” system at the stack, which remove the suspended particulates. From these effluents the ash sludge produced is sent to the landfill of Jorge Lacerda Thermoelectric Power Plant on Capivari de Baixo municipality, at 680 km way. The leakage emissions from ash transportation is considered in Monitoring Plan and subtracted from the CERs.

The boilers and turbo generator control system is automated and assure continuous operation.

The main source of biomass is comprised by biomass bought from third mills or landfills, transported by trucks. This truck transportation represents the project leakage and was considered as 0.0016861 ton CO<sub>2</sub>/ton biomass transported, considering the weighted average round trip distance to biomass supply sites of 21.8 km and corresponding to 1.55 km/ton waste wood biomass. The major suppliers (Multiform and Battistella) are neighbours of “Lages Methane Avoidance Project”, and the distances were verified through truck transport receipts. DNV was able to assess a sample of biomass receipts for biomass bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on the spot market from June 2006 to May 2007. The sample included some new suppliers. The project boundary changes were



assessed by checking a sample of the biomass receipts and calculating the distance from the town where the wood is supplied to the project site. Since all new suppliers are located in Santa Catarina State, it is demonstrated that in the absence of the project activity, that amount of wood waste would be left to decay. The State law (Decree n° 14,250 of June 5th, 1981) bans open air burning of wood waste, leading to piled up wood waste if it is not used for other purposes.

### 3.3 Completeness of Monitoring

All indicators stated in the validated monitoring plan based on the monitoring methodology and AMS III.E v-7 are monitored and reported.

### 3.4 Accuracy of Emission Reduction Calculations

CO<sub>2</sub> emissions reductions in the project and the baseline scenario were correctly calculated using the amount of methane avoidance generated by wood waste biomass available (considering the reductions mentioned in section 1.3) to controlled burning, for which the emission factor of 0.1147 ton CH<sub>4</sub>/ton biomass for Battistella and 0.0573 ton CH<sub>4</sub>/ton biomass for Sofia and spot market was calculated considering default IPCC factors. Since the wood waste amount consumed from Sofia was lower than the wood waste amount that previously was consumed in Sofia's old boilers, the wood waste amount from Sofia effectively treated under the project is considered as zero. The wood waste amount consumed from Sofia was reduced mainly due to the decrease in Sofia activities in the period.

The project emission are calculated considering the residual methane and N<sub>2</sub>O from wood waste biomass burning is also calculated through the default IPCC factors according the AMS III.E version 7 and includes the internal transportation of wood waste biomass and the total of leakage from external wood waste biomass transportation and ash transportation.

The Monitoring Plan /6/ states that the emissions always will be determined using the most recent values available. However, the emission factors for trucks used (VEF\_CO<sub>2</sub>, VEF\_CH<sub>4</sub>, VEF\_N<sub>2</sub>O) are from IPCC 1996 Guidelines (CAR 1). The new version of the CDM Monitoring Report /1/ resolved this CAR, justifying that VEF\_CO<sub>2</sub> is a parameter not available in IPCC 2006 Guidelines, and the parameters VEF\_CH<sub>4</sub> and VEF\_N<sub>2</sub>O are more conservatives in the IPCC 1996 Guidelines than in the IPCC 2006 Guidelines.

The total project emissions were 3 078 ton CO<sub>2</sub> and 2 382 ton CO<sub>2</sub> for the years of 2006 and 2007 respectively, evidencing the compliance with the requirement of small scale CDM project criteria.

### 3.5 Quality of Evidence to Determine Emission Reductions

Lages Bioenergética Ltda has an automated control system where the monitoring system operation includes the wood waste biomass consumed. At 00:00 hrs every day the Tractebel-Lages turbo generator operator manually reads the record of the totalized accumulated wood waste biomass and is included on management report to be analysed by the operation manager.

These figures are inserted in a daily report, and consolidated in a monthly report. As the feed scale record is cumulative, the sum of all wood waste biomass since start up is the same as the actual reading.



