



VERIFICATION / CERTIFICATION REPORT

“LAGES METHANE AVOIDANCE PROJECT” IN BRAZIL

(UNFCCC Registration Ref. No. 0268)

Monitoring Period:
1 June 2011 to 31 December 2012

REPORT No. 2013-0432

REVISION No. 01

DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

Date of first issue: 12 July 2013	Project No.: PRJC-421601-2012-CCS-BRA	DNV CLIMATE CHANGE SERVICES AS Veritasveien 1, 1322 HØVIK, Norway Tel: +47 67 57 99 00 Fax: +47 67 57 99 11 http://www.dnv.com Org. No: NO 994 774 352 MVA
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Summary:
 DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the project activity "Lages Methane Avoidance Project" in Brazil" (UNFCCC Registration Ref. No. 0268) for the period 1 June 2011 to 31 December 2012.
 In our opinion, the GHG emission reductions reported for the project in the monitoring report (version 03) of 3 July 2013 are fairly stated.
 The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-III.E (version 07) and the monitoring plan contained in the Project Design Document of February 2011.
 DNV Climate Change Services AS is able to certify that the emission reductions from the project activity "Lages Methane Avoidance Project" in Brazil during the period 1 June 2011 to 31 December 2012 amount to 392 174 tonnes of CO₂ equivalent.

Report No.: 2013-0432			Indexing terms <table border="1"> <tr> <td rowspan="3"> Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism </td> <td>Service Area Verification</td> </tr> <tr> <td>Market Sector</td> </tr> <tr> <td>Process Industry</td> </tr> </table>		Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification	Market Sector	Process Industry
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	Market Sector							
	Process Industry							
Report title: "Lages Methane Avoidance Project" in Brazil			<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					
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Date of this revision: 12 July 2013	Rev. No.: 01	Number of pages: 38						

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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 _{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
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
PS	Clean Development Mechanism Project Standard
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard



1 INTRODUCTION

Tractebel Energia S.A. has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of emission reductions reported for the CDM project activity 0268 “Lages Methane Avoidance Project” in Brazil (the project) for the period 1 June 2011 to 31 December 2012. 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 emission reductions reported for the “Lages Methane Avoidance Project” for the period 1 June 2011 to 31 December 2012.

1.2 Scope

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD;
- The monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan, including compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

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), Switzerland, 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 07)
Sectoral scope(s):	13



Project Participants: Lages Bioenergética Ltda and Tractebel Energia S.A. from Host Party Brazil, Bunge Emission Fund Limited from Switzerland, 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.; 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 2011 to 31 December 2012

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 2011 to 31 December 2012, 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 verification of the sixth monitoring period from 1 June 2011 to 31 December 2012. The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project.

DNV reviewed the project documentation; specifically the monitoring report for the period 1 June 2011 to 31 December 2012 /1/ and the PDD of February 2011 /17/.

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 0.0573 tCH₄/tonne for the spot market. This is lower than the estimated emission factor in the registered PDD (0.0616 tCH₄/tonne), 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 07 /41/ 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 PDD of February 2011 /17/.

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.



2 METHODOLOGY

DNV has assessed and determined that the implementation and operation of the project activity, and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance provided by the Board.

The assessment involved a desk review of relevant documentation as well as an on-site visit(s).

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

- i) Verifying the compliance of actual monitoring at project site with the PDD of February 2011 /17/ as well as the monitoring methodology AMS-III.E (version 07) /41/.
- ii) Verification of the calibrations of the entrance truck scale and the feeding treadmill and effectiveness of consumption of biomass /8/ - /10/.
- iii) Checking of the list of delivery receipts of biomass bought by Lages Bioenergética Ltda. from suppliers of biomass on the open market from 1 June 2011 to 31 December 2012 /4/ by sampling;
- iv) Checking of the list of delivery receipts of ashes by Lages Bioenergética Ltda. to ashes disposal sites /5/, from 1 June 2011 to 31 December 2012 by sampling;
- v) 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;
- vi) 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 2011 to 31 December 2012 against the values stated in the Monitoring Report /1/ and Workbooks /3/;
- vii) Checking of the monthly report from the operational system records of diesel consumed /7/ from 1 June 2011 to 31 December 2012 against the values stated in the Monitoring Report /1/ and Workbooks /3/;
- viii) Interviewing of Mario Wilson Cusatis /42/ and Ligia Bittencourt da Silva /43/, involved in the project to assure that they were aware of the monitoring procedures.

