VALIDATION REPORT

LAGES METHANE AVOIDANCE PROJECT IN BRAZIL

REPORT NO. 2005-0935

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DET NORSKE VERITAS

VALIDATION REPORT

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Client: Lages Bioenergética Ltda	Client ref.: Gabriel Mann dos Santos

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Summary:

Det Norske Veritas Certification Ltd. (DNV Certification) has performed a validation of the Lages Methane Avoidance Project (hereafter called "the project") located in Lages, State of Santa Catarina, Brazil, on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. This validation report summarizes the findings of the validation.

In summary, it is DNV's opinion that the project, as described in the project design document of September 2005, meets all relevant UNFCCC requirements for the CDM, is eligible as category III.E small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-III.E. Hence, DNV requests the registration of the "Lages Methane Avoidance Project" project as CDM project activity. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of the DNA of Brazil, including confirmation that the project assists in achieving sustainable development.

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2005-0935	Environment

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Lages Methane Avoidance Project in Brazil

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DOC	Degradable organic carbon
DOC_f	Fraction DOC dissimilated to landfill gas
DNA	Designated National Authority
FATMA	Environmental Agency of Santa Catarina State (FATMA – Fundação do Meio Ambiente)
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MCF	Methane correction factor
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNIPLAC	Universidade do Planalto (Planalto University)
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Lages Bioenergética Ltda has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the "Lages Methane Avoidance Project" at Lages Municipality; Santa Catarina State, Brazil, (hereafter called "the project").

This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Ms. Cintia Dias	DNV Rio de Janeiro	Team leader, waste sector expert
Mr. Luis Filipe Tavares	DNV Rio de Janeiro	CDM auditor
Mr. Michael Lehmann	DNV Oslo	Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual /5/, employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 Lages Methane Avoidance Project

The objective of this proposed small-scale CDM project activity is to avoid methane emissions from anaerobic decay of wood waste in stockpiles (biomass decay) through controlled combustion of wood waste in a cogeneration process, which simultaneously generates electricity. This electricity is supplied to the local distribution company, and the thermal energy from the co-generation is supplied to industrial clients in the vicinity of the projects. Only emission reductions for the avoidance of methane emissions are claimed by the project.

The emission reductions are generated by burning of biomass that otherwise would have been left to decay. Hence, the project involves methane avoidance from biomass not being landfilled. During the ten-year crediting period starting 01 November 2004, the project's expected emission

reductions are estimated to 2 204 394 tCO_2e. The annual emission reductions of the proposed project activity is estimated to 220 439 tCO_2. These emission reductions were recalculated.

2 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design and the baseline and monitoring plan

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /5/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "Lages Methane Avoidance Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective Action Requests (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;

ii) validation protocol requirements have not been met; or

iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	***Ref. to Table 2***	***Summary of project participants' response***	***Final conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Validation protocol tables

2.1 Review of Documents

The PDD (version 1 of August 2005) /1/ submitted by Lages Bioenergética Ltda and a revised PDD of September 2005 /2/ were reviewed by DNV. The project's monitoring plan /3/ as well as the revised spreadsheets documenting the emission reduction calculations were also checked /3//4/.

Other documents, such as the Environmental Impact Assessment, the Environmental Licences and licence requirements as well as the letters sent to local stakeholders were also reviewed during the follow up interviews in order to ensure the accuracy of the relevant information.

2.2 Follow-up Interviews

On 14 and 15 September 2005 DNV performed a site visit and interviews with Lages, Sofia and Battistella in Lages, Santa Catarina State, to confirm and to resolve issues identified during the document review.

The main topics of the interviews were:

- Project technology: energy output, experience with biomass boiler technology and provisions for technology and capacity transfer, including training of local employees
- Biomass availability;
- Use of biomass at Battistella and Sofia prior to and after implementation of the project
- Environment impacts & their control;
- Cogeneration systems;
- Calibration requirements;
- QA/QC procedures;
- Emergency procedures/corrective actions, i.e. provisions to mitigate emergencies, i.e. fire, procedures for corrective actions and project performance reviews
- Consultation process with local stakeholders.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was the resolution of outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design.

The initial validation of the project identified two *Corrective Action Requests* and one request for *Clarification.* These *Corrective Action Requests* and request for *Clarification* were presented to the project participant in DNV's draft validation report of 3 August 2005 (rev. 0). The project participant's response to DNV's draft validation report findings, including the submission of a revised PDD in September 2005, addressed the *Corrective Action Requests* and *Clarification* to DNV's satisfaction. To guarantee the transparency of the validation process, the concerns raised are documented in Table 3 of the validation protocol in Appendix A.

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted PDD of September 2005.

3.1 Participation Requirements

The project participant is Lages Bioenergética Ltda of Brazil. The host Party Brazil meets all relevant participation requirements. No Annex I Party is yet identified for the project.