The accounting methane avoidance from biomass is constituted by the receipts of waste bought from third mills, registered on Electronic Planning Production Control program.

### **3.6 Management System and Quality Assurance**

Data is collected according to well defined data collection procedures:

- i) The biomass bought from third suppliers is registered in the Electronic Planning Production Control System, and has good traceability and consistency.
- ii) The biomass consumed on boiler is recorded in the dynamic scale feeding system of the boiler and record cumulatively Electronic Planning Production Control System.
- iii) Data is processed by the electronic datasheet in order to calculate the emission reductions and to produce the monitoring report.
- iv) Lages Bioenergética Ltda has a Quality Management System Certified as ISO 9001:2000 and a Environmental Management System Certified as ISO 14001:2004;
- v) The monitoring report is carried out by the CDM Support Engineer and is based on reviewed records from the Electronic Planning Production Control System



#### 4 VERIFICATION STATEMENT

*Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions of the “Lages Methane Avoidance Project” (UNFCCC Registration Ref. No. 0268) reported for the period 1 June 2006 to 31 May 2007.*

*Lages Bioenergética Ltda is responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.*

*It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project. DNV does not express any opinion on the selected baseline scenario or on the validated and registered PDD.*

*DNV conducted the verification on the basis of the monitoring methodology AMS III.E Version 07 (version 07), the monitoring plan included in the PDD of the project and the monitoring report of 26 June 2007. The verification included i) checking whether the provisions of the monitoring methodology AMS III.E Version 07 and the monitoring plan in the PDD were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.*

*DNV’s verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.*

*In DNV’s opinion, the GHG emissions reduction for the “Lages Methane Avoidance Project” as reported in the Monitoring Report issued on 26 June 2007 are fairly stated.*

*The GHG emission reductions were correctly calculated on the basis of the approved monitoring methodology of AMS III.E Version 07 and the monitoring plan contained in the validated Project Design Document for the project (21 September 2005).*

*Det Norske Veritas Certification AS is able to certify that the emission reductions from the “Lages Methane Avoidance Project” during the period 1 June 2006 to 31 May 2007 amount to 274 958 tonnes of CO<sub>2</sub> equivalent.*

Oslo, 10 July 2007

Felipe Lacerda Antunes

CDM Auditor

DNV Rio de Janeiro, Brazil

Det Norske Veritas Certification AS

Einar Telnes

Director

International Climate Change Services

Det Norske Veritas Certification AS



## 5 REFERENCES

*Documents provided by the Project Participants that relate directly to the project.*

- /1/ Lages Bioenergética Ltda: *Monitoring Report – “Lages Methane Avoidance Project”*: 1 June 2006 to 31 May 2007, version of 26 June 2007.
- /2/ Lages Bioenergética Ltda: *Monitoring Report – “Lages Methane Avoidance Project”*: 1 June 2006 to 31 May 2007, version of 18 June 2007.
- /3/ Lages Bioenergética Ltda: *Project Design Document of the “Lages Methane Avoidance Project”*, version 2 of 21 September 2005.
- /4/ Det Norske Veritas Certification Ltd. – DNV: *Validation Report – “Lages Methane Avoidance Project”*. Report 2005-0935 Rev 3 of 14 February 2006
- /5/ Det Norske Veritas Certification Ltd. – DNV: *Verification Report – “Lages Methane Avoidance Project”*. Report 2006-1233 Rev 1 of 05 August 2006
- /6/ Lages Bioenergética Ltda: *Monitoring Plan of the “Lages Methane Avoidance Project”*, version 2 of 21 September 2005.
- /7/ Lages Monitoring Plan Workbook of 2006 and 2007 with the amount of wood waste biomass purchased and consumed on the boiler, including the distance average of waste wood biomass transport, and the consumption of diesel oil on internal transport of waste wood biomass and transport of ash to the disposal site in Capivari de Baixo municipality.
- /8/ Relation of biomass receipts bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on spot market from June 2006 to May 2007
- /9/ Monthly report of waste wood biomass consumed as fuel on boiler/turbo generator set from November June 2006 to May 2007;
- /10/ Toledo Scales calibration certificate INMETRO # 578127 e 578128 issued on 22/06/07

*Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.*

- /11/ International Emission Trading Association (IETA) & World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /12/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities, *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*, Methodology AMS III.E “Avoidance of methane production from biomass decay through controlled combustion”, Version 07, 28 November 2005



*Persons interviewed during the initial verification, or persons contributed with other information that are not included in the documents listed above.*

/13/ Gabriel Mann dos Santos – CDM Support Engineer - Tractebel Energia

/14/ Marcio Daian Neves – Lages Operation Manager – Tractebel Energia

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## **APPENDIX A**

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### **VERIFICATION CHECKLIST**

## Verification Checklist

| OBJECTIVE  | MoV* | COMMENTS   | Concl.(incl FARs/CARs) |
|--|------|--|------------------------|
| <b>A. Opening Session</b>  |      |  |                        |
| <b>A.1. Introduction to audits</b>   | DR   | <i>Lages Bioenergética Ltda have commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification and certification of emission reductions generated by the “Lages Methane Avoidance Project” for the period 1 June 2006 to 31 May 2007.</i> | OK                     |
| <b>A.2. Contractors for equipment and installation works</b><br><i>Who has installed the equipment? Who was contracted for planning etc.?</i>  | I,W  | <i>AZ 200 MAX manufactured by Dedini with capacity of 120 ton/h steam, feed with waste wood biomass, and a generator manufactured by Alston Power Brasil Ltda, Model SGHW 1250 C4 BA with capacity of 28 MW, at nominal tension of 13.8 kV</i>                   | OK                     |
| <b>A.3. Actual status of installation works</b><br><i>Project installation should be finished at time of initial verification in so far as the project should be ready to generate emission reductions afterwards.</i> | I,W  | <i>The installation of cogeneration plant was concluded on 23 December 2003 and the project was completely operational from 01 November 2004.</i>  | OK                     |
| <b>B. Implementation of the project</b><br><i>This part is covering the essential checks during the on-site inspection at the project's site, which is indispensably for an initial verification</i>                   |      |  |                        |
| <b>B.1. Physical components</b><br><i>Check the installation of all required facilities and equipment as described by the PDD.</i>   | D,I  | <i>AZ 200 MAX manufactured by Dedini with capacity of 120 ton/h steam, feed with waste wood biomass, and a generator manufactured by Alston Power Brasil Ltda, Model SGHW 1250 C4 BA with capacity of 28 MW, at nominal tension of 13.8 kV</i>                   | OK                     |
| <b>B.2. Project boundaries</b>   | I,W  | <i>The project comprises a new 28MW biomass electricity cogeneration plant,</i>  | OK                     |

\* MoV: Means of Verification - Interview (I), Document review (DR), Witnessing of actual practise (W), Inspection (Ins)

