



VERIFICATION / CERTIFICATION REPORT

LAGES METHANE AVOIDANCE PROJECT IN BRAZIL

(UNFCCC Registration Ref. No. 0268)

Monitoring Period:
1 June 2009 to 31 May 2011

REPORT No. 2011-1562

REVISION No. 01

DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

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Summary:

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the “Lages Methane Avoidance Project” in Brazil (UNFCCC Registration Ref. No. 0268) for the period 1 June 2009 to 31 May 2011.

In our opinion, the GHG emission reductions reported for the project in the monitoring report (Version 3) of 22 March 2012 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-III.E (version 7) and the monitoring plan contained in the revised Project Design Document of February 2011.

DNV Climate Change Services AS is able to certify that the emission reductions from the “Lages Methane Avoidance Project” in Brazil during the period 1 June 2009 to 31 May 2011 amount to 443 651 tonnes of CO₂ equivalent.

Report No.: 2011-1562	Indexing terms Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism		Service Area Verification
Report title: Lages Methane Avoidance Project in Brazil			Market Sector
Work carried out by: Felipe Antunes, Juliana Scalon	<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit <input type="checkbox"/> free distribution within DNV after 3 years <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution		Process Industry
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Abbreviations

ANEEL	National Electric Energy Agency
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	DNV Climate Change Services AS
FAR	Forward Action Request
FATMA	Santa Catarina Environmental Agency
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
INMETRO	National Institute of Metrology, Quality and Technology
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
N ₂ O	Nitrous oxide
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Tractebel Energia S.A. has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of the emission reductions reported for the “Lages Methane Avoidance Project” in Brazil (the project) for the period 1 June 2009 to 31 May 2011. 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 monitoring 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 the emission reductions reported for the “Lages Methane Avoidance Project” in Brazil for the period 1 June 2009 to 31 May 2011.

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 reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that 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.

1.3 Description of the project activity

Project Parties:	Brazil (host country), Switzerland, Canada, Finland, France, Germany, Japan, Netherlands, Norway, Sweden, United Kingdom of Great Britain and Northern Ireland
Title of project activity:	“Lages Methane Avoidance Project”
UNFCCC registration No:	0268
Baseline and monitoring methodology	AMS-III.E (version 7)
Project Participants:	Lages Bioenergética Ltda and Tractebel Energia S.A. from Host Party Brazil, Bunge Emission Fund Limited from Switzerland, Government of Canada - Ministry of Foreign Affairs & International Trade from Canada, Government



of Finland - Ministry for Foreign Affairs of Finland; Fortum Corporation from Finland, GDF SUEZ from France, RWE Power AG from Germany, Chubu Electric Power Co., Inc.; Japan International Cooperation Agency (JICA); Kyushu Electric Power Co., Inc.; MIT Carbon Fund Co., Ltd.; Mitsubishi Corporation; Shikoku Electric Power Co., Inc.; Tohoku Electric Power Co., Inc.; The Tokyo Electric Power Co., Inc.; The Chugoku Electric Power Co., Inc., Mitsui & Co. Ltd from Japan, Electrabel N.V.; The Netherlands Ministry of Infrastructure and the Environment (IenM), Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I) from the Netherlands, Norsk Hydro ASA; Government of Norway - Ministry of Foreign Affairs; Statoil ASA from Norway, BP Alternative Energy International Ltd.; Deutsche Bank AG from United Kingdom of Great Britain and Northern Ireland , and Government of Sweden-Swedish Energy Agency from Sweden.

Location of the project activity: The project activity is located in the Lages municipality. Brazilian South region, State of Santa Catarina in Brazil.

Project's crediting period: 1 November 2004 to 31 October 2014

Period verified in this verification: 1 June 2009 to 31 May 2011

The project is in operation since 23 December 2003 by Lages Bioenergética Ltda., a Special Purpose Company fully owned by Tractebel Energia S.A., specially constituted to build, operate and maintain the "Lages Methane Avoidance Project" in Brazil. The project activity avoids methane emissions from anaerobic digestion in stockpiles (biomass decay) through controlled combustion in a cogeneration process, which simultaneously generates electricity and thermal energy (steam). The project activity claims emission reductions from the methane avoidance and not for the electricity or heat generated.

The electricity generated is supplied to the local distribution company and some individual industrial customers. Also, the thermal energy can be supplied to industrial clients in the vicinity of the projects, if the demand exists. During the monitoring period, no thermal energy was supplied to local industrial consumers.

The project during the conceptualization stages envisaged the main suppliers of the wood waste to be the neighboring wood industries of Battistella (38%) and Sofia (16%), and other distant suppliers on open market (46%).

Battistella and Sofia used the wood waste to generate thermal energy in the baseline and this quantity of thermal energy is to be supplied by the project plant. Hence, the baseline emissions consider that 32 640 tonnes/year of wood waste from Battistella and 14 400 tonnes/year of wood waste from Sofia would be combusted also in absence of the project activity. This is the amount that was previously burned by Battistella and Sofia in their old boilers before the Lages Project, as validated in the registered PDD (i.e. if Sofia was operating, 14 400 tonnes would be combusted per year, and this amount would be discounted. If Battistella was operating, 32 640 tonnes would be combusted per year, and this amount would be discounted). The baseline also considers the spontaneous burning of wood waste in piles on the premises of Battistella, (pile has a depth of more than 5 meters) due to internal



oxidation reaction. Hence, 1% of the wood waste supplied by Battistella is considered to be burnt also in absence of the project and discounted from the wood waste consumed in the year. These assumptions were validated and are conservative.

Since 2006, many wood industries that export their production in the Lages region have faced an economic crisis which has obliged them to reduce or even to interrupt their activities /14/. This was the specific case for Sofia and Battistella wood industries, two of the main wood residues suppliers of the Lages Methane Avoidance Project. During the monitoring period 1 June 2009 to 31 May 2011, no biomass was supplied by Sofia or Battistella since both companies closed down its activities respectively in September 2007 and October 2008.

1.4 Methodology for determining emission reductions

This verification is the fifth verification and covers the monitoring period from 1 June 2009 to 31 May 2011. The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. Based on the recommendations of Executive Board's "*Validation and Verification Manual*" version 1.2 /15/ the DNV team has for this assignment decided to check all factors and issues with the same emphasis.

DNV reviewed the project documentation; specifically the monitoring report for the period 1 June 2009 to 31 May 2011 /1/, the revised PDD of February 2011 /18/ and the registered PDD dated 21 September 2005 version 2.

The baseline scenario is methane production by the decay of biomass residues in stockpiles. The emission factors for biomass decaying are monitored in the monitoring plan annually and hence the emission factor was determined *ex-post* as 0.1147 tCH₄/tonne for Battistella, 0.0573 tCH₄/tonne for the Sofia and the spot market. This is lower than the estimated emission factor in the registered PDD (0.1232 and 0.0616 tCH₄/tonne, respectively) and this is due to reduced degradable organic carbon fraction dissimilated into landfill gas and higher degradable organic carbon in wood and wood production in IPCC2006 /31/ compared to IPCC1996 /30/.

The amount of wood waste biomass received is measured through a calibrated truck scale at the entrance of Tractebel-Lages /8/ /9/ facilities and checked with the purchase receipts /4/. The baseline emissions are calculated using the amount of biomass measured by the dynamic scale at the entrance of boiler of Tractebel-Lages /10/.