3.2 Project Design

The project avoids methane emissions with project emissions being less than 15 kilotonnes of carbon dioxide equivalent annually. The project is thus eligible as a *Methane avoidance* (Category III.E) small-scale CDM project activity as outlined in Appendix B of the simplified modalities and procedures for a small-scale CDM project activities /7/.

The simplified modalities and procedures give no further guidance on which project emissions to include for determining whether a projects meets the small-scale eligibility threshold for category III.E, i.e. the project emissions shall be less than 15 000 tCO_2e per year. However, the selected definition of the project emissions being the CH_4 and N_2O emissions due to incomplete combustion of biomass with an exclusion of biogenic CO_2 emissions from the combustion of biomass is in line with other approved CDM baseline and monitoring methodologies.

The project design engineering reflects good practice, and the technology as well as know-how being promoted by this project is environmentally safe and sound. The thermoelectric plant is fuelled by biomass residues with high granularity and different calorific values supplied by third parties. Due to the residue characteristics, equipment to treat the residues before its use was installed. This equipment shreds, triturates and homogenizes approximately 10% to 15% of the wood waste and will produce a mix of fuel suitable for combustion in a boiler.

Social and other environmental effects than the reduction of GHG emissions are described. By using biomass residues from wood industries and by generating renewable electricity (no CERs are claimed for displacing grid electricity), the project is likely to contribute to sustainable development in Brazil.

The project will not receive any public funding from Parties included in Annex I. The validation did not reveal any information that indicates that the project's financing can be seen as a diversion of ODA funding towards Brazil.

3.3 Project Baseline

The project baseline is established according to the simplified baseline methodologies for category III.E small-scale CDM project activities (Other Projects Activities / Methane Avoidance) and the baseline scenario is the situation where wood waste is left to decay and methane is emitted to the atmosphere. The amount of methane produced from decay of biomass

landfilled in absence of the project is determined using IPCC emission factors according to the situation of the project. For the wood waste bought in the spot market, the default MCF factor used is 0.4 because the waste disposal site depth is less than 5 meters. For the wood waste bought from one of the suppliers of the plant, Battistella, the MCF considered is 0.8 based on the IPCC default for unmanaged deep waste disposal sites with depths greater than or equal to 5 meters. This supplier was checked during follow up interview and this factor was deemed appropriate for the estimations. For the other supplier, Sofia, a recalculation was required based on a factor of 0.4 and this was correctly applied by the project proponent in the revised PDD /2/.

3.4 Additionality

A simplified baseline methodology may be used for small-scale CDM project activities if the project participants are able to demonstrate that the project activity would otherwise not be implemented due to the existence of barriers. Technological barriers, barriers due to prevailing practice and other barriers were considered. DNV's assessment of the presented barriers is as follows:

DNV was able to confirm that the project faces the presented barriers. Although the technology involved in this scenario is available in the market and has been used effectively in Brazil, this cogeneration project is the first of its kind with such a large installed capacity and with the single aim of selling energy to a grid and steam for commercial purposes. As the co-generation facility does not have its own sources of wood, it also has to have a logistic process that must be implemented to secure continuous supply of wood residues. Moreover, the plant has to pay commercial penalties or to replace energy in the case it is unable to supply energy to the grid due to commercial agreements.

The prevailing practice in the region is to dispose the sawdust and tree barks (wood waste) in open-air piles with no associated control. As the region faces an increasing use of wood, the scenario without the project would be the continued dumping of wood waste. The project thus faces barriers due to prevailing practice. Hence, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to what would have occurred in the absence of the project.

3.5 Monitoring Plan

The project applies the simplified monitoring methodology as described for category III.E small-scale CDM project activities.

The amount of wood waste bought from each source is monitored.

Transport emission factors of biomass transported have been calculated and will be monitored. For the on-site fuel used for transportation the amount of diesel oil purchased will be monitored and recorded on a monthly basis. These values will be added annually and fed in the monitoring spreadsheet. Off-site emissions resulting from the transport of biomass to the project site and for ash transported from the site will be determined based on transport distance, average truck load and average fuel consumption per truck and km. Each new wood waste supplier or new ash disposal site will be registered and data on distance and average truck load will be fed in the monitoring spreadsheet to determine the related transport emissions.

Truck capacity for off-site biomass and ash transportation will be measured using weight measurements equipment. Amount of ash produced and transported to the ash disposal site will be monitored using scales when the ash is leaving the project site.

Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures have been presented in an attached document and were checked during follow up interviews. The monitoring practices are considered appropriate.