Verification team

Role	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 13.1 competence
Team leader (Verifier)	Leiroz	Andrea	Brazil	✓	✓	✓	✓		✓
Technical reviewer	Antunes	Felipe	Brazil					✓	✓

***Duration of verification***

Monitoring report publication: 13 March 2013
Desk review: 14 March 2013 to 28 March 2013
On-site assessment: 4 April 2013 to 5 April 2013
Reporting, calculation checks and QA/QC: 14 March 2013 to 12 July 2013

2.1 Desk review

In addition to the monitoring report /1/ (version 01 dated 18 January 2013 and version 03 dated 3 July 2013), DNV reviewed:

- The PDD for the project activity (version 03 dated February 2011) /17/;
- The previous verification reports /19/ - /23/;
- Baseline and monitoring methodology AMS-III.E, version 07 /41/;
- The validation report (DNV Report No. 2005-0935, Rev 3 of 14 February 2006) /18/.

Besides the above mentioned documents, DNV also assessed other additional documents that were required to assess the accuracy of the emission reduction calculations presented in the monitoring report /3/ - /14/.

A list of key documents is given in the reference section of this report.

2.2 On-site assessment

On 4 April 2013 to 5 April 2013 DNV performed on-site assessments. During the on-site assessment DNV carried out an assessment of the implementation and operation of the registered project activity is as per the PDD for the project activity (version 03 dated February 2011) /17/;

On-site inspection included review of performance records, interviews with the plant manager /42/, 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 suppliers of biomass on the open market from 1 June 2011 to 31 December 2012 /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 2011 to 31 December 2012, or 580 days of supply from about 160 suppliers, the total number of biomass purchase receipts is over 1 200. Hence, sampling was applied using the sampling procedure 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 2011 to 31 December 2012. 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 2011 to 31 December 2012, or 580 days of disposal to over 130 farms and disposal sites, the total number of ash delivery receipts is above 1 200. Hence, sampling was applied using the sampling procedure 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 and Toledo /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 2011 to 31 December 2012 against the values stated in the Monitoring Report /1/ and Workbooks /3/;
- Checking of the monthly report from the operational system records of diesel consumed /7/ from 1 June 2011 to 31 December 2012 against the values stated in the Monitoring Report /1/ and Workbooks /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 /42/.

2.3 Closing out of verification findings

The objective of this phase of the verification was to resolve any issues which needed be clarified prior to DNV's conclusion that i) the project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD, ii) the monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan and iii) the data and calculation of GHG emission reductions are correct.

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

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- ii. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;



- iv. 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 identified three CARs, three CLs and no FARs. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the monitoring (please refer to Appendix A for further details). The only change made to the monitoring report (version 03 dated 3 July 2013) where as a result of the verification findings. There were no other changes made compared to the initial version of the monitoring report received for verification (version 01 dated 18 January 2013):



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Lages Methane Avoidance Project” for the period 1 June 2011 to 31 December 2012.

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

No previous FAR were identified with regards to remaining issues from the fifth verification report /23/.

3.2 Post registration changes

There were no post registration changes identified by DNV during this verification.

3.3 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 the PDD (version 03 of February 2011) /17/.

Project component	Implementation in accordance with PDD	Description of how implementation was assessed by verification team
Boiler of 120 ton/h manufactured by Dedini Indústrias de Base.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Inspection during the site visit.
Turbine of 28 MW manufactured by Siemens DDIT.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Inspection during the site visit.
Generator of 35 000 kVA manufactured by Alstom Power.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Inspection during the site visit.

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 0.131 and 0.520 ktCO₂ per tonnes of biomass transported in 2011 and 2012 respectively, considering the weight average round trip distance to biomass



supply sites of 20.5 km in 2011 and 32.1 km in 2012, weighted average truck capacities of 15.9 tonnes in 2011 and 17.0 tonnes in 2012 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 "toretes"), contributing with 5.28% and 1.30% in 2011 and 2012 /3//4/ 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 PDD version 03 /17/.