The project emissions from the project activity include the methane and N₂O emissions from wood waste biomass burning, calculated using formulae provided in the AMS-III.E., version 7 /16/ and default IPCC factors, and emissions due to diesel consumption from internal transportation of wood waste biomass. For the biomass burning, the emission factors used are the CH₄ emission factor (11 kgCH₄/TJ as per specific IPCC default value to wood waste boilers /30/) and N₂O emission factor for biomass and waste combustion (7 kgN₂O/TJ as per specific IPCC default value to wood waste boilers /30/). For internal transportation, the emission factors used are fixed *ex-ante* as per the revised PDD of February 2011.

The emissions due to the transportation of wood biomass from suppliers on the open market to the project plant and ash transportation have been considered as leakages and *ex-ante* emission factors are the same used in the calculation of internal transportation.

Data and information provided in the monitoring report was assessed by DNV by means of:

- Verifying the compliance of actual monitoring at project site with the revised PDD of February 2011 /18/ as well as the monitoring methodology AMS-III.E (version 7) /16/.



- Verification of the calibrations of the entrance truck scale and the feeding treadmill and effectiveness of consumption of biomass /8/-/10/.
- Checking of the list of delivery receipts of biomass bought by Lages Bioenergética Ltda. from Battistella, Sofia and suppliers of biomass on the open market from 1 June 2009 to 31 May 2011 /4/ by sampling;
- Checking of the list of delivery receipts of ashes by Lages Bioenergética Ltda. to ashes disposal sites /5/, from 1 June 2009 to 31 May 2011 by sampling;
- Checking a measurement of a truck in the entrance during the day of site in order to evaluate the quality system of data recording and processing in a certain moment. DNV was able to verify that data recording and quality of management of data is in place;
- Checking of the monthly report from the operational system records of wood waste biomass consumed /6/ as fuel on boiler/turbo generator set from 1 June 2009 to 31 May 2011 against the values stated in the Monitoring Report and Workbooks /1/ /3/;
- Checking of the monthly report from the operational system records of diesel consumed /7/ from 1 June 2009 to 31 May 2011 against the values stated in the Monitoring Report and Workbooks /1/ /3/;
- Interviewing of Marcio Daian Neves /38/, involved in the project to assure that he was aware of the monitoring procedures.

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 include:

- i) Lages emission reduction workbooks of 2009, 2010 and 2011 /3/ with the amount of wood waste biomass purchased and consumed by the boiler /6/, including the average distance of wood waste biomass transport, distance of ash transport to the disposal site and the consumption of diesel oil on internal transport of wood waste biomass /7/;
- ii) List of delivery receipts of biomass bought by Lages Bioenergética Ltda. from Battistella, Sofia and suppliers on the open market from 1 June 2009 to 31 May 2011 /4/;
- iii) Monthly Report of wood waste biomass consumed as fuel on boiler/turbo generator set from 1 June 2009 to 31 May 2011 /6/;
- iv) List of transportation receipts of ashes to disposal sites from 1 June 2009 to 31 May 2011 /5/;
- v) Calibration certificates of scales /8/-/10/.

Verification team

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>
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				Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 13.1 competence
Team leader (Verifier)	Antunes	Felipe	Brazil	✓	✓	✓	✓		✓
Verifier	Scalon	Juliana	Brazil	✓	✓	✓			✓
Technical reviewer	Wong	Simon Yon-Sing	Malaysia					✓	✓

Duration of verification

Monitoring report publication: 18 October 2011.
 Preparations: From 19 October 2011 to 10 November 2011.
 On-site verification: From 16 November 2011 to 17 November 2011
 Reporting, calculation checks and QA/QC: From 17 November 2011 to 2 April 2012.

2.1 Review of documentation

The monitoring reports version 1 of 8 August 2011 and version 3 of 22 March 2012 /1/ corresponding to the emission reductions for the period of 1 June 2009 to 31 May 2011 were assessed with the following support documentation: a) Lages monitoring plan workbooks of 2009, 2010 and 2011 /3/, b) List of delivery receipts of biomass bought by Lages Bioenergética Ltda. from Battistella, Sofia and suppliers on open market /4/, c) Monthly report of diesel consumption as fuel on boiler/turbo generator set and on-site transportation /6/, d) Operating Environmental License, issued by FATMA /2/ and e) List of transportation of ashes to disposal sites /5/.

In addition, the revised Project Design Document (PDD) version 3 /18/, in particular the monitoring plan contained in the PDD, the validation report (DNV Report No. 2005-0935, Rev 3 of 14 February 2006 /20/), the previous DNV verification reports No. 2006-1233 Rev 1 of 25 August 2006 /21/, report No. 2007-1084 Rev 1 of 17 September 2007 /22/, report No. 2008-112 Rev 1a of 29 July 2009 /23/ and report No. 2010-0248 Rev 1 of 1 March 2010 /24/ were assessed.

2.2 Site visit

On 16 – 17 November 2011, Felipe Antunes and Juliana Scalon from DNV carried out a site visit at Lages Bioenergética Ltda. in Lages municipality, Santa Catarina State. During the visit /38/, DNV verified that the actual implementation of the project was as described in the revised PDD /18/.

On-site inspection included review of performance records, interviews with the plant manager /38/, operations and maintenance personnel, confirming all data sources and constants used in the monitoring report and the verification was carried out by means of:



- Verification of compliance of the monitoring plan through the verification of the calibrations of the entrance truck scale and the feeding treadmill and effectiveness of consumption of biomass /8/-/10/, i.e. that all consumed biomass is fed into the boiler.
- Checking of the list of delivery receipts of biomass bought by Lages Bioenergética Ltda. from Battistella, Sofia and suppliers of biomass on the open market from 1 June 2009 to 31 May 2011 /4/. Samples were taken to verify the quantity of the biomass purchased (QC_{biomass}) and also to check the distance from the supplier to the Lages plant in order to calculate the weighted average round trip (ADV_{biomass}). Considering the monitoring period from 1 June 2009 to 31 May 2011, or 730 days of supply from about 150 suppliers, the total data size is over 1 200 of biomass purchase receipts. Sampling procedure was based on the American Military Standard and tables for Inspection by Attributes (MIL-STD-105E) /32/ Level II, single sample for normal inspection. Since data size is higher than 1 200, the normative determines that the sample size should be 100. The sampling was done during site visit, where 100 receipts were randomly chosen by DNV and cross-checked with the Electronic Planning Production Control program and with the Monitoring Plan Workbooks (QC_{biomass} and ADV_{biomass}) /3/. No error was identified.
- Checking of the list of delivery receipts of ashes by Lages Bioenergética Ltda. to ashes disposal sites /5/, from 1 June 2009 to 31 May 2011. Samples were taken to verify the distance from the disposal site to the Lages plant in order to calculate the weighted average round trip (ADV_{ash}). Considering the monitoring period from 1 June 2009 to 31 May 2011, or 730 days of disposal to over 150 farms and disposal sites, the total data size is above 1 200 of ash delivery receipts. Sampling procedure was based on the American Military Standard and tables for Inspection by Attributes (MIL-STD-105E) /32/ Level II, single sample for normal inspection. Since data size is higher than 1 200, the normative determines that the sample size should be 100. The sampling was done during site visit, where 100 receipts were randomly chosen by DNV and the distances were cross-checked with the Monitoring Plan Workbooks /3/. No error was identified.
- Measurements of truck capacity were witnessed at the site when new loads were being delivered. The scale used to weigh the trucks and biomass from open market mills is calibrated by INMETRO /8/ /9/.
- Checking of the monthly report from the operational system records of wood waste biomass consumed /6/ as fuel on boiler/turbo generator set from 1 June 2009 to 31 May 2011 against the values stated in the Monitoring Report and Workbooks /1/ /3/;
- Checking of the monthly report from the operational system records of diesel consumed /7/ from 1 June 2009 to 31 May 2011 against the values stated in the Monitoring Report and Workbooks /1/ /3/;
- Assessment of the accuracy of the GHG emissions reduction calculations and effectiveness of data quality assurance and control /3/.
- During the site visit the DNV has verified the use of renewable biomass analysing samples of the biomass invoices and performed visual inspections in the wood waste inventory of the project.
- Location of stockpiles of wood waste and ashes were verified and photographed at the site /38/.