3.6 Calculation of GHG Emissions

The baseline calculations are according to the simplified baseline methodology for category III.E small-scale CDM project activities:

$$BE_y = Q_{biomass} * CH_4\_IPCC_{decay} * GWP\_CH_4$$

Where:

BE_y = Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)
$Q_{biomass}$ = Quantity of biomass treated under the project activity (tonnes)
CH_4_GWP = GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)

and

$$CH_4\_IPCCdecay = (MCF * DOC * F * 16/12)$$

Where:

CH_4_$IPCC_{decay}$ = CH_4C CH_4 emission factor for decaying biomass in the region of project activity (tonnes of CH_4/tonne of biomass or organic waste)
MCF = methane correction factor for shallow waste disposal (fraction) (default is 0.4)
MCF = methane correction factor for deep waste disposal (fraction) (default is 0.8)
DOC = degradable organic carbon (fraction, see equation below or default is 0.3)
DOCF = fraction DOC dissimilated to landfill gas (default is 0.77)
F = fraction of CH_4 in landfill gas (default is 0.5)

The methane avoidance was determined using IPCC default MCF for unmanaged, shallow (< 5 m waste) landfills, a DOC of 0.3 for wood waste and a the IPCC default DOC_f of 0.77. The selection of these factors is deemed reasonable.

For the wood waste purchased from the two main suppliers to the co-generation plant, the MCF originally considered was 0.8. This was based on the IPCC default for unmanaged deep waste disposal sites with depths greater than or equal to 5 meters. These two suppliers were visited during follow up interviews in order to confirm the appropriateness of the selected MCF. One supplier – Battistella - has huge amounts of wood waste that are left for decay and the selected factor for MCF of 0.8 is therefore deemed appropriate. The other supplier – Sofia - sells wood waste that is obtained from third parties, making it difficult to justify a MCF of 0.8. In the revised PDD /2/ the MCF for wood waste from this supplier is thus set at 0.4.

Project activity emissions are calculated according to the simplified baseline methodology for category III.E small-scale CDM project activities:

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

where,

PEy = Project activity emissions ($ktCO_2e$/year);
QCbiomass = Quantity of biomass consumed by the project activity (t/year);
Ebiomass = Energy content of biomass (TJ/t);

CH_4bio_comb = CH_4 emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion ($kgCH_4/TJ$). Default value is 300 $kgCH_4/TJ$ according to AMS III.E, which is based on general IPCC default value. However, 30 $kgCH_4/TJ$ was used according to the specific IPCC default value to energy industry;
CH_4_GWP = GWP for CH_4 (tCO_2e/tCH_4);
N_2Obio_comb = N_2O emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kgN_2O/TJ, default value is 4);
N_2O_GWP: GWP for N_2O (tCO_2e/tN_2O).

30 kg CH_4/TJ was used as emission factor for project methane emissions from the combustion of wood waste according to the specific IPCC default value to energy industry. According to the AMS III.E the default value is 300 kg CH_4/TJ. Nonetheless, the selected value of 30 $kgCH_4/TJ$ is based on the IPCC default value for wood and wood waste in the energy industry. The selected emission factor is thus deemed applicable to the project*.

Emissions resulting from the on-site transportation of the biomass are accounted for, and the formula and assumptions used to calculate these emissions seem reasonable and conservative according to IPCC guidelines. Transport emission factors of 3.17 tCO_2/t, of 0.18 $kgCH_4/t$ and of 0.09 kgN_2O/t of biomass transported have been calculated. For all wood waste used this factor will be applied for determining transport related emissions. It is demonstrated that the emissions originating from the transportation of residues to the site and off-site – 411**tCO_2e/year -** are significantly less than the amount that would be produced by the decay of biomass in normal conditions – 223 509 **tCO_2e/year**.

For project activities using biomass, leakage must be considered. Potential leakage effects from competitive uses of biomass as well as from biomass transport are considered. It is established that there presently is no such competitive use of biomass that would deplete the biomass source to the plant. One of the key reasons is that the main activities in the South region of Brazil where the project is located is the wood industry, with many sawmills. These sawmills generate huge amounts of biomass residues (sawdust), and the Brazilian legislation prohibits uncontrolled burning of such biomass. As a result, sawmills have huge amounts of biomass that are left to decay. It is confirmed that the project represents a solution for the biomass residues problem in the region. Therefore, the project is not likely to result in biomass scarcity which could cause other biomass users to switch to other fuels (leakage effects to third parties).

Leakage effects related to the off-site transportation of biomass were also discussed according to paragraph 8 of the simplified baseline and monitoring methodologies for small-scale CDM project activities, which requires that leakage shall be considered in the case of project activities using biomass, the formula and assumptions used to calculate these emissions seem reasonable and conservative according to IPCC guidelines. Transport emission factors of 1.097 $kgCO_2/km$, of 0.00006$kgCH_4/km$ and of 0.000031 kgN_2O/km of biomass transported have been used in calculations. For all wood waste used this factor will be applied for determining emissions related to transports. It is demonstrated that the emissions originating from transportation of residues to the site are significantly less than the amount that would be produced by the decay of biomass in normal conditions/4/.

