



VALIDATION REPORT

SÃO JOÃO LANDFILL GAS TO ENERGY PROJECT (SJ) IN BRAZIL

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DET NORSKE VERITAS



VALIDATION REPORT

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Approved by: Einar Telnes Technical Director	Organisational/Organizational unit: DNV Certification, International Climate Change Services
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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “São João Landfill Gas to Energy Project (SJ)” (hereafter called “the project”) in Brazil on the basis of UNFCCC and host Party criteria’s for the CDM, as well as criteria given to provide consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures 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 documents, 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. The only changes made to this version of the validation report compared to the validation report rev. 02 dated 22 February 2006 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNA of Brazil.

In summary, it is DNV’s opinion that the “São João Landfill Gas to Energy Project (SJ)” as described in the revised PDD of 21 December 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0001 in combination with ACM0002. Hence, DNV will request the registration of the “São João Landfill Gas to Energy Project (SJ)” as CDM project activity.

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Report title: São João Landfill Gas to Energy Project (SJ)		
Work carried out by: Luis Filipe Tavares, Cintia Dias		
Work verified by: Michael Lehmann		
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[Appendix A Validation Protocol](#)

**Abbreviations**

ANEEL	Agência Nacional de Energia Elétrica (Brazilian Electricity Regulatory Agency)
BM	Build margin
BNDES	Brazilian Bank for Development
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CETESB	São Paulo Environment State Agency
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organization
ODA	Official Development Assistance
OM	Operating margin
ONS	Operador Nacional do Sistema Elétrico (National Electric System Operator)
PDD	Project Design Document
SELIC	Brazilian bond interest rate
S-SE-CO	South/ Southeast/Midwest (one of two regional grids in Brazil)
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Biogás Energia Ambiental S/A (Biogás) has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the “São João Landfill Gas to Energy Project (SJ)” at São Paulo Municipality, São Paulo State, Brazil.

This report summarizes the findings of the validation of the project, performed based on UNFCCC and host Party criteria's for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting. The only changes made to this version of the validation report compared to the validation report rev. 02 dated 22 February 2006 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNA of Brazil.

The validation team consisted of the following personnel:

Mr. Luis Filipe Tavares	DNV Rio de Janeiro	Team leader, Waste sector expert
Ms. Cintia Dias	DNV Rio de Janeiro	CDM auditor
Mr. Michael Lehmann	DNV Oslo	Energy sector expert, 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, the 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 /6/, employing 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 corrective actions may provide input for improvement of the project design.

1.3 Sao Joao Landfill Gas to Energy Project

The São João landfill at São Paulo Municipality, São Paulo State, Brazil, started operation in 1992. The landfill has the capacity to receive up to 5 000 tonnes/day of waste and the landfill is expected to be closed in 2006. Until 2003, landfill gas (LFG) was collected only through a passive system, and the collected LFG was vented and occasionally flared at the head of the wells for safety and odour control.

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The “São João Landfill Gas to Energy Project (SJ)” plans to install a LFG collection and treatment system to increase the LFG collection efficiency to 80% and aims to utilize the collected LFG to generate electricity by installing gas engines with a total capacity of 20 MW.

The project will be a landfill gas collection and electricity generation project in Brazil. The project’s core idea is to avoid methane emissions from the landfill managed by São João in the São Paulo municipality and to displace grid electricity that is partly generated with fossil fuel, with electricity generated by the combustion of LFG.

The estimated amount of GHG reduction from the project is 5 718 583 tonnes of CO₂e during the first crediting period (7 years), consisting of 5.450.477 tonnes of CO₂e from avoiding methane emissions and 268 105 tonnes of CO₂e from electricity displacement, and resulting in estimated average annual emission reductions of 816 940 tCO₂e.

2 METHODOLOGY

The validation consisted of the following three phases:

- i) a desk review of the project design documents;
- 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 customized for the project, according to the Validation and Verification Manual /6/. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, 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 “São João Landfill Gas to Energy Project (SJ)” 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
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a Clarification Request (CL), where further clarifications are needed. N/A means not applicable.</i>	<i>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.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>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 Clarification Request (CL) is used when the validation team has identified a need for further clarification.</i>

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD (version 01 of January 2005) /1/ submitted by Biogás and Econergy in January 2005 and the revised version 02 of the PDD of August 2005 /2/ submitted in August 2005 were reviewed by DNV. Finally, a further revised version of PDD was submitted on 21 December 2005 /3/, in which the build margin emission factor was recalculated based on the plant efficiencies recommended by the CDM Executive Board at its 22nd meeting. In addition, spreadsheets containing detailed calculations for the combined margin emission coefficient applied by the project were assessed /4/.