2.3 Reporting of findings

A corrective action request (CAR) is issued, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

The verification was able to verify that the GHG emission reductions reported for the project in the monitoring report version 3 of 22 March 2012 are fairly stated. One Corrective Action Request (CAR) was identified. No Forward Action Requests (FAR) were identified. Three Clarification Requests (CL) were identified regarding regulation of the calibration frequency, high wood waste consumption and different default values used, which were corrected in a new version of the monitoring report. The findings were correctly addressed and closed by DNV.



3 VERIFICATION FINDINGS

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 2009 to 31 May 2011.

3.1 Remaining issues, CARs, FARs from previous validation / verification

No previous FAR were identified with regards to remaining issues from the fourth verification report /24/.

3.2 Project implementation

As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in revised PDD version 3 of February 2011 /18/.

The project has been in operation since 23 December 2003. During the conceptualization stages, it envisaged the main suppliers of the wood waste to be the neighboring wood industries of Battistella (38%) and Sofia (16%), and other distant suppliers on the open market (46%).

Since 2006 however, many wood industries in the Lages region that export their production have faced an economic crisis due to the devaluation of US dollars currency, resulting in the reduction or even interruption of their activities. This was the specific case for Sofia and Battistella wood industries, two of the main wood residues suppliers of the Lages Methane Avoidance Project. As a consequence, the wood waste supply from these two mills got reduced during the following years and during this monitoring period no biomass was supplied by Sofia or Battistella since both companies closed down its activities respectively in September 2007 and October 2008.

The bulk of the wood waste bought (100%) was sourced from the open market and needs to be transported over large distances by trucks. The truck transportation represents the leakage of the project and was considered at 0.002818, 0.001503 and 0.001446 tCO₂ per tonnes of biomass transported in 2009, 2010 and 2011 respectively, considering the weight average round trip distance to biomass supply sites of 43.6 km in 2009, 23.7 km in 2010 and 22.4 km in 2011, weighted average truck capacities of 17.1 tonnes in 2009, 17.5 tonnes in 2010 and 17.1 tonnes in 2011 and wood sourced based on the supply receipts.

In addition to the normal wood waste from more distant suppliers, the project also sourced and used tree branches (the “toretas”), contributing with 10.74%, 8.07% and 6.19% in 2009, 2010 and 2011 respectively, of the total amount of biomass on a weight basis in the monitoring period. However, since this is not disposed to anaerobic decay in the baseline, the monitoring report excluded this quantity for baseline emission and included for the leakage and calculation of project emissions, in line with the revised PDD version 03 /18/.

The monitoring report of 22 March 2012 identifies a list of supplier of biomass around the Lages facilities. Lages get wood waste from 156 open market suppliers. About 16 suppliers were responsible more than 90% of total additional demand and other suppliers responsible by the remaining demand.



During the site visit /38/ DNV confirmed that the waste wood biomass used by the project consisted mainly of bark, saw dust and small wood pieces from the renewable *pinus* forests, the main raw material for wood industry of Santa Catarina State, supplied by the open market suppliers mentioned above, through visual inspections in the wood waste inventory of the project.

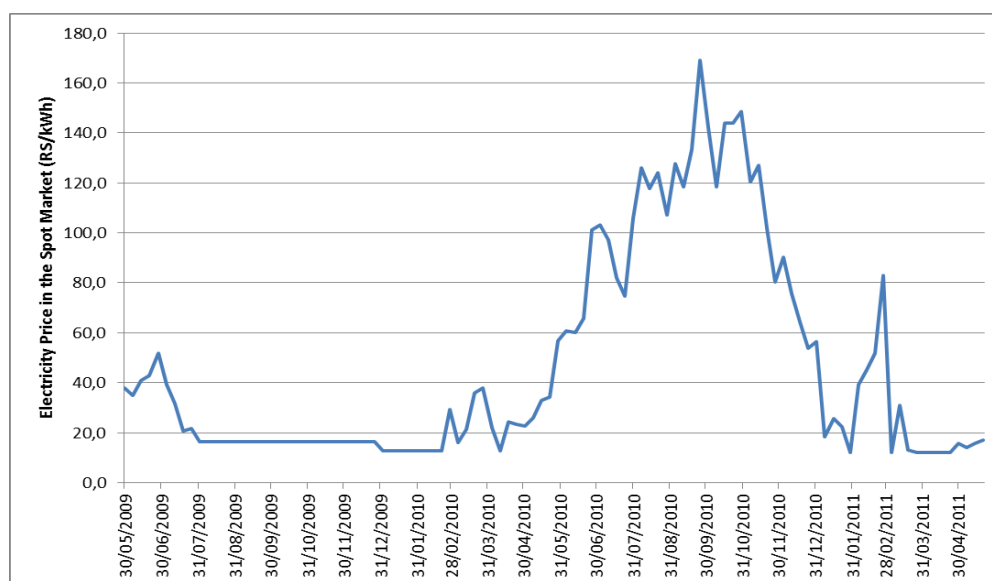
In addition, it has checked the use of renewable biomass through analysing reports of the biomass invoices, especially from the 158 open market suppliers mentioned above, which supplied wood wastes during this monitoring period /4/. The identification of wood waste and respective biomass heating values confirms that Lages Project uses only wood waste from renewable biomass, specifically from *pinus* (*pinus taeda* and *pinus elliottii*), a specie used in reforested plantations in the Lages region. Additionally, the use of native species is constantly assessed by the state environmental authority (called FATMA) forbidding the use of non-renewable biomass in the region /26/.

3.3 Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD

The emission reductions achieved over the designated monitoring period are 443 651 tonnes of CO₂e. This amount is around 13% higher than the 393 378 tonnes of CO₂e which were estimated to be reduced according to the revised PDD /18/ in the same period. This was caused by a higher load factor of the cogeneration plant during this period and to a lower consumption of "torete", consequently burning an amount of wood waste higher than that estimated in the revised PDD. The amount of "torete" consumed during the monitoring period was of 1 253 tonnes/month /1/, about 68.5% less than the previous monitoring period, which was of 3 984 tonnes/month /25/. As per the monitoring plan in the revised PDD /18/, the "torete" is not considered in the baseline emission calculation. Therefore, the biomass fed in the cogeneration plant had less "toretos" and more wood waste.

The higher amount of wood waste consumed was also caused by a dry season in Brazil especially in the second semester of 2010 /37/. Since the primary source of energy in Brazil is hydro (more than 65% of the national grid energy source /36/), during dry seasons, additional thermal generation is demanded to supply the required power from Brazilian grid. Since the thermal electricity prices are higher than electricity from hydro sources, this cause an increase in the general spot market price. Hence, in Brazil it is possible to analyze the type of energy dispatched and the general climatology conditions by monitoring the prices of spot market in the grid. This can be verified in the Figure 1, with the average spot market price during the monitored period.

Figure 1: Variation to the electricity price in spot market from 1 June 2009 to 31 May 2011 /33/:



Therefore, the higher consumption of wood waste was caused by the demand of the national grid for thermal electric energy during the dry season (second semester of 2010). Since the project participant had the technical ability (amount of wood waste and installed capacity) to supply such demand, the energy was then generated.