3.7 Environmental Impacts

According to the Brazilian regulations renewable energy projects are required to have a permit for operation. The environmental operation licence nº CPS/002/2.005 from the Environmental

* Even if the default value of 300 kg CH_4 per TJ is applied, project emissions are expected to be below 15 000 tCO_2e per year.

Agency of Santa Catarina state (FATMA – Fundação do Meio Ambiente) has already been issued. Hence, environmental impacts of the project have been sufficiently assessed and taken into account.

The renewable energy plant has received authorization for implementation through Resolution 583 (29 October 2002) from ANEEL, the Brazilian Electricity Regulatory Agency with capacity of 28 MW.

3.8 Comments by Local Stakeholders

According to Resolution 1 of the Brazilian DNA, local stakeholders were invited to comment on the project. The main Brazilian stakeholders received letters and were asked to provide comments within a period of 30 days. These letters were sent to the validator and were verified during follow up interviews.

The selected stakeholders were: City Hall of Lages, Chamber of Lages, Environment agencies from the State and Local Authority, Brazilian Forum of NGOs, District Attorney (known in Portuguese as Ministério Público, i.e. the permanent institution essential for legal functions responsible for defending the legal order, democracy and social/individual interests) and local community associations. Two positive comments were received.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of August was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 26 July 2005 to 24 August 2005.

Two positive comments were received one on 29 July 2005 and other on 30 July 2005. The comment (in unedited form) and how DNV has taken due account of the comment received is given below.

Comment by: Luciano Koeche Goulart

Inserted on: 29 July 2005

Subject: The importance of Lages Methane Avoidance Project

Comment: The decay of biomass in landfills produce methane gas one of the three major gases that are supposedly causing global warming. It is twenty times more potent than carbon dioxide, and which is produced from decomposing biomass material. Methane (CH4), which is the main component of natural gas, is normally discharged directly into the air. Tractebel Energia S.A. (Suez Group) has a company called Lages Bioenergética Ltda. located in Lages, Santa Catarina State, Brazil. This company has developed a project which produces Biofuels using the wood waste from lumber mills before the decay process begins. This new source of energy has a potential for replacing substantial amounts of fossil fuels currently used to produce Electricity, Thermal energy, or Transportation fuel. Tractebel is already producing 28mw/hr of electric energy, and 25,000kcal/hr (heat) of thermal energy. This project certainly places Tractebel in the right path predicting that wood waste is a major feedstock in both short and long term forecasts of biofuels. Initiative by Companies, like Lages Bioenergética Ltda., focusing investment and

strategies on environmental issues, in developing regions, must be unquestionably appreciated and supported by all of us.

Luciano Koeche Goulart

Ms Finance

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Comment by: Joaquim Goulart Jr.

Inserted on: 30 July 2005

Subject: Lages Bioenergética Project

Comment: With the knowledge that I have regarding the company Lages Bioenergética Ltda, subsidiary of Tractebel Energia S.A. (Suez Group), and its Power Plant, located in the District of Lages, Santa Catarina, Brazil, I strongly believe that this innovator project will fulfill the needs of our state. For a long time this region has been a polo of lumber production. First with the extraction of the pine known as Araucaria Angustifolia (native), and now with the Pines known as Eliotis, and Taeda (new forest plantation).

With the implementation of Lages Bioenergética Ltda, the waste material that comes out from the lumber activities will not be accumulated in the environment anymore or neither be burned in low technologic ovens that promote the release of CO2 into the atmosphere. This Plant will help to reduce the release of Methane Gas into the atmosphere, and it will help to prevent the green gas effect.

This is a project based on the production of renewed energy, using the Lumber Industry waste. This company has a correct ecological approach.

I would like to congratulate Tractebel, and the Suez Group for this great project.

Joaquim Goulart Jr.

Secretary Executive of Lages

Lages, Santa Catarina, Brazil

Phone: 55 49 3222 3798

E-mail: joaquimg@hotmail.com

How DNV has considered the comment received in its validation:

Both comments support the project and do not raise any issues that needed to be assessed in DNV's validation of the project.

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Lages Methane Avoidance Project" in Brazil. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

Being a project activity having less than 15 000 tCO_2e project emissions, the project meets the criteria for Methane avoidance (Type III.E) as defined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

The simplified modalities and procedures give no further guidance on which project emissions to include for determining whether a project meets the small-scale eligibility threshold for category III.E, i.e. the project emissions shall be less than 15 000 tCO_2e per year. The selected definition of the project emissions being the CH_4 and N_2O emissions due to incomplete combustion of biomass with an exclusion of biogenic CO_2 emissions from the combustion of biomass is in line with other approved CDM baseline and monitoring methodologies.