Other documents, such as further project information, Environmental Impact Assessment, Environmental Licenses and license requirements, were reviewed during the site visit on 01 April 2005. Also the letters sent to local stakeholders were reviewed during the follow up interviews in order to ensure the accuracy of the relevant information.

2.2 Follow-up Interviews

On 01 April 2005 DNV performed interviews with Econergy /11/ and the shareholder Arcadis/Logos Engineering office /10/ in the São Paulo municipality, São Paulo State, to confirm and to resolve issues identified during the document review.

The main topics of the interviews were:

- Baseline emission calculations
- IRR and NPV calculations
- Environmental control aspects
- Environmental licenses.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which need to be clarified for DNV's positive conclusion on the project design.

The initial validation of the project identified 05 (five) *Corrective Action Requests* and 03 (three) requests for *Clarification*. These *Corrective Action Requests* and requests for *Clarification* were presented to the project participant in DNV's draft validation report of 20 April 2005 (rev. 0). The project participant's response to DNV's draft validation report findings, including the submission of a revised PDD in August 2005, addressed the *Corrective Action Requests* and requests for *Clarification* to DNV's satisfaction. To guarantee the transparency of the validation process, the concerns raised and the response provided 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 validation findings relate to the project design as documented and described in the PDD of December 2005 /3/.

3.1 Participation Requirements

The project participants are Biogás Energia Ambiental S/A and Municipality of São Paulo of Brazil. The participating host Party Brazil meets all relevant participation requirements and have provided written approval of voluntary participation in the project. No Annex I Party has yet been identified for the project.

3.2 Project Design

The project involves a reduction of emissions of greenhouse gases by avoiding methane emissions and by displacing grid electricity, which is partly generated with fossil fuel, with electricity generated by the combustion of LFG. This objective will be achieved through the installation of an active gas recovery system, a LFG treatment system and electricity generators. The recovered LFG will be as far as possible combusted in the generator and surplus LFG will be burned in a flaring system.

The project technology represents good practise and comprises the following components:

- A high-density polyethylene membrane of an impermeable layer;
- A leachate drainage system using high-density polyethylene pipes;
- A LFG exhaust system, including polyethylene pipe net connected to several collectors to control methane concentration;
- A LFG treatment system through cooling and condensing;
- 21 generators with a capacity of 925 kW each.

The aim of the project is to enhance the already operational passive venting system in order to increase the efficiency of LFG collection, to utilize the LFG for electricity generation, to flare surplus LFG systematically and to continuously monitor the operations. For this purpose, an active recovery system as well as a generation facility will be installed on the landfill. This comprises connecting wellheads through pipes, which will be connected to a blower, where the gas will be sent to the LFG treatment facility from where it will be sent to the electricity generators. This kind of technology is applied in Brazil only in the Bandeirantes Landfill Gas to Energy Project, which is also proposed as CDM project activity.

The project contributes to sustainable development in several ways:

- it is reducing methane emissions that would enhance climate change;
- it is minimizing the risk that any explosions happen on the site;
- Although the project initiative is a replication of what was already implemented at the Bandeirantes landfill, the project can be considered to result in a technology transfer;



- specialized operators will be needed for project operation, resulting in employment and capacity building.

The project complies with the Brazilian policy for sustainable development. The DNA of Brazil has confirmed that the project assists in achieving sustainable development.

The project will be financed by Biogás and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

The expected operational lifetime of the São João Landfill Gas to Energy Project is 21 years and the project applies for a renewable crediting period of 7 years starting on 30 June 2006.

3.3 Project Baseline and Additionality

The project applies the approved baseline methodology AMC0001 “Consolidated baseline methodology for landfill gas project activities” /7/. To calculate the emission reductions originating from displacing grid electricity, the project applies the formulas for calculating an combined margin emission coefficient provided by the approved baseline methodology ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources” /8/.

AMC0001 is applicable to project activities that reduce greenhouse gas emissions through landfill gas capture and destruction of the methane by flaring and/or generating electricity. In the case of the project, such destruction will occur through the combustion of LFG in electricity generators and the flaring of surplus LFG.