Considering the revised PDD /18/ and respective monitoring plan as per AMS-III.E version 7, the monitoring plan is restricted to monitoring the fuel on the baseline as the amount of wood waste received and combusted in the boiler. DNV could confirm that all the waste wood used by the project consisted mainly of bark, saw dust and small wood pieces from the renewable *pinus* forests, which would have been left to decay in other areas. During the site visit /38/, DNV has verified the use of this type of renewable biomass analysing samples of the biomass invoices and performing visual inspections in the wood waste inventory of the project. Therefore, DNV is able to confirm that the variations in the wood waste amount do not represent a permanent change from the project activity as described in the revised PDD.

Moreover, considering that the project additionality was based on technical barriers such as barriers to the prevailing practice (the wood waste if left to decay in stockpiles) and also as first of its kind /19/, the increased production does not raise concern for the additionality.

At the time of project validation it was not known by the project participant that higher wood waste would be consumed because of an increase in the demand for electricity. This depends on the climate conditions of Brazil and extremely dry climate conditions are considered to be isolated cases, named as "rain anomalies" by the National Water Agency 2010 annual report /37/. Hence, raining and dry seasons are not in control of the project participant and are not linked to the barriers presented in the PDD that would have prevented the project to take place.

Therefore, the excess generation of emission reduction by the project activity during the period from 1 June 2009 to 31 May 2011 was a particular and isolated case with the regards of a period of dry season in Brazil and less "torete" consumed, and it does not affect the project additionality. DNV is able to confirm that no revision of the project design to address the over generation of CERs is required.



3.4 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the monitoring plan contained in the revised PDD version 3 of February 2011/18/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-III.E (version 7) /16/.

3.5 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the revised PDD version 3 of February 2011.

All parameters as stated in the validated monitoring plan and the monitoring methodology AMS-III.E (version 7) /16/ are properly monitored and reported. Monitoring parameters include the amount of wood waste purchased, consumed and the proportion that would be left for decay. In addition, the leakage of wood waste transport was monitored considering the weighted average distance and truck capacities. The project emission is monitored considering the total of wood waste burned. IPCC default values are yearly verified. The monitoring plan requires the monitoring of the following data:

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#1 Fuel – Amount of wood waste combusted
Measuring frequency:	Continuously
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	The wood waste fed into the boiler is measured through dynamic scale at entrance and automatically register in the Lages/Tractebel Electronic Planning Production Control System
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes. The scale has accuracy of 99%, which complies with the maximum uncertainty of $\pm 1\%$ defined by INMETRO /27/. The dynamic scale represents good practice in measuring continuous amounts of waste fed into the boiler.
Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The PDD does not establish the calibration frequency. According to the general guidelines to SSC CDM methodologies, the calibration interval has to be a maximum of three years. Therefore, the selected frequency of 18 months represents a good monitoring practice.
Company performing the calibration:	Toledo
Did calibration confirm proper functioning	Yes, and confirmed by the certificate. The



of monitoring equipment? (Yes / No):	maximum error of the calibrations performed was 1%.
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes.</p> <p>Boiler feeding scale Toledo model 9270 serial number 3092000123 calibration certificates /10/:</p> <ul style="list-style-type: none"> • 0080677 issued on 06 May 2008; • 0080839 issued on 17 June 2009; • 0064923 issued on 14 January 2010; • 0080925 issued on 27 July 2010; • 0081007 issued on 30 May 2011 <p>The calibration certificates from Toledo contain validity of 18 months. The regulations of the host country sets the validity for such calibrations to the end of the following year, as established in item 11.3 of the Technical Metrological Regulation approved by Disclosure 236 INMETRO 1994 /27/ /29/. The calibrations were in line with this.</p>
If applicable, has the reported data been cross-checked with other available data?	The reported data was cross checked with purchase receipts /12/.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System and was cross checked with purchase receipts /12/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste 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 /6/. As the feed scale record is cumulative, the sum of all waste biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of wood waste bought from open market mills, registered on Electronic Planning Production Control program.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in	N/A.



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accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	
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	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#2 – Amount of wood waste obtained from Battistella.
Measuring frequency:	Each truck
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. Entrance truck scale records and list of biomass official receipts bought by Lages Bioenergética Ltda from Battistella. It was zero for the period.
Type of monitoring equipment:	Entrance truck scales Toledo model 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes.</p> <p>Calibration certificates for scale serial number 03077001101 /8/:</p> <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on 15 July 2010. <p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2



	<p>October 2008;</p> <ul style="list-style-type: none"> • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; • #1152670-1 issued by INMETRO on 15 July 2010.
If applicable, has the reported data been cross-checked with other available data?	Wood waste obtained from Battistela in this period was zero. No comparison was made.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System. It was zero for the period.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste biomass and include on management report to be analysed by the Operation Manager.</p> <p>These figures are inserted in a daily report, and consolidated on monthly report /6/. As the feed scale record is cumulative, the sum of all waste biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of wood waste bought from open market mills, registered on Electronic Planning Production Control program.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#3 – Amount of wood waste obtained from Sofia.
Measuring frequency:	Each truck
Reporting frequency:	Monthly



Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. Entrance truck scale records and list of biomass official receipts bought by Lages Bioenergética Ltda from Sofia. Wood waste obtained from Sofia in this period was zero.
Type of monitoring equipment:	Entrance truck scales Toledo model 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes.</p> <p>Calibration certificates for scale serial number 03077001101 /8/:</p> <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on 15 July 2010. <p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2 October 2008; • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; <p>#1152670-1 issued by INMETRO on 15 July 2010.</p>
If applicable, has the reported data been cross-checked with other available data?	Wood waste obtained from Sofia in this period was zero. No comparison was made.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning



	Production Control System. It was zero for the period.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste biomass and include on management report to be analysed by the Operation Manager.</p> <p>These figures are inserted in a daily report, and consolidated on monthly report /6/. As the feed scale record is cumulative, the sum of all waste biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of wood waste bought from open market mills, registered on Electronic Planning Production Control program.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#4 – Amount of wood waste obtained from suppliers on the open market
Measuring frequency:	Each truck
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Each truck
Type of monitoring equipment:	Entrance truck scales Toledo mod 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the	The calibration frequency is not specified in



monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes.</p> <p>Calibration certificates for scale serial number 03077001101 /8/:</p> <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on 15 July 2010. <p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2 October 2008; • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; • #1152670-1 issued by INMETRO on 15 July 2010.
If applicable, has the reported data been cross-checked with other available data?	The reported data was cross checked with purchase receipts /4/ /12/.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System and was cross checked with purchase receipts /12/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste biomass and include on management report to be analysed by the Operation Manager.</p> <p>These figures are inserted in a daily report, and consolidated on monthly report /6/. As the feed scale record is cumulative, the sum of all</p>



	<p>waste biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of wood waste bought from open market mills, registered on Electronic Planning Production Control program.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#6 – Diesel oil purchase
Measuring frequency:	Daily
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Diesel feed pump at internal gas station
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No, the PDD does not state a specific accuracy for diesel pumps. Project participant does not have the accuracy of the equipment available. Nonetheless, the project participant has submitted the pump for check by INMETRO, which is the most recognized institute for calibration and instrument certification in Brazil /11/.
Calibration frequency /interval:	According to National Petroleum Agency Resolution #12 of 21 March 2007 on feed pumps standards, the internal gas station feed pumps must have a calibration control although it does not specify the calibration frequency /34/.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	<p>The monitoring plan does not specify a calibration for diesel pump. The diesel consumption is controlled by the diesel pump measurement device, but also mainly by the diesel oil purchase invoices /7/.</p> <p>Nevertheless project participant decided to start a periodic calibration of the diesel feed pump.</p>