Page 1

| OBJECTIVE  | MoV*   | COMMENTS  | Concl.(incl FARs/CARs) |
|--|--------|---|------------------------|
| <p><i>Check whether the project boundaries are still in compliance with the ones indicated by the PDD.</i></p>   |        | <p><i>using waste wood biomass from pinus waste that on normal conditions is dumped in opened air and left to decay, and thus avoiding the release of methane to the atmosphere.</i></p> <p><i>The main source of biomass is composed by biomass bought from third mills or landfills, transported by trucks, considering the weight average round trip distance to biomass supply sites of 21.8 km once the major suppliers (Battistella and Multiform) are neighbours.</i></p> <p><i>This electricity is supplied to the local distribution company, and the thermal energy from the cogeneration is supplied to industrial clients in the vicinity of the projects. Only emission reductions for the avoidance of methane emissions are claimed by the project.</i></p>  |                        |
| <p><b>B.3. Monitoring and metering systems</b></p> <p><i>Check whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.</i></p> | DR,I,W | <p><i>According the Baseline of “Lages Methane Avoidance Project” the main supplier of waste wood biomass is the neighbour wood industries Battistella (38%) and Sofia (16%), and others distant suppliers on spot market (46%). In 2007, after a huge crisis, the quantity of wood processed by Sofia decreased a lot. In this situation, the two major suppliers became Battistella and Multiform, the latest considered as part of the spot market. Although the production of waste wood from Battistella and Sophia has decreased, there had been an increase in the consumption of wood waste from the spot market, resulting in an increase in the total quantity of wood processed.</i></p> <p><i>Some particularity was assumed and validated on PDD. The Battistella has a large passive of wood waste biomass, which reach more than 5 meter deep, and according Table 6.2 Reference Manual of 1996 IPCC Revised Guidelines the MCF was consider with value of 0.8 and will likely continue with this practice. For the waste wood biomass for Sofia and spot market, the MCF was considered the default value of 0.4.</i></p> <p><i>The amount of wood waste biomass received is measured through the bought receipts and checked with calibrated truck scale on entrance of Tractebel-Lages facilities. The carbon emission reductions are calculated through the dynamic scale on entrance of boiler of Tractebel-Lages. Because the condition of different MCF for Battistella waste wood biomass, the amount of carbon emission reduction due Battistella is calculated proportional,</i></p> | OK                     |

\* MoV: Means of Verification - Interview (I), Document review (DR), Witnessing of actual practise (W), Inspection (Ins)

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| OBJECTIVE   | MoV*  | COMMENTS   | Concl.(incl FARs/CARs) |
|---|-------|--|------------------------|
|   |       | <p>considering the percentage of waste wood biomass Battistella receipts.</p> <p>Another particularity was that Battistella and Sofia used on own process steam generators using waste wood biomass, without electricity generation before the implementation of the “Lages Methane Avoidance Project”. Due this, the baseline consider discount 32 640 ton CO<sub>2</sub>/year for Battistella and 14 400 ton CO<sub>2</sub>/year for Sofia. Also, the baseline consider the spontaneous burn of waste wood biomass on the Battistella pile, due oxidation internal reaction, the amount of 1% is discounted from the amount of waste wood biomass available to use as fuel on boiler. All this consideration evidences the conservativeness of the project and adequately considered on monitoring plan and report.</p>  |                        |
| <p><b>B.4. Data uncertainty</b></p> <p>How will data uncertainty be determined for later calculations of emission reductions? Is this in compliance with monitoring and metering equipment?</p> | DR, W | <p>CO<sub>2</sub> emissions reductions in the project and the baseline scenario were correctly calculated using the amount of methane avoidance promoted by wood waste biomass available (considering the reduction mentioned on section 1.3) to controlled burning, for which an emission factor of 0.1147 ton CH<sub>4</sub>/ton biomass for Battistella and 0.0573 ton CH<sub>4</sub>/ton biomass for Sofia and spot market was calculated considering the default IPCC factors.</p> <p>All waste wood biomass received is weighted with calibrated scales, according commercial law.</p> <p>The project emission, considering the residual of Methane and N<sub>2</sub>O from waste wood biomass burning also calculated through the default IPCC factors according the AMS III.E Version 7 and including the internal transportation of waste wood biomass and the total of leakage consisting on external waste wood biomass transportation and ash transportation. The total was 3 078 ton CO<sub>2</sub> and 2 382 ton CO<sub>2</sub> for the years of 2006 and 2007 respectively, evidencing the compliance with the requirement of small scale criteria.</p> | OK                     |
| <p><b>B.5. Calibration and quality assurance</b></p> <p>Check how monitoring and metering systems are subject to calibration and quality assurance routines</p>                                 | DR, W | <p>The scales used to weigh trucks and biomass is calibrated by INMETRO.</p>   | OK                     |