The monitoring report of 3 July 2013 /1/ identifies a list of supplier of biomass around the Lages facilities. Lages get wood waste from 159 open market suppliers. About 12 suppliers were responsible for more than 90% of total additional demand, and the other suppliers were responsible by the remaining demand.

During the site visit /42/ 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, DNV checked the use of renewable biomass through analysing reports of the biomass invoices, especially from the 159 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 /2/.

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

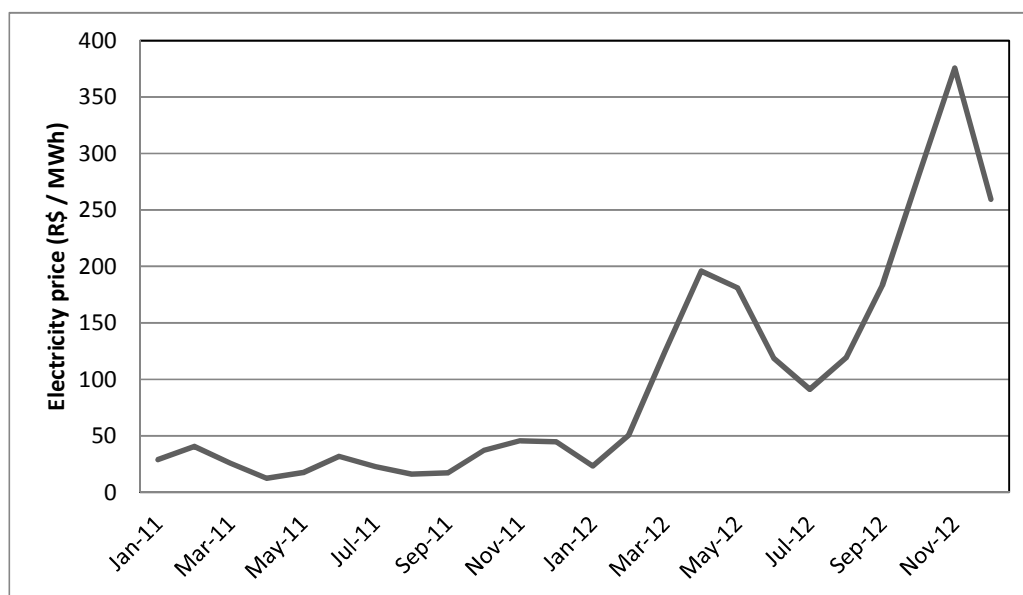
The emission reductions achieved over the designated monitoring period are 392 174 tonnes of CO₂e. This amount is around 26% higher than the 312 546 tonnes of CO₂e which were estimated to be reduced according to the PDD /17/ in the same period. This was caused by a higher load factor of the cogeneration plant during this period and is due to a lower consumption of "torete", consequently burning an amount of wood waste higher than estimated in the PDD. The amount of "torete" consumed during the monitoring period was of 785 tonnes/month /1/, about 37.3% less than the previous monitoring period, which was of 1 253 tonnes/month /24/. As per the monitoring plan in the PDD /17/, the "torete" is not considered in the baseline emission calculation. Therefore, the biomass fed in the cogeneration plant had less "toretes" and more other wood waste (bark, saw dust and small wood pieces from the renewable *pinus* forests).

The higher amount of wood waste consumed was also caused by a dry season in Brazil especially in the second semester of 2012 /36/. Since the primary source of energy in Brazil is hydro (more than 64% of the national grid energy source /35/), 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 difference settlement price. Hence, in Brazil it is possible to analyze the type of energy



dispatched and the general climatology conditions by monitoring the difference settlement prices in the grid. This can be verified in the Figure 1, with the average difference settlement price during the monitored period.

Figure 1: Variation to the electricity price in the market from 1 June 2011 to 31 December 2012 /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 2012). 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 PDD /17/ and respective monitoring plan as per AMS-III.E version 07, 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 /42/ /43/, 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 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 /18/, the increased production does not raise concerns on the project's 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 Meteorology National Institute /36/. 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 2011 to 31 December 2012 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’s additionality.

3.5 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the monitoring plan contained in the PDD (version 03 of February 2011) /17/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-III.E (version 07) /41/.

3.6 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD of February 2011 /17/.