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Company performing the calibration:	INMETRO
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration certificate statement has confirmed that the equipment functions properly and within the specification.
Is(are) calibration(s) valid for the whole reporting period?	No. According to National Petroleum Agency Resolution #12 of 21 March 2007 on feed pumps standards, the internal gas station feed pumps must have a calibration control although it does not specify the calibration frequency /34/. A calibration was performed on 8 December 2011 and the calibration was approved by INMETRO /11/, certifying that the pump was within the required standards for fuel pump. The monitoring plan does not specify a calibration for diesel pump. Since the diesel oil consumption is controlled by the diesel oil purchase invoices /7/, there is no need to apply a discount factor to the measured values.
If applicable, has the reported data been cross-checked with other available data?	The reported amounts were cross checked with Lages/Tractebel Electronic Planning Production Control System of diesel purchased amounts.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System /7/ during the site visit.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Lages Bioenergética Ltda. has an automated control system where the operation including the diesel consumed on monitoring system. These figures are inserted in a monthly report. The consumption of diesel constituted by the receipts bought from diesel supplier is registered on Electronic Planning Production Control program and used for cross checking.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

Assessment/ Observation



Data / Parameter: (as in monitoring plan of PDD):	#7 – Location of wood waste suppliers compared to Lages site
Measuring frequency:	Each purchase receipt, address on purchase receipts
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Not applicable. The distances are taken from the addresses declared in the purchase receipts.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	The reported amounts were cross checked with the amounts reported in earlier monitoring periods.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System and cross checked with purchase receipts through the sampling analyses /12/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste 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. The receipts of wood waste bought from open market mills are catalogued in the Electronic Planning</p>



	Production Control program and stored in Lages Bioenergética Ltda. office and easily retrieved during site visit.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#8 Wood waste transportation – Truck capacity
Measuring frequency:	Each transportation receipt
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The wood waste truck is specific.
Type of monitoring equipment:	Entrance truck scales Toledo mod 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Calibration certificates for scale serial number 03077001101 /8/: <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on



	<p>15 July 2010.</p> <p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2 October 2008; • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; • #1152670-1 issued by INMETRO on 15 July 2010.
If applicable, has the reported data been cross-checked with other available data?	The report was cross checked with the truck capacities reported in the previous (fourth) monitoring period.
How were the values in the monitoring report verified?	<p>The receipts of wood waste are registered at entrance of Lages, including the actual weight of each truck. The information from the Lages/Tractebel Electronic Planning Production Control System was used to calculate the average.</p> <p>The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System</p>
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator operator manually reads the record of the totalized accumulated wood waste 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 /6/. As the feed scale record is cumulative, the sum of all waste biomass since start up is the same of actual reading.</p> <p>The accounting methane avoidance from biomass is constituted by the receipts of wood waste bought from open market mills, registered on Electronic Planning Production Control program.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring	N/A.



plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	
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	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#9 Ash transportation – Location of ash disposal site
Measuring frequency:	Each transport
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. All trucks transportation are registered into the Lages/Tractebel Electronic Planning Production Control System
Type of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	The reported distances were cross checked with the distances reported in earlier monitoring periods.
How were the values in the monitoring report verified?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System and cross checked with ashes delivery receipts through the sampling analyses /13/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Lages Bioenergética Ltda. has an automated control system where the operation including the ash disposed on monitoring system. These figures are inserted in a daily report, and consolidated on monthly report. The receipts of ash delivery/disposal are catalogued in the Electronic Planning Production Control program and stored in Lages Bioenergética Ltda. office and easily retrieved during site



	visit.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#10 Ash transportation – truck capacity
Measuring frequency:	Each transportation receipt
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The ash truck is specific.
Type of monitoring equipment:	Entrance truck scales Toledo mod 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Calibration certificates for scale serial number 03077001101 /8/: <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on 15 July 2010.



	<p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2 October 2008; • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; • #1152670-1 issued by INMETRO on 15 July 2010.
If applicable, has the reported data been cross-checked with other available data?	The report was cross checked with the truck capacities reported in the previous (fourth) monitoring report.
How were the values in the monitoring report verified?	<p>The receipts of ash transportation are registered at entrance of Lages, including the actual weight of each truck. The information from the Lages/Tractebel Electronic Planning Production Control System was used to calculate the weighted average.</p> <p>The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System</p>
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Lages Bioenergética Ltda. has an automated control system where the operation including the ash transportation data. These figures are inserted in a daily report, and consolidated on monthly report /6/. The receipts of ash delivery/disposal are catalogued in the Electronic Planning Production Control program and stored in Lages Bioenergética Ltda. office and easily retrieved during site visit.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#11 Ash production – amount of ash produced
Measuring frequency:	Each weight of transported ash



Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	All ash trucks are weighed and the weight is registered into the Lages/Tractebel Electronic Planning Production Control System
Type of monitoring equipment:	Entrance truck scales Toledo mod 820-J # 03077001101 and # 03077001100
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /28/ and therefore reflects a good monitoring practice of measuring trucks weights.
Calibration frequency /interval:	Yearly
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency is not specified in the monitoring plan contained in the PDD. The calibration frequency is recommended by INMETRO /29/ and represents a good monitoring practice.
Company performing the calibration:	INMETRO and Toledo.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes.
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes.</p> <p>Calibration certificates for scale serial number 03077001101 /8/:</p> <ul style="list-style-type: none"> • #6340216 issued by INMETRO on 2 October 2008; • #1190476-8 issued by INMETRO on 3 July 2009; • #0080922 issued by Toledo on 12 May 2010; • #1152669-5 issued by INMETRO on 15 July 2010. <p>Calibration certificates for scale serial number 03077001100 /9/:</p> <ul style="list-style-type: none"> • #6340217 issued by INMETRO on 2 October 2008; • #1190475-6 issued by INMETRO on 3 July 2009; • #0080921 issued by Toledo on 12 May 2010; • #1152670-1 issued by INMETRO on 15 July 2010.
If applicable, has the reported data been cross-checked with other available data?	The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System.



How were the values in the monitoring report verified?	The receipts of ash transportation are registered at entrance of Lages. The information from the Lages/Tractebel Electronic Planning Production Control System. The reported data was compared with the data in the Lages/Tractebel Electronic Planning Production Control System
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Lages Bioenergética Ltda. has an automated control system where the operation including the ash transportation data. These figures are inserted in a daily report, and consolidated on monthly report /6/. The receipts of ash delivery/disposal are catalogued in the Electronic Planning Production Control program and stored in Lages Bioenergética Ltda. office and easily retrieved during site visit.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A.

3.6 Assessment of data and calculation of emission reductions

CO₂ emissions reductions for the project and the baseline scenario were correctly calculated using the amount of methane avoided by wood waste biomass available for controlled burning. The emission factor of 0.1147 tCH₄/tonne biomass sourced from Battistella and 0.0573 tCH₄/tonne biomass sourced from Sofia and suppliers on the open market are calculated considering the default IPCC factors and as per the revised PDD (0.0573 tCH₄/tonne). The wood waste amount combusted from Sofia and Battistella during the monitoring period was zero.

Baseline emission due to methane avoidance is determined in line with AMS-III.E version 7, is given by the formula:

$$BE_y = QT_{biomass} * CH_4_IPCC_{decay} * CH_4_GWP$$

Where:

- $QT_{biomass}$ is the quantity of biomass used in the project activity;
- $CH_4_IPCC_{decay}$ is the default IPCC value for emission factor for decaying biomass (0.0573 tCO₂e/tCH₄) in the region of the project and,
- GWP of methane is 21 tCO₂e/tCH₄.