As required by AMC0001, the project uses the “Tool for demonstration and assessment of additionality”. DNV’s assessment of the demonstration of the project’s additionality identified some issues that needed further clarifications and the project participants provided further clarification (the concerns raised and the response provided are documented in Table 3 of the validation protocol in Appendix A)

Step 0 - Preliminary screening based on the starting date of the project activity- does not apply as the project’s crediting period is foreseen to start on 30 June 2006,

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The only two scenarios considered are i) the increase of the LFG collection efficiency and the utilization of LFG for electricity generation, selling of the electricity to the open market for a price currently at about 60R\$ (project scenario) and ii) the continuation of the situation prior to project implementation (limited LFG collection with passive system and flaring, i.e. the baseline scenario). A scenario of capturing and flaring LFG could be considered as a further plausible scenario. However, given that there is no legislation in Brazil obliging landfills to collect and flare/use LFG, this is not a likely baseline scenario.

Step 2 - - Investment analysis: An investment analysis, namely a benchmark analysis, is presented to demonstrate that - without CER revenues – São João would not have made the investments to increase the efficiency of the LFG collection system and to install the LFG treatment system and the gas engines in order to utilize the LFG for electricity generation. The argumentation considers that the project IRR of around 15% is smaller than the Brazilian bond interest rate (SELIC) of 23.3% chosen as an indicator for the benchmark analysis. The calculation of the IRR was done considering two separate companies (Biogás for LFG collection and treatment and another sub-unit for the electricity generation).



The IRR and NPV analyses were presented to DNV in detailed spreadsheets and included relevant cash flows both from the revenue from selling the electricity on the open market and the total investment and operating and maintenance costs for both the LFG capture and treatment equipment.

The government bond rate during the year 2003 is selected as benchmark. Although government bond rates have declined in the beginning of 2004, the government bond rate of 2003 is appropriate as this was the prevailing government bond rate by the time of the decision to undertake the project activity.

Step 3 - - Barrier analysis: No barrier analysis was carried out.

Step 4 - Common practice analysis: Collection and utilization of LFG to generate electricity is not common practice in Brazil (with the exception of some few projects proposed as CDM project activities). Common practice in Brazil is to vent methane only for safety reasons.

Step 5 - Impact of CDM registration: It is demonstrated that the registration of the project as CDM project activity will alleviate the economic and financial hurdles for the project, increasing the IRR of the project above the government bond rate threshold of 23.3% and thus making the whole initiative attractive to its investors.

Considering that LFG was already collected and occasionally burnt at the head of the wells for safety and odour control prior to project implementation, it is assumed that 20% of the LFG collected and utilized by the project would also have been collected and flared in the absence of the project. The selected adjustment factor (AF) of 20% is deemed reasonable considering the project specific circumstances and considering that legislation that requires landfills to collect and flare a certain amount of the LFG produced is not likely to be implemented in the short term in Brazil.

3.4 Monitoring Plan

The project applies the approved monitoring methodology AMC0001 “Consolidated monitoring methodology for landfill gas project activities” /7/.

The project applies also the relevant indicators of the monitoring methodology ACM0002 /8/ which is used to determine the combined margin emission coefficient for displaced grid electricity.

Details of the data to be collected, the frequency of data recording, its certainty, and format and storage location are described. The recording frequency of the data seems appropriate for the project. Algorithms and formulas used have also been clearly established. The period for which data will be archived is established according to the monitoring methodology ACM0001.

The Quality Control and Quality Assurance procedures for the project establish several monitoring routines, including data review procedures of monthly reports. This includes the review of emissions reduction calculations by the São Paulo Municipal Secretary of Green and Environment, which is an owner of part of the emission reductions generated by the project.

3.5 Calculation of GHG Emissions

The emission reductions for LFG combustion will be directly monitored and calculated *ex-post* using the approach of the approved methodology.



The *ex-ante* estimation of emission reductions are calculated using a first order decay model and are based on historic and expected future waste amounts from 1992 to 2006 when the landfill is foreseen to be closed. The LFG collection efficiency is assumed to be 80 %. An Adjustment Factor of 20% is applied to account for LFG collected and flared in the baseline scenario.