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| OBJECTIVE  | MoV*  | COMMENTS   | Concl.(incl FARs/CARs) |
|--|-------|--|------------------------|
| a) with installation<br>b) during future operation   |       |  |                        |
| <b>B.6. Data acquisition and data processing systems</b><br><i>Check the eligibility of used systems.</i>  | DR, W | <p>Lages Bioenergética Ltda has an automated control system where the operation including the waste wood biomass consumed on monitoring system. At 00:00 hrs every day the Tractebel-Lages turbo generator operator manually reads the record of the totalized accumulated waste wood biomass and include on management report to be analysed by Operation Manager.</p> <p>These figures are inserted in a daily report, and consolidated on monthly report. As the feed scale record is cumulative, the sum of all waste wood biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of waste bought from third mills, registered on Electronic Planning Production Control program.</p>   | OK                     |
| <b>B.7. Reporting procedures</b><br><i>Check how reports with relevance for the later determination of emission reductions will be generated</i> | DR, W | <p>Data is collected according to well defined data collection procedures:</p> <ul style="list-style-type: none"> <li>i) The biomass bought from third suppliers is registered on Electronic Planning Production Control System, and has good traceability and consistency;</li> <li>ii) The biomass consumed on boiler is recorded on dynamic scale on feeding system of the boiler and record cumulatively Electronic Planning Production Control System;</li> <li>iii) Data is processed by the electronic datasheet to calculate emission reductions and to produce the monitoring report;</li> <li>iv) Lages Bioenergética Ltda has a Quality Management System Certified as ISO 9001:2000 and a Environmental Management System Certified as ISO 14001:2004;</li> <li>v) The monitoring report is carried out by CDM Support Engineer based on reviewed records from the Electronic Planning Production Control System.</li> </ul> | OK                     |
| <b>B.8. Documented instructions</b><br><i>Check whether the personnel performing tasks</i>   | DR, W | <p>Lages Bioenergética Ltda has a Quality Management System Certified as ISO 9001:00 with respective procedures for acquire storage and recovery</p>   | OK                     |

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| OBJECTIVE   | MoV*  | COMMENTS  | Concl.(incl FARs/CARs) |
|---|-------|---|------------------------|
| <i>with sensitivity for the monitoring of emission reductions have access and knowledge of documented instructions, forming a part of the project's management system.</i>  |       | <i>the records of waste wood biomass and other. The records are stored in the mainframe of Tractebel at Florianópolis.</i>  |                        |
| <b>B.9. Qualification and training</b><br><i>Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions has the appropriate competences, capabilities and qualifications to ensure the required data quality.</i>                | DR, W | <i>The operators of the boiler have an obliged boiler operator course (NR13 Work Legislation) and have being trained to operate the system control by the manufacturer. The readings of the electricity generation are included on the daily report.</i><br><br><i>The operators of Planning Production Control System have being trained to produce monthly reports for the biomass process.</i> | OK                     |
| <b>B.10. Responsibilities</b><br><i>Check whether all tasks required to gather data and prepare a monitoring report with the necessary quality have been allocated to responsible employees.</i>  | DR, I | <i>The responsibilities with CDM are distributed trough the Boiler Operator/Supervisor, Lages Operation Manager, Plant Manager and CDM Support Engineer.</i>  | OK                     |
| <b>B.11. Troubleshooting procedures</b><br><i>Check whether there are possibilities of redundant data monitoring in case of having problems with the used monitoring equipment. Such procedures may reduce risks for the buyers of emission reductions (e.g. the Client)</i>  | DR, W | <i>In case of problems with the dynamic scale the biomass consumption on the boiler in a certain period could be monitored considering the initial biomass inventory plus the biomass amount purchased in that period minus the final biomass inventory.</i>  | OK                     |
| <b>C. Internal Data</b><br><i>Identifying the internal GHG data sources and ways in which the data have been collected, calculated, processed, aggregated and stored should be part of initial verification to assess accuracy and reliability of the internal GHG data..</i> |       |   |                        |
| <b>C.1. Type and sources of internal data</b>   | DR, W | <i>See B.3</i>  | OK                     |