The baseline is established according to the simplified baseline methodology for category III.E small-scale CDM project activities. The amount of methane produced from decay of biomass landfilled in absence of the project is determined using adequate IPCC default emission factors.

An analysis of relevant barriers demonstrates that the proposed project is not a likely baseline scenario and emission reductions are hence additional to any that would occur in its absence of this proposed CDM project activity.

By avoiding landfilling of biomass, the project results in reductions of CO_2 emissions and the avoidance of CH_4 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The project applies the simplified monitoring methodology described for category III.E small-scale CDM project activities. Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures have been presented during interviews with Lages. The monitoring plan is established as a corporate policy.

A consultation process with relevant local stakeholders has been conducted and no comments were received during the consultation process.

Parties, stakeholders and NGOs were invited to provide comments and all issues raised by stakeholders were taken into account during the validation.

In summary, it is DNV's opinion that the "Lages Methane Avoidance Project", as described in the revised and resubmitted project design document of September 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodologies for category III.E small-scale CDM project activities. Hence, DNV requests the registration of the "Lages Methane Avoidance Project" as CDM project activity.

Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of the participating Parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ Project Design Document for the Lages Tractebl Project. Version 1 (August 2005)

/2/ Project Design Document for the Lages Tractebl Project. Version 2 (September 2005)

/3/ Lages Project, *Monitoring document*, 22 September 2005

/4/ Lages Project, *Emission Calculations*, Excel sheets, 22 September 2005

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

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/6/ IPCC, *Good Practise Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. 2000

/7/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 05: 25 February 2005.

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

/8/ Marcio Daian Neves Operational Manager of Lages.

/9/ Jorge Ivanov Hristo Commercial Director of the Supplier Sofia.

/10/ Rogério Franzoi - Supervisor of the production process of Battistella.

/11/ Gabriel Mann – Business Development of Tractebel

/12/ Luiz Carlos Luckner – Director of one of spot supplier Multiform

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APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	NA	Table 2, Section E.4.1 No Annex I party has yet been identified.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	-	Table 2, Section A.3 Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	-	Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4

Requirement	Reference	Conclusion	Cross Reference/Comment
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	The Brazilian DNA is the "Comissão Interministerial de Mudança Global do Clima".
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	Brazil has ratified the Kyoto Protocol on 23 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	NA	No Annex I party has yet been identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	NA	No Annex I party has yet been identified.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The PDD is in line with the CDM-PDD for small-scale CDM project activities (version 02 of 08 July 2005).