According to the revised PDD /18/, 47 040 tonne (32 640 tonne from Battistella and 14 400 tonne from Sofia) of biomass consumed yearly in the baseline scenario are discounted from the total biomass consumed in the monitoring period to obtain $Q_{biomass}$.

The project emissions from the project activity include the methane and N_2O emissions from wood waste biomass burning, calculated using formulae provided in the AMS-III.E., version 7 /16/ and default IPCC factors, emissions due to diesel consumption from internal transportation of wood waste biomass. The emissions due to the transportation of wood biomass from suppliers on the open market to the project plant and ash transportation have been considered as leakages.

The project emissions due to the project activity are calculated by the formula:

$$PE_y = QC_{biomass} * E_{biomass} * [(CH_4bio_comb * CH_4_GWP) + (N_2Obio_comb * N_2O_GWP)] * 10^6$$

Where:

- $QC_{biomass}$ corresponds to the amount of biomass consumed in the project activity;
- $E_{biomass}$ is the energy content of biomass (0.007746 TJ/t as per UNIPLAC study /26/);
- CH_4bio_comb and N_2Obio_comb are the CH_4 emission factor (11 kg CH_4 /TJ as per specific IPCC default value to wood waste boilers /30/) and N_2O emission factor for biomass and waste combustion (7 kg N_2O /TJ as per specific IPCC default value to wood waste boilers /30/). The values used are according to the monitoring plan in the revised PDD where IPCC values will be checked annually of updates;
- The GWP of CH_4 is 21 tonne CO_2e /t CH_4 and the GWP of N_2O is 310 t CO_2e /t N_2O .

Except for the $Q_{biomass}$ all other parameters are fixed *ex-ante* in the registered PDD.

Associated to the project, there are also project emissions from *on-site* wood waste transportation, which is given by the formula:

$$OT_GHG_y = \frac{Q_{diesel} * D_{diesel} * (VEF_CO_2 + VEF_CH_4 * CH_4_GWP + VEF_N_2O * N_2O_GWP)}{10^6}$$

Where:

- Q_{diesel} corresponds to the amount of diesel consumed in the project activity per year;
- D_{diesel} corresponds to the density of the diesel oil (880 kg/m³ as per Brazilian Petroleum Agency);
- VEF_CO_2 is the CO_2 emission factor for trucks (3 172.31 kg CO_2 /t or 1.097 kg CO_2 /km as per IPCC default values /31/);
- VEF_CH_4 is methane emission factor for trucks (0.18 kg CH_4 /t or 6.0E⁻⁵ kg CH_4 /km as per IPCC default values /31/);
- VEF_N_2O is N_2O emission factor for trucks (0.09 kg N_2O /t or 3.1E⁻⁵ kg N_2O /km as per IPCC default values /31/).

Except for the Q_{diesel} all other parameters are fixed *ex-ante* in the registered PDD.

The leakage emissions from off-site wood waste transportation are calculated by the formulae:

$$BT_GHG_y = \frac{QC_{biomass}}{TC_{biomass}} * ADV_{biomass} * (VEF_CO_2 + VEF_CH_4 * CH_4_GWP + VEF_N_2O * N_2O_GWP) / 10^6$$



Where:

- $QC_{biomass}$ corresponds to the amount of biomass consumed in the project activity per year;
- $TC_{biomass}$ corresponds to the truck average capacity for biomass transportation (17.1 tonnes for 2009, 17.5 tonnes for 2010 and 17.1 tonnes for 2011);
- $AVD_{biomass}$ is the average round trip distance to biomass supply sites (43.6 km for 2009, 23.7 km for 2010 and 22.4 km for 2011);
- VEF_{CO_2} is the CO₂ emission factor for trucks (1.097 kgCO₂/km as per IPCC default values /31/);
- VEF_{CH_4} is CH₄ emission factor for trucks (6.0E⁻⁵ kgCH₄/km as per IPCC default values /31/) and
- VEF_{N_2O} is N₂O emission factor for trucks (3.1E⁻⁵ kgN₂O/km as per IPCC default values /31/).

The leakage emissions from ash transportation are calculated by the formulae:

$$AT_GHG_y = \frac{Q_{ash}}{TC_{ash}} * ADV_{ash} * (VEF_{CO_2} + VEF_{CH_4} * CH_4_GWP + VEF_{N_2O} * N_2O_GWP) / 10^6$$

Where:

- Q_{ash} corresponds to the amount of ash produced by the project activity per year;
- TC_{ash} corresponds to the truck average capacity for ash transportation (17.6 tonnes for 2009, 18.5 tonnes for 2010 and 16.2 for 2011);
- AVD_{ash} is the average round trip distance to disposal sites (77.8 km for 2009, 97.1 km for 2010 and 67.8 km for 2011).

The total project emission, including leakage, was 8 898 tCO₂ for the period 1 June 2009 to 31 May 2011, evidencing the compliance with the requirement of small scale criteria.

All reported and verified data were found to be consistent, i.e. data in the monitoring report (version 3) of 22 March 2012. It has been verified by DNV on-site that data collected and calculated are complete, and where complete data are not available, conservative assumptions were applied for the whole monitoring period. These evidences enable DNV to verify the amount waste wood combusted and the resulting emission reductions of 443 651 tCO₂e for the period from 1 June 2009 to 31 May 2011.

As confirmed above, the input data for calculation and calculation process and result are complete and transparent, and DNV is able to confirm the accuracy.

3.7 Quality of evidence to determine emission reductions

Tractebel Energia S.A. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. At 00:00 hours every day the Tractebel-Lages turbo generator operator manually reads the record of the totalized accumulated wood waste biomass and include on management report to be analysed by Operation Manager.

Also, the purchase diesel /7/, biomass /4/ /6/, and ashes transportation /5/ are recorded and stored in a proper manner, easily to be retrieved when necessary.



All these figures are inserted in a daily report when applicable, and consolidated on monthly report. As the feed scale record is cumulative, the sum of all waste biomass since start up is the same of actual reading.

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

3.8 Management system and quality assurance

Data is collected according to well defined data collection procedures:

- i) The biomass bought from open market suppliers is registered on Electronic Planning Production Control System, and has good traceability and consistency.
- 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.
- iii) Data is processed by the electronic datasheet to calculate emission reductions and to produce the monitoring report.
- iv) Lages Bioenergética Ltda. has a Quality Management System Certified as ISO 9001:2000 and an Environmental Management System Certified as ISO 14001:2004;
- v) The monitoring report is carried out by CDM Support Engineer based on reviewed records from the Electronic Planning Production Control System.



4 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions that have been reported for the “Lages Methane Avoidance Project” in Brazil (UNFCCC Registration Reference No. 0268) for the period 1 June 2009 to 31 May 2011.

The project participants are responsible for the collection of data in accordance with the 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 7), the monitoring plan contained in the revised Project Design Document of /18/ and the monitoring report version 3 dated 22 March 2012. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan 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 our opinion the GHG emissions reductions of the ““Lages Methane Avoidance Project” in Brazil (UNFCCC Registration Ref. No. 0268) for the period 1 June 2009 to 31 May 2011 are fairly stated in the monitoring report version 3 dated 22 March 2012.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-III.E version 7 and the monitoring plan contained in the revised PDD of February 2011.

DNV Climate Change Services AS is able to certify that the emission reductions from the “Lages Methane Avoidance Project” in Brazil during the period 1 June 2009 to 31 May 2011 amount to 443 651 tonnes of CO₂ equivalent.