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| OBJECTIVE   | MoV*  | COMMENTS  | Concl.(incl FARs/CARs) |
|---|-------|---|------------------------|
| <i>Acquire information on type and source of internal GHG data, which is used in calculations of emission reductions. E.g.” continuous direct measurements”, “site-specific correlations”, “periodic direct measurements”, “use of models” and/or “use of default emissions factors”.</i>   |       |   |                        |
| <b>C.2. Data collection</b><br><i>How is data collected and processed? What are the means of quantifying emissions from the different data sources?</i>   | DR, W | <i>See B.3</i>  | OK                     |
| <b>C.3. Quality assurance</b><br><i>Does internal data collection underlie sufficient quality assurance routines?</i>   | DR,I  | <i>See B.7 and B.10</i>   | OK                     |
| <b>C.4. Significance and reporting risks</b><br><i>Assess the significance and reporting risks related to the different internal data sources. Potential reporting risks may be related to the calculation methods, accuracy of data sources and data collection and/or the information systems from which data is obtained. The significance of and risks associated with the data source indicate the level of verification effort required at a later stage.</i> | W,I   | <i>No risk were verified, once it consider all assumptions identified on PDD, and the records and figures acquire system assure consistent Monitoring Report.</i> | OK                     |
| <b>D. External Data</b><br><i>Especially for data of baseline emissions there might be the necessity to include external data sources. The access to such data and a proof of data quality should be part of initial verification. If it is deemed to be necessary, an entity delivering such data should be audited.</i>   |       |   |                        |
| <b>D.1. Type and sources of external</b>  | DR    | <i>The factors to calculate the methane avoidance are established by IPCC and other official sources.</i>   | <del>CAR 1</del>       |

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| OBJECTIVE   | MoV* | COMMENTS   | Concl.(incl FARs/CARs) |
|---|------|--|------------------------|
| <b>data</b><br><i>Acquire information on type and source of external data, which is used in calculations of emission reductions</i>   |      | <i>The Monitoring Plan states that the emissions will be determined using always the most recent values available. However, the emission factors for trucks used (VEF_CO2, VEF_CH4, VEF_N2O) are from IPCC 1996 Guidelines (CAR 1). The new version of the CDM Monitoring Report /1/ resolved this CAR, justifying that VEF_CO2 is a parameter not available in IPCC 2006 Guidelines, and the parameters VEF_CH4 and VEF_N2O are more conservative in IPCC 1996 Guidelines than in IPCC 2006 Guidelines.</i> |                        |
| <b>D.2. Access to external data</b><br><i>How is data transferred? How can reproducibility of data set be ensured?</i>  | DR   | <i>See D.1</i>   | OK                     |
| <b>D.3. Quality assurance</b><br><i>Does external data underlie any quality assurance routines?</i>   | DR   | <i>See B.10</i>  | OK                     |
| <b>D.4. Emergency procedures</b><br><i>Are there any procedures which will be applicable if there is no access to relevant external data?</i>   | DR   | <i>Not applicable.</i>   | --                     |
| <b>E. Environmental and Social Indicators</b><br><i>A Monitoring Plan may comprise environmental and/or social indicators which could be necessary to monitor for the success of the project activity.</i>  |      |  |                        |
| <b>E.1. Implementation of measures</b><br><i>A project activity may demand for the installation of measures (e.g. filtering systems or compensation areas), which are exceeding the local legal requirements. A check of the implementation or realization of such measures should be part of the initial verification.</i> | DR   | <i>Not applicable.</i>   | --                     |