An *ex-ante* determined emission coefficient that will be multiplied with the ex-post determined amount of net electricity generated by the project and supplied to the grid is selected for calculating emission reductions from displacing grid electricity. The emission coefficient for grid electricity displaced by the project is calculated in accordance with ACM0002. To calculate this emission coefficient, the project uses generation data for the years 2002 to 2004 from ONS for 120 generations units dispatched centrally by ONS in the South-Southeast-Midwest (S-SE-CO) interconnected grid. Furthermore, average plant efficiencies for different power plant types established in an IEA study on the Brazilian grid /9/ and IPCC carbon emission factors for specific fuels were used to calculate plant specific emission coefficients. For the calculation of the build margin emission coefficient, the conservative plant efficiencies recommended by the CDM Executive Board at its 22nd. meeting were applied. The resulting simple-adjusted OM emission coefficient is 0.4310 tCO₂e/MWh (applying an average λ of 0.5135) and the BM emission coefficient 0.1045 tCO₂e/MWh, resulting in a combined margin emission coefficient of 0.2677tCO₂e/MWh (weighted average of the build and operating margin). The emission coefficient calculations were transparently presented in spreadsheets /4/ submitted to and verified by DNV. It must be noted that no hourly dispatch data is publicly available. Hence, λ was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants. The selected approach for calculating λ is in accordance with ACM0002.

Generation data for the years 2002-2004 are the most recent statistics available. The ONS dataset does not include power plants that are locally dispatched. However, it is justified to only include plants dispatched by ONS although they only represent about 80% of the total installed capacity. Data for the remaining plants is not publicly available. Also, these plants operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Hence, these plants are not likely to be affected by a CDM project and the power plants dispatched by ONS are thus representative for the operating margin.

Even though the S-SE-CO grid is connected with the North-Northeast grid, the energy flow between these grids is heavily limited by the transmission lines capacity. It is hence appropriate to consider the S-SW-CO grid for the purpose of determining the BM and OM emission coefficient and to consider imports from the North-Northeast grid at 0 tCO₂/MWh in accordance with ACM0002.

3.6 Leakage

In accordance with ACM0001, no leakage must be considered because all energy used for LFG pumping and operating other project equipment is supplied by electricity generated by the project.

3.7 Environmental Impacts

Biogás Energia Ambiental has a Previous Environmental License for electricity generation with LFG issued by CETESB (state environment agency) after having the Environmental Impact



Assessment carried out for the project evaluated by the SMA/DAIA (state environment secretary). The project will only start its operation after an Operation Environment License is issued.

3.8 Comments by Local Stakeholders

Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighbouring communities and the office of the attorney general, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The letters sent to the local stakeholders were verified during the follow up interviews. One comment was received from the Environment Agency (CETESB) about plausible alternatives for use of LFG and initiatives to reduce waste amount. The comment was adequately addressed by Econergy in their reply to CETESB.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV Certification published the PDD of January 2005 on the DNV Climate Change web site (<http://www.dnv.com/certification/ClimateChange>) and stakeholders were, through the UNFCCC CDM web site, invited to provide comments within a 30 days period from 17 February 2005 to 19 March 2005.

Two comments were received on 20 February 2005 and on 25 February 2005, respectively. The comment received (in unedited form) is given in the below text boxes.

Comment by:	Wally Menne, Timberwatch
Inserted On:	2005-02-20
Subject:	Concerns about DNV certified CDM project in Brazil
Comment:	<p>UNFCCC has not responded to my letter written in November. Can you do better ?</p> <p>Your message has been forwarded to our central registry, where it will be routed to the competent secretariat staff. They will be in a better position to respond to your queries.</p> <p>Thank you.</p> <p>Carrie Assheuer UNFCCC</p> <p>From: "Wally Menne" <plantnet@iafrica.com> To "Carrie Assheuer" To: <cassheuer@unfccc.int>, "Climate change Info Mailing List" <climate-l@lists.iisd.ca>, <durban@seen.org> cc <rafiquee@telkomsa.net> 20/11/2004 00:43 Subject Re: UNFCCC Press release: The Kyoto Protocol's Clean Development Mechanism takes off: first CDM project</p> <p>Dear Carrie</p>