Rio de Janeiro and Oslo, 21 May 2012

Felipe Lacerda Antunes

CDM Verifier

DNV Rio de Janeiro, Brazil

Hendrik W. Brinks

Approver

DNV Climate Change Services AS



5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

- /1/ Tractebel Energia S.A.: *Monitoring Report – Lages Methane Avoidance Project in Brazil*: 1 June 2009 to 31 May 2011, version 1 of 8 August 2011 and version 3 of 22 March 2012.
- /2/ Tractebel Energia S.A.: *Operating Environmental License – issued by FATMA on 23 December 2008 and valid until 23 December 2012.*
- /3/ Tractebel Energia S.A.: Lages Monitoring Plan Workbooks of 2009, 2010 and 2011 with the amount of waste biomass purchased and consumed on the boiler, including the distance average of wood waste biomass transport, and the consumption of diesel oil on internal transport of wood waste biomass and transport of ash to the disposal site in Capivari de Baixo municipality and other sites in the Lages Region.
- /4/ Tractebel Energia S.A.: List of delivery receipts of biomass bought by Tractebel Energia S.A. from suppliers on open market from 1 June 2009 to 31 May 2011.
- /5/ Tractebel Energia S.A.: List of receipts of transportation of ashes to disposal sites from 1 June 2009 to 31 May 2011.
- /6/ Tractebel Energia S.A.: Monthly report of wood waste biomass consumed as fuel on boiler/turbo generator set from 1 June 2009 to 31 May 2011.
- /7/ Tractebel Energia S.A.: Monthly report of diesel consumed from 1 June 2009 to 31 May 2011.
- /8/ Tractebel Energia S.A.: Entrance Scale Toledo model 820-J serial number 03077001101 calibration certificates:
 - #6340216 issued by INMETRO on 2 October 2008;
 - #1190476-8 issued by INMETRO on 3 July 2009;
 - #0080922 issued by Toledo on 12 May 2010;
 - #1152669-5 issued by INMETRO on 15 July 2010.
- /9/ Tractebel Energia S.A.: Entrance scale Toledo model 820-J serial number 03077001100 calibration certificates:
 - #6340217 issued by INMETRO on 2 October 2008;
 - #1190475-6 issued by INMETRO on 3 July 2009;
 - #0080921 issued by Toledo on 12 May 2010;
 - #1152670-1 issued by INMETRO on 15 July 2010.
- /10/ Tractebel Energia S.A.: Boiler feeding scale Toledo model 9270 serial number #3092000123 calibration certificates (issued by Toledo):
 - 0080677 issued on 06 May 2008;
 - 0080839 issued on 17 June 2009;
 - 0064923 issued on 14 January 2010;
 - 0080925 issued on 27 July 2010;
 - 0081007 issued on 30 May 2011.



- /11/ Tractebel Energia S.A.: Diesel feed pump serial number #504670 calibrated by INMETRO on 8 December 2011 (certificate #2219728-0).
- /12/ Tractebel Energia S.A.: Sampling check of biomass purchase receipts and location of wood waste suppliers during site visit. Sampling assessment of 100 receipts during the monitoring period 1 June 2009 to 31 May 2011. The receipts values and addresses (distance from Lages Methane Avoidance Project location) were cross check with Lages/Tractebel Electronic Planning Production Control System and with the values expressed in the workbooks.
- /13/ Tractebel Energia S.A.: Sampling check of ash delivery receipts and location of the disposal sites during site visit. Sampling assessment of 100 addresses and distances during the monitoring period 1 June 2009 to 31 May 2011. The receipts addresses (distance from Lages Methane Avoidance Project location) were cross check with the values expressed in the workbooks.
- /14/ Brazilian wood exportation statistics – Issued by the Brazilian Association of Processed Wood. Depicts the decline of the exportation since 2007 and further diminishment due to the economic crisis of 2008, resulting in 45% decrease from the 1st Quarter of 2008 to the 1st Quarter of 2009. Available at: http://www.google.com.br/url?sa=t&source=web&cd=4&sqi=2&ved=0CCoQFjAD&url=http%3A%2F%2Fwww.abimci.com.br%2Findex.php%3Foption%3Dcom_docman%26task%3Ddoc_download%26gid%3D46%26Itemid%3D37&ei=geEITpyEJ6Li0QHz_d2CCw&usg=AFQjCNHNEyQuqdz2hvo2K_XJ4iu3dtkDjw&sig2=VFrFvY9UME2Ro4vuAHwXWQ

Background documents related to the design and/or methodologies employed in the design or other reference documents.

- /15/ CDM Executive Board: *Validation and Verification Manual*. Version 1.2
- /16/ CDM Executive Board: Baseline and monitoring methodology “avoidance of methane production from biomass decay through controlled combustion”, AMS-III.E version 7.
- /17/ CDM Executive Board: *Notification of changes* approved on 30 March 2011 for Lages Methane Avoidance Project.
- /18/ CDM Executive Board: *Revised Project Design Document of the Lages Methane Avoidance Project*, version 3 of February 2011.
- /19/ CDM Executive Board: *Original Project Design Document of the Lages Methane Avoidance Project*, version 2 of 21 September 2005.
- /20/ Det Norske Veritas Certification Ltd. – DNV: *Validation Report* – Lages Methane Avoidance Project. Report 2005-0935 Rev 3 of 14 February 2006.
- /21/ Det Norske Veritas Certification Ltd. – DNV: *Verification Report* – Lages Methane Avoidance Project. Report 2006-1233 Rev 1 of 25 August 2006
- /22/ Det Norske Veritas Certification Ltd. – DNV: *Verification Report* – Lages Methane Avoidance Project. Report 2007-1084 Rev 1 of 17 September 2007
- /23/ Det Norske Veritas Certification Ltd. – DNV: *Verification Report* – Lages Methane Avoidance Project. Report 2008-1182 Rev 1a of 29 July 2009
- /24/ Det Norske Veritas Certification Ltd. – DNV: *Verification Report* – Lages Methane Avoidance Project. Report 2010-0248 Rev 1 of 27 June 2011
- /25/ CDM Executive Board: *Monitoring Report of 1 June 2008 to 31 May 2009 (4th verification period) of the Lages Methane Avoidance Project*, version 3 of 16 June



2011.

- /26/ UNIPLAC, *Study about amount of biomass in Lages region*, dated December 2001.
- /27/ INMETRO (Metrology National Institute) – *Disclosure n° 236*, dated 22 December 2004 about the validity of scale certifications:
<http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC000180.pdf>
- /28/ INMETRO: classification of truck scale TOLEDO model 820J:
<http://www.inmetro.gov.br/legislacao/pam/pdf/PAM001119.pdf>
- /29/ INMETRO (Metrology National Institute) – *Frequently asked questions*, about the validity of scale certifications:
<http://www.inmetro.gov.br/ouvidoria/faqs.asp#balanca>
- /30/ Revised IPCC Guidelines for National Greenhouse Gas Inventories, 1996, Volume 2, Chapter 2, Table 2.6.
- /31/ IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Table 1-32.
- /32/ US Department of Defense: American Military Standard and tables for Inspection by Attributes (MIL-STD-105E). 10 May 1989.
- /33/ Chamber for Electric Energy Commercialization: spot market prices in a chosen period. Available at:
<http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=a893f5b4ccd98110VgnVCM1000005e01010aRCRD>
- /34/ National Petroleum Agency: Resolution #12 of 21 March 2007 on internal gas station feed pumps standards. Available at:
http://nxt.anp.gov.br/nxt/gateway.dll/leg/folder_resolucoes_anp/resolucoes_anp/2007/mar%C3%A7o/ranp%2012%20-%202007.xml
- /35/ TOLEDO: technical specifications of the dynamic scale model 9270:
<http://www.toledobrasil.com.br/produtos/balanca/9270/>
- /36/ National Electric Energy Agency, *Bank of Information of Generation*, the capacity of electricity generation in Brazil. Available at:
<http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.asp>
- /37/ National Water Agency: *rain anomalies in Brazil during 2010*. Available at:
<http://conjuntura.ana.gov.br/conjuntura/Downloads/2011/2%20-%20MAPAS%20TEM%20TICOS/Anomalias%20de%20chuva%20em%2009-2010.pdf>