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| OBJECTIVE   | MoV* | COMMENTS        | Concl.(incl FARs/CARs) |
|---|------|-----------------|------------------------|
| <b>F. Management and Operational System</b><br><i>In order to ensure a successful operation of a Client project and the credibility and verifiability of the ERs achieved, the project must have a well defined management and operational system.</i>                                    |      |                 |                        |
| <b>F.1. Documentation</b><br><i>The system should be documented by manuals and instructions for all procedures and routines with relevance to the quality of emission reductions. The accessibility of such documentations to persons working on the project has to be secured.</i>       | DR,I | See B.7         | OK                     |
| <b>F.2. Qualification and training</b><br><i>The system should describe the requirements on qualification and the need of training programs for all persons working on the emission reduction project. Performed training programs and certificates should be archived by the system.</i> | DR,I | See B.9         | OK                     |
| <b>F.3. Allocation of responsibilities</b><br><i>The allocation of responsibilities should be documented in written manner.</i>   | DR,I | See B.10        | OK                     |
| <b>F.4. Emergency procedures</b><br><i>The system should contain procedures which provide emergency concepts in case of unexpected problems with data access and/or data quality.</i>   | DR   | Not applicable. | --                     |
| <b>F.5. Data archiving</b><br><i>The system should provide routines for the archiving of all data which is required for verifying the project's performance in the context</i>  | DR,I | See B.8         | OK                     |

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| OBJECTIVE   | MoV* | COMMENTS  | Concl.(incl FARs/CARs) |
|---|------|---|------------------------|
| <i>of consecutive verifications.</i>  |      |   |                        |
| <b>F.6. Monitoring report</b><br><i>The system includes procedures for the calculation of emission reductions and the preparation of the monitoring report.</i> | DR,I | <p><i>The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project.</i></p> <p><i>According the Baseline of “Lages Methane Avoidance Project” the main supplier of waste wood biomass is the neighbour wood industries Battistella (38%) and Sofia (16%), and others distant suppliers on spot market (46%).</i></p> <p><i>Some particularity was assumed and validated on PDD. The Battistella has a large passive of wood waste biomass, which reach more than 5 metter deep, and according Table 6.2 Reference Manual of 1996 IPCC Revised Guidelines the MCF was consider with value of 0.8 and will likely continue with this practice. For the waste wood biomass for Sofia and spot market, the MCF was considered the default value of 0.4.</i></p> <p><i>The amount of wood waste biomass received is measured through the bought receipts and checked with calibrated truck scale on entrance of Tractebel-Lages facilities. The carbon emission reductions are calculated through the dynamic scale on entrance of boiler of Tractebel-Lages. Because the condition of different MCF for Battistella waste wood biomass, the amount of carbon emission reduction due Battistella is calculated proportional, considering the percentage of waste wood biomass Battistella receipts.</i></p> <p><i>Another particularity was that Battistella and Sofia used on own process steam generators using waste wood biomass, without electricity generation before the implementation of the “Lages Methane Avoidance Project”. Due this, the baseline consider discount 32 640 ton CO2/year for Battistella and 14 400 ton CO2/year for Sofia. Also, the baseline consider the spontaneous burn of waste wood biomass on the Battistella pile, due oxidation internal reaction, the amount of 1% is discounted from the amount of waste wood biomass available to use as fuel on boiler. All this consideration evidences the conservativeness of the project and adequately considered on monitoring plan and report.</i></p> <p><i>These reductions were assessed for the methane avoidance of wood waste biomass, and included:</i></p> | OK                     |

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|--|------|--|------------------------|
|  |      | <p><i>Lages Monitoring Plan Workbook of 2004, 2005 and 2006 with the amount of wood waste biomass purchased and consumed on the boiler, including the distance average of waste wood biomass transport, distance of ash transport to the disposal site and the consumption of diesel oil on internal transport of waste wood biomass:</i></p> <p><i>Relation of biomass receipts bought by Lages Bioenergética Ltda from Battistella, Sofia and third suppliers on spot market from June 2006 to May 2007;</i></p> <p><i>Monthly report of waste wood biomass consumed as fuel on boiler/turbo generator set from June 2006 to May 2007;</i></p> |                        |
| <p><b>F.7. Internal audits and management review</b></p> <p><i>The system includes internal control procedures, which allow the identification and solution of problems at an early stage.</i></p> | DR,I | See B.8 and B.10   | OK                     |

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