Requirement	Reference	Conclusion	Cross Reference/Comment
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD has been published on http://www.dnv.com/certification/ClimateChange. Parties, stakeholders and NGOs have been through the UNFCCC CDM website invited to provide comments on the validation requirement from 26 July 2005 to 24 August 2005. Two comments were received and addressed in the validation report.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. **Project Description** The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1//7/	DR	The project conforms to the small-scale project Type III.E because in the project scenario the emissions related to the combustion of the biomass will be lower than 15 000 tCO_2e annually. The simplified modalities and procedures give no further guidance on which project emissions to include for determining whether a project meets the small-scale eligibility threshold for category III.E, i.e. the project emissions shall be less than 15 000 tCO_2e per year. The selected definition of the project emissions being the CH_4 and N_2O emissions due to incomplete combustion of biomass with an exclusion of biogenic CO_2 emissions from the combustion of biomass is in line with other approved CDM baseline and monitoring methodologies.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	This small-scale methane avoidance project is not part of a larger emission-reduction project.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1//7/	DR	The project is a “Methane avoidance” (Type III.E) small-scale CDM project activity as defined in the simplified modalities and procedures for small-		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			scale CDM project activities.		
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.	/1/				
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project is located at Vivandério Santos do Vale Street, in Lages municipality, in State of Santa Catarina.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	The project will avoid emissions by means of using the biomass that would be left for decay in a cogeneration system of 28 MW. That biomass on normal conditions is dumped in opened air and left to decay. The electric energy will be exported to the grid but the project participants will not claim credits for this.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR	Yes, the projects uses a boiler with a steam turbine, producing electricity and supplying steam to local wood industries, using wood waste from local industries as a fuel.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	No. The technology is fully used in Brazil.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/1//3/	DR	The project will require new safety measures as well as management capacity. The monitoring plan received by DNV establishes that the responsibility of the operator to ensure that the required capacity and internal training is made available to the operational staff to enable them to undertake the tasks required by the Monitoring Plan. Staff training		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			is provided as a corporate training before the initial verification and it was checked during follow up interviews.		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes, the project has a positive impact on the local economy, including the direct and indirect generation of jobs.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	No, all the wood waste is available in the area and it will not mean any increase on the collection of this biomass.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The project is in line with current sustainable development priorities in Brazil.		OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Yes. See Table 1 - 17. The "Environmental License" and also the ANEEL license and Operation License were presented with the PDD.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B. **Project Baseline** The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	Yes. The project applies the simplified baseline methodologies proposed for this project activity: and Category III.E (Methane avoidance), i.e. the methane emissions from biomass that would have otherwise been left to decay.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes, the baseline methodology is applicable.		OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/	DR	Technological barriers, barriers due to prevailing practice and other barriers were considered. DNV's assessment of the presented barriers is as follows: DNV was able to confirm that the project faces the presented barriers. Although the technology involved in this scenario is available in the market and has been used effectively in Brazil, this		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			cogeneration project is the first one with such a large installed capacity and with a single aim of selling energy to grid and steam for commercial purposes. As the facility does not have its own sources of wood, it also has to have a complex logistic process that must be implemented to secure a continuous supply of wood residues. Moreover, due to commercial agreements the plant has to pay commercial penalties or to replace energy in the case of not generating energy to the grid. The prevailing practice in the region is to dispose the sawdust and tree barks (wood waste) in open-air piles with no control. So as the region has an increasing use of wood, the scenario without the project would be the continuing dumping of wood waste. The project thus faces barriers due to prevailing practice. Hence, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	Yes, the selected baseline for the methane avoidance component is the CH_4 emissions from disposing the wood waste on a landfill and leaving it to decay.		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	For methane avoidance no policy is established with respect to controlled biomass burning.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	Yes, all the data is available and the quantity of waste used on the old boilers was checked during follow up interviews.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1//8/	DR	During follow up interviews DNV observed uncontrolled burning of biomass in the wood waste piles of Battistella. As this observation showed that not all wood waste is left for decay, the baseline shall discount a percentage of losses due to this spontaneous combustion. I	~~CAR 1~~	OK
C. **Duration of the Project / Crediting Period** It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/	DR	Yes. The project started on 23 December 2003		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A crediting time of 10 years starting on 01 November 2004 is selected. The project's starting date is prior to the registration of the first CDM project activity and a crediting period starting prior to the registration of the project can thus be selected.		OK
D. **Monitoring Plan** The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology	/1//3/	DR	Yes, the monitoring methodology is according to		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
in line with the monitoring methodologies provided for the relevant project category?			the methodologies established for small scale CDM project category III.E.		
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1//3/	DR	Yes, it complies with the monitoring requirements for small scale CDM project category III.E.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1//3/	DR	Yes		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1//3/	DR	To determine CH_4 avoidance the total amount of biomass burned is monitored. The on-site and off-site transportation are monitored as well.		OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Are the choices of project emission indicators reasonable?	/1/	DR	Yes. There are only two gases to be measured: CH_4 and N_2O from incomplete combustion of biomass and from the transportation of wood waste on-site and off-site. CO_2 emissions associated with the combustion of biomass must not be accounted for since biomass is a climate neutral source of energy.		OK