All parameters as stated in the validated monitoring plan and the monitoring methodology AMS-III.E (version 07) /41/ 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 below tables describe for each parameter, which is to be measured according to the monitoring plan, how DNV has verified that i) the actual monitoring complies with the monitoring plan and that ii) data have been assessed to correctly support the emission reductions being claimed.

	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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer’s specification?	The accuracy is not stated in the PDD. The scale has accuracy of 99%, which complies with the maximum uncertainty of $\pm 1\%$ defined by INMETRO /26/. The dynamic scale represents good practice in measuring continuous amounts of waste fed into the boiler.



Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The PDD does not establish the calibration frequency. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration was carried out by Toledo /10/ who is accredited by INMETRO to perform calibrations /29/.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, and confirmed by the certificate. The maximum error of the calibrations performed was 1%.
Is(are) calibration(s) valid for the whole reporting period?	Yes. Boiler feeding scale Toledo model 9270 serial number 3092000123 calibration certificates /10/: <ul style="list-style-type: none"> • 0081007 issued on 30 May 2011; • 0066377 issued on 8 November 2012. 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 /26//28/. The calibrations were in line with this.
If applicable, has the reported data been cross-checked with other available data?	The reported data was cross checked with purchase receipts /12/.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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	Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on



transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#2 Fuel – Amount of wood waste obtained from Battistela.
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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 18 months.



Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 /9/:</p> <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012. <p>Calibration certificates for scale serial number 03077001100 /8/:</p> <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; • #0988138 issued by Toledo on 23 August 2012.
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.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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	Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on



transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#3 Fuel – 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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.



Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 03077001101/9/: <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012. Calibration certificates for scale serial number 03077001100 /8/: <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; • #0988138 issued by Toledo on 23 August 2012.
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.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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	Lages Bioenergética Ltda. has an automated control system where the operation including



reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#4 Fuel – Amount of wood waste obtained from spot market
Measuring frequency:	Each truck
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Entrance truck scales Toledo mod 820-J # 03077001101 and # 03077001100.
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 18 months.



Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 /9/: <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012. Calibration certificates for scale serial number 03077001100/8/: <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; #0988138 issued by Toledo on 23 August 2012.
If applicable, has the reported data been cross-checked with other available data?	The reported data was cross checked with purchase receipts /4//12/.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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	Lages Bioenergética Ltda. has an automated control system where the operation including the wood waste biomass consumed on monitoring system. The turbo generator



reductions and are necessary QA/QC processes in place?	<p>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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#6 On-site transportation – 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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	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/.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
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/ However, the calibration has been carried out with 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	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/. 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 of measuring equipment carried out by an accredited person or institution?	Yes. Calibration was carried out by INMETRO /11/ who is the Metrology National Institute.
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 20 April 2012 and the calibrations were 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.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#7 Off-site transportation – 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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications	Not applicable



(if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	
Is the calibration of measuring equipment carried out by an accredited person or institution?	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.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable.
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 Production Control program and stored in Lages Bioenergética Ltda. office and easily retrieved during site visit.</p>
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.



	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	#8 Off-site 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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 /9/: <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012.



	<p>Calibration certificates for scale serial number 03077001100/8/:</p> <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; • #0988138 issued by Toledo on 23 August 2012.
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 (fifth) monitoring period.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by	N/A.



the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
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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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable.
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	Not applicable
Is the calibration of measuring equipment carried out by an accredited person or institution?	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.
Is the calibration carried out for a	Not applicable.



measuring range comparable with the range for which measurements have been carried out?	
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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.



Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18 months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 03077001101/9/:</p> <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012. <p>Calibration certificates for scale serial number 03077001100 /8/:</p> <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; • #0988138 issued by Toledo on 23 August 2012.
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 (fifth) monitoring report.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
How were the values in the monitoring report verified?	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. 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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	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 monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy is not stated in the PDD. The accuracy is proper for truck and validated by INMETRO /27/ and therefore reflects a good monitoring practice of measuring trucks weights.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 18 months.
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the	The calibration frequency is not specified in the monitoring plan contained in the PDD. Therefore, the selected frequency of 18



frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	months represents a good monitoring practice since INMETRO recommends that the scales should be calibrated once per year /28/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes. Calibration /8//9/ was carried out by INMETRO and Toledo who is accredited by INMETRO to perform calibrations /29/.
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 03077001101/9/:</p> <ul style="list-style-type: none"> • #1152669-5 issued by INMETRO on 15 July 2010; • #1959470-7 issued by INMETRO on 27 October 2011; • #0988137 issued by Toledo on 23 August 2012. <p>Calibration certificates for scale serial number 03077001100 /8/:</p> <ul style="list-style-type: none"> • #1152670-1 issued by INMETRO on 15 July 2010; • #1959471-9 issued by INMETRO on 27 October 2011; • #0988138 issued by Toledo on 23 August 2012.
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.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
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	Lages Bioenergética Ltda. has an automated control system where the operation including



reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	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 project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A.

3.7 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 0.0573 tCH₄/tonne biomass sourced from suppliers on the open market is calculated considering the default IPCC factors. 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 07 /41/, 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 PDD /17/, 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 N₂O emissions from wood waste biomass burning, calculated using formulae provided in the AMS-III.E, version 07 /41/ 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:

$$PE_y = QC_{biomass} * E_{biomass} * [(CH_{4_bio_comb} * CH_{4_GWP}) + (N_{2O_bio_comb} * N_{2O_GWP})] * 10^6$$



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 /25/);
- $CH_4_{bio_comb}$ and $N_2O_{bio_comb}$ 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 t 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) /37/;
- 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 (15.9 tonnes for 2011 and 17.0 tonnes for 2012);
- $AVD_{biomass}$ is the average round trip distance to biomass supply sites (20.5 km for 2011 and 32.1 km for 2012);
- VEF_CO_2 is the CO_2 emission factor for trucks (1.097 kg CO_2 /km as per IPCC default values /31/);
- VEF_CH_4 is CH_4 emission factor for trucks (6.0E⁻⁵ kg CH_4 /km as per IPCC default values /31/) and
- VEF_N_2O is N_2O emission factor for trucks (3.1E⁻⁵ kg N_2O /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 (15.2 tonnes for 2011 and 15.2 for 2012);
- ADV_{ash} is the average round trip distance to disposal sites (79.6 km for 2011 and 71.1 km for 2012).

The total project emission, including leakage, was 7 374 tCO₂ for the period 1 June 2011 to 31 December 2012, 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 03) of 3 July 2013. 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 392 174 tCO₂e for the period from 1 June 2011 to 31 December 2012.

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.

3.8 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.

3.9 Management system and quality assurance

Data is collected according to well defined data collection procedures:

- 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 9001:2008 /15/ and an Environmental Management System Certified as ISO 14001:2004 /16/;

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 CDM project activity 0268 "Lages Methane Avoidance Project" in Brazil for the period 1 June 2011 to 31 December 2012.

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 activity.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

DNV conducted the verification on the basis of the baseline and monitoring methodology AMS-III.E (version 07), the monitoring plan contained in the PDD (version 03 of February 2011) and the monitoring report (version 03) dated 3 July 2013. 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 reported for the project activity for the period 1 June 2011 to 31 December 2012 are fairly stated in the monitoring report (version 03) dated 3 July 2013.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-III.E (version 07) and the monitoring plan contained in the PDD (version 03 of February 2011).

DNV Climate Change Services AS is able to certify that the emission reductions from the CDM project activity 0268 "Lages Methane Avoidance Project" in Brazil during the period 1 June 2011 to 31 December 2012 amount to 392 174 tonnes of CO₂ equivalent.

Rio de Janeiro and Oslo, 12 July 2013

Andrea Leiroz
Verifier
DNV Rio de Janeiro, Brazil

Michael Lehmann
Director of Services and Technologies
DNV Climate Change Services AS