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

- /38/ Marcio Daian Neves – Lages Operation Manager – Tractebel Energia

APPENDIX A

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	The values stated in the Monitoring Report for the parameters ID 8, <i>off-site transportation – truck capacity</i> ($TC_{biomass}[AD]$) and ID 10, <i>ash transportation – truck capacity</i> ($TC_{ash}[AF]$) do not correspond to the truck capacity of the active wood waste suppliers and ash transport companies of the monitored period (from 1 June 2009 to 31 May 2011).	The values stated for off-site and ash transportation for each active wood player or ash destination was based on an average of the complete monitoring report period (1 June 2009 to 31 May 2011) and not calculated on an annual basis. The monitoring report was revised considering the correct annual average data for off-site and ash transportation for each active wood player or ash destination site.	DNV has assessed the calculation of the new truck capacity, and it corresponds to the active waste wood suppliers and active ash transportation companies. Data is well stated and calculated in the monitoring plan workbook /3/ and in the monitoring report version 3 of 22 March 2012 /1/. Therefore this CAR is closed,

Clarification requests

CL ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	According to the monitoring report, the calibration frequency for the parameter ID 6, <i>on-site transportation – diesel oil purchase</i> is “according to commercial regulation”. The project participant is requested to clarify which regulation is this and provide related evidence of the diesel feed pump calibration.	<p>According to National Petroleum Agency, resolution ANP #12 of 21 March 2007, the internal gas station feed pumps must have a calibration control although it does not specify the calibration period.</p> <p>It is important to point out that the diesel oil consumption is controlled by the diesel pump measurement device, equipment maintained with the same accuracy of the other power plant equipment, but in the same time by the tank level indicator and by the diesel oil purchase invoices. Nevertheless a calibration of the diesel feed pump was performed in 8 December 2011 proving the equipment reliability and the monitoring report revised including the calibration certificate. From 2011 onwards a periodically calibration will be adopted.</p>	<p>DNV has assessed the diesel consumption monitoring plan contained in the revised PDD /18/. The monitoring plan does not specify a calibration for diesel pump. The diesel consumption is controlled by the diesel pump measurement device, but mainly by the diesel oil purchase invoices /7/.</p> <p>Nevertheless project participant decided to start a yearly calibration of the diesel feed pump. A calibration was performed on 8 December 2011 and the calibration was approved by INMETRO /11/, certifying that the pump is within the required standards.</p> <p>Therefore this CL is closed.</p>

CL ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 2	The monitoring report does not clear demonstrated in section E.6 the reasons for the higher consumption of wood waste and consequently higher plant load factor and electricity generation during a few months of the period under verification, specially the second semester of 2010.	The higher load factor was consequence of a drier season on the second semester of 2010, demanding additional thermal generation, besides the hydroelectric power generation, to supply the required power from Brazilian grid. The monitoring report was revised including this consideration.	<p>DNV has assessed the monitoring report version 3 of 22 March 2012 /1/, and the higher wood waste amount than that estimated in the revised PDD was caused by a dry season especially in the second semester of 2010, demanding additional thermal generation besides the hydroelectric power generation to supply the required power from Brazilian grid (which increases the general spot market price, since thermal energy is more expensive /33/).</p> <p>DNV is able to confirm the correlation of the over generation of emission reduction by the project activity during the period from 1 June 2009 to 31 May 2011 with the electricity price in the spot market and considers that this was a particular and isolated cause hence not demanding a revision of the project design to address the over generation of CERs.</p> <p>Therefore this CL is closed.</p>

CL ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 3	The emission factors for biomass and waste for CH ₄ and N ₂ O used (CH ₄ bio_comb and N ₂ Obio_comb) are not according to the default values expressed in the revised PDD.	<p>These two factors are used in the project emission calculations. The revised PDD defines that default values expressed in the methodology will be substituted by the IPCC values for energy industry, which is 30 kgCH₄/TJ (see page 25 of the PDD). For the value of N₂Obio_comb, the PDD defines the default value of 4 kgN₂O/TJ, which is based on the IPCC.</p> <p>On the other hand, section D.3 of the revised PDD (page 18), the default values are used in the emission calculation. It is stated that annually the IPCC values will be checked. When IPCC 2006 indicates values specific for wood boilers, those values will be adopted since it reflects the reality better. It is worth mentioning that using the default values stated in the PDD of 30 for CH₄bio_comb and 4 for N₂Obio_comb, the resulted project emissions would be smaller hence less conservative.</p>	<p>DNV has assessed the monitoring report version 3 of 22 March 2012 /1/ and the calculation workbook /3/. The choice for the factors is according to the revised monitoring plan contained in the PDD. Moreover, the use of such factors leads to a higher project emissions, which is conservative for the calculation of the emission reductions.</p> <p>Therefore this CL is closed.</p>

Forward action requests from previous verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
	No FAR was issued in the previous verification period		

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
	No FAR was issued.		

APPENDIX B

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Felipe Antunes

Mr. Felipe Antunes holds a Master's Degree in Production Engineering (Quality) and a Post Graduate Diploma in Environmental Management and Industrial Waste Management and Treatment. Possesses an International experience of more than 10 years in the field of quality and environmental auditing, working two years as the responsible of the QMS of Rede Metrológica RS and since 1999 as a QMS and EMS auditor in DNV.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV, both in South America & abroad. He has also been actively involved in Management System Audits such as ISO 9001, ISO 14001 and OHSAS 18001 standards in various industrial sectors for more than 10 years in DNV.

His qualification and experience in CDM demonstrate him sufficient sectoral competence in energy generation from renewable energy sources, waste handling and disposal, and animal waste management.

Juliana Scalon

Ms. Juliana Scalon holds a Bachelor Degree in Civil Engineering having an overall experience of around 11 years. Prior to joining DNV having 5 years of experience in waste handling and disposal service industry, covering technical operation and environment aspects of landfills and gas management, and 5 years of experience in CDM consultancy services, responsible for the development of several Project Design Documents for landfill gas projects, project management on CDM projects of renewables, transport, and the development of greenhouse gas inventories for chemical industry.

She works in DNV for the team of validation and verification of CDM projects/JI and other 3rd party validation/verification services. Her qualification, industrial experience and experience in CDM demonstrate her sufficient sectoral competence in waste handling and disposal.

Simon Wong Yon Sing

Simon Wong Yon Sing holds a Bachelor's Degree in Chemical Engineering with Environmental Engineering, with a year experience in the field of design and operation/maintenance of wastewater treatment as part of working in wastewater design & equipment supply services. His experience in designing and maintaining the wastewater treatment systems covers the fields of various manufacturing and chemical industries in Malaysia.

He has experience of more than 5 years in validation and verification of numerous CDM projects in DNV, both in Malaysia and abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in Energy Generation from Renewable Energy Sources, Waste Handling and Disposal, Thermal energy generation from fossil fuels and biomass and Animal Waste Management System.