D.2.2. Will it be possible to monitor / measure the specified project emission indicators?	/1//3/	DR	The biomass consumed by the project can be easily monitored.		OK
D.2.3. Do the measuring technique and frequency comply with good monitoring practices?	/1//3/	DR	The PDD is clear about the monitoring practices.		OK
D.2.4. Are the provisions made for archiving	/1//3/	DR	Yes. For the crediting period plus two years.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
project emission data sufficient to enable later verification?					
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	/1/	DR	Yes, project participants consider as leakage the fuel used to transport the waste wood from off-site locations and ashes as well. All the factors used are according to the IPCC and are correctly applied.		OK
D.3.2. If applicable, will it be possible to monitor / measure the specified leakage indicators?	/1//3/	DR	Yes. The fuel used, quantity of biomass transported and km of distance to off-site locations are monitored.		OK
D.3.3. If applicable, do the measuring technique and frequency comply with good monitoring practices?	/1//3/	DR	Yes, according to the monitoring plan.		OK
D.3.4. If applicable, are the provisions made for archiving leakage data sufficient to enable later verification?	/1//3/	DR	Yes, according to the monitoring plan.		OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Methane avoidance is simply calculated based on amount biomass used as combustible.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.4.2. Will it be possible to monitor / measure the specified baseline emission indicators?	/1/	DR	It needs to be specified how the quality of biomass used will be monitored. Since there are some different kinds of wood biomass and qualities, it has to be demonstrated how it can be assured that the biomass would in absence of the project be left for decay on landfills. As there is biomass with high quality, it is likely that this biomass would be used and not be dumped. In this case, no methane avoidance can be claimed from this biomass. DNV asks more information about this specification.	~~CL 1~~	OK
D.4.3. Do the measuring technique and frequency comply with good monitoring practices?	/1//3/	DR	Yes, the PDD establishes good monitoring practices.		OK
D.4.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?	/1//3/	DR	Yes.		OK
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1//3//8/	DR	Yes, the operator will be responsible for the project management.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1//3//8/	DR	Yes, the operator will be responsible for the project management.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1//3//8/	DR	It was checked during follow up interviews that all personnel responsible for the project are trained as a corporate policy.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	There is no unintended emission. All the processes are controlled.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1//8/	DR	All equipment is calibrated. This mainly comprises the scales, which are calibrated annually.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1//8/	DR	They have a proper maintenance planning.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	It was ascertained that the biomass records are precise. The net value, name of the supplier, date of purchase is filed in a corporate programme.		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1//3//8/	DR	Yes, it is recorded daily in the supervisory system. Backup and transference of data were also checked during follow up interviews and are deemed appropriate.		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1//3//8/	DR	Yes, according to the monitoring plan, new sources of waste wood will be monitored.		OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1//3//8/	DR	Yes, according to the monitoring plan, there will be internal audits.		OK
D.5.11. Are procedures identified for project performance reviews?	/1//3//8/	DR	Yes, according to the monitoring plan, there will be internal auditors to check performance.		OK
D.5.12. Are procedures identified for corrective actions?	/1//3//8/	DR	Yes, according to the monitoring plan, there will be internal auditors to check corrective actions.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E. **Calculation of GHG emission** It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	Yes. CH_4 and N_2O emissions from incomplete combustion of biomass are calculated. Transport emissions are also considered. CO_2 emissions associated with the combustion of biomass are not accounted since biomass generation is considered a climate neutral source of energy.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes, see E.1.1		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR	Yes, according to the formulae established by the simplified baseline and monitoring methodology for small scale CDM project category III.E.		OK
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes, all the sources and calculations are well documented.		OK
E.1.5. Have conservative assumptions been used?	/1/	DR	30 kg CH_4/TJ was used as an emission factor for methane emissions from the combustion of wood waste according to the specific IPCC default value for energy industries. According to AMS III.E the default value is 300 kg CH_4/TJ. The selected		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			emission factor is thus deemed conservative and applicable to the project. It must be noted that even if the default value of 300 kg CH_4 per TJ is applied, project emissions are expected to be below 15 000 tCO_2e per year.		
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	Yes, according formulae established by the simplified baseline and monitoring methodology for small scale project type III.E.		OK
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1//4/	DR	See D.3.1		OK
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	/1//4/	DR	It is demonstrated that there is an abundance of currently not used biomass and the project is thus not likely to cause any biomass shortage which could cause other biomass users to switch to fossil fuels.		OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	/1//4/	DR	A study by the Universidade de Planalto Catarinense (UNIPLAC) was uses as basis for assessing the availability of biomass in the region.		OK
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	/1//4/	DR	Yes, the abundance of biomass is transparently calculated and presented.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2.5. Have conservative assumptions been used (if applicable)?	/1//4/	DR	Yes, the IPCC factors are used.		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?	/1//4/	DR	The only uncertainty is the contracting of new sources of waste wood that is properly taken into account.		OK
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1//4/	DR	For the treatment of the biomass the boundaries are defined as the physical, geographical site where the project takes place. All emissions from transports of biomass and ash occurring off-site are accounted.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1//4/	DR	The emissions related to the methane avoidance are determined based on the formula established for small scale project type III.E. Indirect baseline emissions were calculated according to the AM0004.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1//4/	DR	CH_4 emissions from biomass being landfilled are considered.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1//4/	DR	For the wood waste bought in the spot market, the default MCF factor of 0.4 is used because the waste disposal site depth is less than 5 meters. For the wood waste bought from the two main suppliers of the plant – Sofia and Battistella, the selected MCF is 0.8 based on the IPCC default for unmanaged deep waste disposal sites with depths greater than or equal to 5 meters.	~~CAR 2~~	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			These two suppliers were visited during follow up interviews. Battistella has huge piles of wood waste and a MCF of 0.8 factor is deemed appropriate. However, Sofia obtains the wood waste from third parties and a MCF of 0.8 is thus not justified. Hence, DNV requests that the calculation for the decay of the biomass for Sofia are revised to apply a MCF of 0.4.		