5 REFERENCES

Documentation provided by the project participants

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- /2/ Tractebel Energia S.A.: *Operating Environmental License – issued by FATMA on 23 December 2008 and valid until 23 December 2012. Renewal protocol n° 253221 dated 27 July 2012.*
- /3/ Tractebel Energia S.A.: Lages Monitoring Plan Workbooks of 2011 and 2012 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 sites in the Lages Region. Version 01 dated 18 January 2013.
- /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 2011 to 31 December 2012.
- /5/ Tractebel Energia S.A.: List of receipts of transportation of ashes to disposal sites from 1 June 2011 to 31 December 2012.
- /6/ Tractebel Energia S.A.: Monthly report of wood waste biomass consumed as fuel on boiler/turbo generator set from 1 June 2011 to 31 December 2012.
- /7/ Tractebel Energia S.A.: Monthly report of diesel consumed from 1 June 2011 to 31 December 2012.
- /8/ Tractebel Energia S.A.: Entrance scale Toledo model 820-J serial number 03077001100 calibration certificates:
 - #1152670-1 issued by INMETRO on 15 July 2010;
 - #1959471-9 issued by INMETRO on 27 October 2011;
 - #0988138 issued by Toledo on 23 August 2012.
- /9/ Tractebel Energia S.A.: Entrance scale Toledo model 820-J serial number 03077001101 calibration certificates:
 - #1152669-5 issued by INMETRO on 15 July 2010;
 - #1959470-7 issued by INMETRO on 27 October 2011;
 - #0988137 issued by Toledo on 23 August 2012.
- /10/ Tractebel Energia S.A.: Boiler feeding scale Toledo model 9270 serial number #3092000123 calibration certificates (issued by Toledo):
 - 0081007 issued on 30 May 2011;
 - 0066377 issued on 8 November 2012.
- /11/ Tractebel Energia S.A.: Diesel feed pump serial number #540670 calibrated by INMETRO on 8 December 2011 (certificate #2219728-0) and on 20 April 2012 (certificate #835573-3).
- /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 2011 to 31 December 2012. 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.
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 - /15/ Tractebel Energia S.A.: Quality Management System Certification: ISO 9001:2008 issued by Bureau Veritas on 29 November 2010.
 - /16/ Tractebel Energia S.A.: Environmental Management System Certification: ISO 14001:2004 issued by Bureau Veritas on 29 November 2010.

Other project documents or documents used by DNV to verify the information provided by the project participants

- /17/ Author: *CDM-PDD for project activity “Lages Methane Avoidance Project”*, version 03 of February 2011.
- /18/ Det Norske Veritas Certification Ltd. – DNV: *Validation Report* – “Lages Methane Avoidance Project”. Report No. 2005-0935 Rev 3 of 14 February 2006.
- /19/ DNV Climate Change Services AS: *Verification / Certification report for project activity 0268 “Lages Methane Avoidance Project” for the monitoring period 1 November 2004 to 31 May 2006*, DNV Report No.2006-1233 rev 1.
- /20/ DNV Climate Change Services AS: *Verification / Certification report for project activity 0268 “Lages Methane Avoidance Project” for the monitoring period 1 June 2006 to 31 May 2007*, DNV Report No. 2007-1084 rev 1.
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- /22/ DNV Climate Change Services AS: *Verification / Certification report for project activity 0268 “Lages Methane Avoidance Project” for the monitoring period 1 June 2008 to 31 May 2009*, DNV Report No. 2010-0248 rev 1.
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- /24/ CDM Executive Board: *Monitoring Report of 1 June 2009 to 31 May 2011 (5th verification period) of the Lages Methane Avoidance Project*, version 03 of 22 March 2012.
- /25/ UNIPLAC, *Study about amount of biomass in Lages region*, dated December 2001.
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- <http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC000180.pdf>
- /27/ INMETRO (Metrology National Institute): classification of truck scale TOLEDO model 820J:
- <http://www.inmetro.gov.br/legislacao/pam/pdf/PAM001119.pdf>
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- /29/ INMETRO (Metrology National Institute) – List of laboratories accredited in accordance with the requirements of the standard ISO 17025 to perform calibrations.
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- /34/ National Petroleum Agency: Resolution #12 of 21 March 2007 on internal gas station feed pumps standards. Available at:
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- /38/ CDM Executive Board: *Clean Development Mechanism Validation and Verification Standard*, version 03.0
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- /41/ CDM Executive Board: *Baseline and monitoring methodology AMS-III.E*, version 07.