E.3.5. Are the calculations documented in a complete and transparent manner?	/1//4/	DR	Yes		OK
E.3.6. Have conservative assumptions been used?	/1//4/	DR	There are many sawmills operating around Lages. It was checked during site visit that dumping sawdust and tree barks – wood waste - is common practice. This biomass accounts for hundred tonnes and in some places it was observed in decay condition. During follow up interviews DNV also observed uncontrolled burning of biomass in the wood waste of Battistella. As this observation showed that not all wood waste is left for decay, the baseline shall discount a percentage of losses due to this spontaneous combustion as a conservative measure. It needs to be specified how the quality of biomass used will be monitored. Since there are some different kinds of wood biomass and qualities, it has to be demonstrated how it can be assured that the biomass would in absence of the project be left for decay on landfills. As there is biomass with high quality, it is likely that this biomass would be used and not be dumped. In this case, no methane	~~CAR 1~~ ~~CL 1~~	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			avoidance can be claimed from this biomass. However, during the verification phase of the project, it will be important to evidence that the biomass used is of low quality and to assure that it is not wood chips which is used for several other purposes (cellulose, agglomerate, chicken bed) and which is normally not dumped and left for decay.		
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	No uncertainties are foreseen.		OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	During the ten-year crediting period starting 01 November 2004, the project's expected emission reductions are 2 204 394tCO_2e. The annual emission reductions for the methane avoidance component of the proposed project activity are estimated as 220 439tCO_2.		OK
F. **Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1//8/	DR	According to the Brazilian regulations renewable energy projects are required to have a permit for operation. The environmental operation licence nº CPS/002/2.005 from the Environmental Agency of Santa Catarina state (FATMA – Fundação do Meio		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			Ambiente) has already been issued. Hence, environmental impacts of the project have been sufficiently assessed and taken into account. The renewable energy plant has received authorization for implementation through Resolution 583 (29 October 2002) from ANEEL, the Brazilian Electricity Regulatory Agency with capacity of 28 MW.		
F.1.2. Does the project comply with environmental legislation in the host country?	/1//8/	DR	Yes		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	No. If there were any, they would have to be mitigated accordingly to the national requirements to obtain an Environmental License.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Yes		OK
***G.* Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	According to the Brazilian DNA Resolution 1, letters to main local stakeholders were issued.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1//11/	DR	According to Resolution 1 of the Brazilian DNA, local stakeholders were invited to comment on the project. The main Brazilian stakeholders received letters and were asked to provide comments within a period of 30 days. These letters were sent to the validator and were verified during site visit. The selected stakeholders were: City Hall of Lages, Chamber of Lages, Environment agencies from the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			State and Local Authority, Brazilian Forum of NGOs, District Attorney (known in Portuguese as Ministério Público, i.e. the permanent institution essential for legal functions responsible for defending the legal order, democracy and social/individual interests) and local communities associations.		
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1//11/	DR	See G.1.2.		OK
G.1.4. Is a summary of the comments received provided?	/1/	DR	There was no local comment.		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	See G.1.4		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 Although open-air burning of biomass is well forbidden by law, it was observed that spontaneous combustion occurs at the wood waste piles at Battistella. The baseline has to be recalculated considering a discount factor for the methane that is already destroyed due to this spontaneous combustion.	B.2.5 E.3.6	A revised PDD was sent considering a discount factor of 1% over the wood waste supplied by Battistella and treated under the Project, which otherwise would be dumped and left to decay. The baseline for Battistella supplier and consequently the emission reduction amount was recalculated.	The revised PDD discounts wood waste that is left for decaying in order to account for uncontrolled fires in the wood waste piles. As the amount of uncontrolled burning observed during the follow up interview was very small and as appropriate measures are generally taken to alleviate uncontrolled burning, a discount by 1% is considered appropriate. This CAR is closed.
CAR 2 Sofia obtains the wood waste from third parties and a MCF of 0.8 is thus not justified. Hence, DNV requests that the calculation for the decay of the biomass for Sofia is revised to apply a MCF of 0.4.	E.3.4.	A revised PDD was sent considering the 0.4 factor for the Sofia supplier. The baseline for Sofia supplier and consequently the emission reduction amount was recalculated.	The revised PDD considers a MCF of 0.4 for wood waste from Sofia which is deemed appropriate and conservative. This CAR is closed.
CL 1 It needs to be specified how the quality of biomass used will be monitored. Since there are some different kinds of wood biomass and qualities, it has to be demonstrated how it can be assured that the biomass would in absence of the project be left for decay on landfills. As there is biomass with high quality, it is likely that this biomass would be used and not be dumped. In this case, no methane avoidance can be claimed from this biomass.	D.4.2 E.3.6	Is important to point out that the Project will use only wood waste of low quality, with moisture content around 50%, which is normally dumped and left to decay. The wood waste of high quality (chips or dry residues) is not an attractive option to be used as fuel when it is used for other more important purposes (cellulose, agglomerate, chicken bed). As demonstrated in the UNIPLAC study, in 2001 the average	The revised PDD considered the information about the prices and the quality of the wood used to produce energy. The elevated prices of the high quality wood waste shows that it is the low wood waste that will be used in the project. This CL is closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
DNV asks more information about this quality of biomass to be used.		price to the wood waste of low quality was around 5 BRL/tonne (around 2 USD/tonne) and of the high quality was around 17 BRL/tonne (around 7 USD/tonne). Currently, after the Project implementation, more value has been given to wood waste produced in the region and these prices could reach values around 4 USD/tonne and 20 USD/tonne respectively. Therefore, price is a good indicator of the quality of the wood waste used as fuel by the Project. This information was included in the PDD.	

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