Persons interviewed during the verification

/42/ Mario Wilson Cusatis

/43/ Ligia Bittencourt da Silva

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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 value reported in section E.4.2 for project emissions or actual net GHG removals by sink (7 374 tCO ₂ /year) does not match with value reported in the CER spreadsheet (6 584 tCO ₂ /year). The value reported in the MR corresponds to the total project activity emissions which also consider leakage.	The information in the MR was revised and the new version (version 2) is being sent.	DNV assessed the revised monitoring report /1/ and confirmed that the correct value was reported for project emissions or actual net GHG removals by sink. This CAR is closed.
CAR 2	As stated in section D.2 of the monitoring report, the calibration interval has to be a maximum of three years according to the "General guidelines for SSC CDM methodologies". However, the "General guidelines for SSC CDM methodologies" version 19 does not refer to calibration.	The information in the MR was revised and the new version (version 2) is being sent.	DNV assessed the revised monitoring report /1/ and confirmed that the statement mentioning the "General guidelines for SSC CDM methodologies" was removed. This CAR is closed.
CAR 3	The value reported in sections E.5 and E.6 for emission reductions estimated in the PDD for the monitoring period (312 008 tCO ₂) is not correct considering the value stated in the PDD per year (196 689 tCO ₂ /year).	The information in the MR was revised and the new version (version 2) is being sent.	DNV assessed the revised monitoring report /1/ and confirmed that the correct value was reported for emission reductions estimated in the PDD for the monitoring period. This CAR is closed.

Clarification requests

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	Further clarification is requested regarding the calibration frequency of the dynamic scale serial number 3092000123. As per MR, the calibration has been carried out annually. However, it was observed that during the monitoring period the scale was calibrated in an interval of 18 months.	The period stipulated for calibration of the equipment in question is up to 18 months. For this case, the information in the MR was revised and the new version (version 2) is being sent.	DNV assessed the revised monitoring report /1/ and confirmed that the calibration frequency was corrected to be according to the calibration frequency recommended by INMETRO /28/. INMETRO recommends that scales should be calibrated once per year. This CL is closed.
CL 2	Further clarification is requested regarding the calibration frequency of the scales serial numbers 03077001101 and 03077001100. As per MR, the calibration has been carried out annually. However, it was observed that during the monitoring period the scales were calibrated in an interval of more than one year between 2010 and 2011.	The period stipulated for calibration of the equipment in question is up to 18 months. For this case, the information in the MR was revised and the new version (version 2) is being sent.	DNV assessed the revised monitoring report /1/ and confirmed that the calibration frequency was corrected to be according to the calibration frequency recommended by INMETRO /28/. INMETRO recommends that scales should be calibrated once per year. This CL is closed.
CL 3	Further clarification is requested regarding the information reported in the monitoring report for accuracy class and calibration frequency for the parameter on-site transportation.	Resolution ANP no 12, March 3rd, 2007 does not refer to a specific period for calibration. Calibration has been carried out within 18 months. The INMETRO, Regulatory Agency of National Metrology, through its visits, ensures the functionality of the device and its compliance.	DNV assessed the revised monitoring report /1/ and confirmed that the information included under accuracy class was removed and an explanation for the calibration frequency was included and accepted by DNV. This CL is closed.

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
	No FAR was issued.	

APPENDIX B

POST REGISTRATION CHANGES

Type of post registration change	Description of post registration change*	Is prior approval by CDM EB required**?	In case prior approval by CDM EB is required, when was post registration change approved?
Corrections	<i>Not applicable</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable	<i>Not applicable</i>
Temporary deviations from the registered monitoring plan and/or monitoring methodology	<i>Not applicable</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable	<i>Not applicable</i>
Permanent changes from the registered monitoring plan or applied methodology	<i>Not applicable</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable	<i>Not applicable</i>
Changes to the project design of a registered project activity	<i>Not applicable</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not applicable	<i>Not applicable</i>

* For further details refer to the “Post-registration changes request form” (F-CDM-PRC) and DNV’s assessment opinion on the changes

** Refer to Appendix 1 Appendix 1 to the CDM Project Standard /39/.

APPENDIX C

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Andrea Leiroz

Andrea Leiroz holds a Bachelor's Degree in Chemical Engineering, Master Degree in Material Science and Doctor Degree in Mechanical Engineering, having an overall experience of around thirteen years.

She has experience of around 6 years in validation and verification of numerous CDM projects in DNV, both in Brazil & abroad.

Her qualification, experience in CDM demonstrates her sufficient sectoral competence in Energy Generation from renewable energy sources, Waste handling and disposal and Animal waste management.

Felipe Antunes

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.