	<p>I write from Durban in South Africa, where World Bank backed attempts are also being made to establish garbage dump gas to electricity projects.</p> <p>The way the local project proponents have handled the public consultation process for the proposed projects has angered many people who feel that there has been mis-representation by the consultants employed, and that many issues of concern were not adequately addressed before the projects were given government approval.</p> <p>In your press release concerning the Brazilian project, there are a number of issues that I would like to query, as I believe that the information in your responses would be relevant in the similar local situation.</p> <p>1) It is time to stop the dishonest use of the euphemism "LANDFILL" to describe garbage dumps.</p> <p>2) Is it not only partially accurate to say that the CDM project " will reduce emissions of methane" when in fact there will be conversion of methane to assorted other gases and chemical pollutants during combustion? Please describe in detail how these converted emissions may impact on human health and the environment.</p> <p>3) The statement "The CDM is an innovative mechanism that mobilises private and public resources for mitigating climate change and, at the same time, promoting sustainable development." needs to be substantiated.</p> <p>Please describe exactly how this project will mitigate against climate change, and also please detail the precise nature and extent of the "sustainable development" that this project will promote.</p> <p>4) The statement "It aims to reduce greenhouse gas emissions from a landfill site by capturing methane to use it for generating electricity and will have direct health and environmental benefits for the local community of Nova Igacú" also needs clarification. "It aims to" is a vague assertion, and it would be appreciated if more precise language could be used. Is it not be possible to state categorically that 'it will definitely' reduce GHG emissions ?</p> <p>It is also unclear how there will be any "direct health and environmental benefits for the local community". In my view this is misleading use of language, and that it would be more truthful to say 'some negative impacts on health and the environment may be reduced'.</p> <p>5) The statement "By using CERs, industrialized countries and companies can comply with their Kyoto and/or national targets at costs below those commonly encountered for domestic projects." implies that there is a global imbalance between the so-called benefits to the participating countries. Cheap CERs seem to provide an attractive incentive to delay GHG reductions in industrialised countries,</p>
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	<p>giving a clear economic advantage to companies that participate in this pretense in my view, at meaningful action.</p> <p>6) Your press release clearly infers that the community of Nova Igacú have suffered negative health and environmental impacts for a considerable period, as a consequence of the effects of the garbage dump concerned. It therefore needs to be asked exactly how this community will now be compensated from the proceeds of the sale of the CERs, and whether the project will be used to justify an extension to the life-span of the garbage dump.</p> <p>In view of the obvious global significance of the first CDM project to be registered, it would be in the interests of all for UNFCCC to provide clear and unambiguous responses to all 6 items listed above. I hope to hear from you soon. Regards Wally Menne</p> <p>----- Original Message ----- From: "Carrie Assheuer" <cassheuer@unfccc.int> To: "Climate Change Info Mailing List" <climate-l@lists.iisd.ca> Sent: Thursday, November 18, 2004 6:00 PM Subject: UNFCCC Press release: The Kyoto Protocol's Clean Development Mechanism takes off: first CDM project > PRESS RELEASE > The Kyoto Protocol's Clean Development Mechanism takes off: first CDM project registered > Bonn, 18 November 2004 – On the day when the crucial ratification for the entry into force of the Kyoto Protocol on 16 February 2005 has arrived, the first project of the Clean Development Mechanism (CDM) has been registered.</p>
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DNV's responses:

With regard to the above comment DNV would like to state that the public stakeholder consultation process is a very useful tool to assure the integrity of the CDM validation process. However, we regret that the possibility to provide comments has been miss-used by Wally Menne, of Timberwatch for expressing a general discontent about certain parties or processes. Nonetheless, a short response to the six issues raised by Wally Menne of Timberwatch is given below:

- 1- The São João Landfill fulfills the real condition/definition of a landfill;
- 2- The conversion of methane into CO₂ through combustion doesn't impact the environment as CO₂ is naturally present in the atmosphere and is considered neutral as this source is from decomposition of renewable sources (domestic waste). Moreover, it must be noted that also CH₄ that would have been released to the atmosphere in the baseline scenario would eventually be oxidized to CO₂ as a natural atmospheric chemical process;



- 3- The practice on Brazil for the disposal of domestic waste is mainly the usage of open dumps. Some municipalities have sanitary landfills and some others, with the help of carbon credits, implemented LFG recovery and burning systems. With the implementation of this kind of project several improvements on health, social and environment benefits can be achieved and represent a more sustainable practice;
- 4- The question refers to another project, but the answer is the same as the above answer to issue #3;
- 5- The Kyoto Protocol and Clean Development Mechanism assure the benefits for Annex I Parties, considering their emission reduction commitment, and benefits for non-Annex I Parties with financial incentives for the transfer of climate friendly technology that contributes to the sustainable development of non-Annex 1 Parties.;
- 6- The answer is the same as the above answer to issue #4.

Comment by:	Axel Michaelowa, Hamburg Institute of International Economics (HWWA)
Inserted On:	2005-02-24
Subject:	Outdated electricity baseline emission factor
Comment:	The electricity baseline emission factor is from an outdated (three-year old) IEA study and should be updated with more recent data.

DNV's response:

The project uses actual generation data for the years 2001 to 2003 for 120 generation units dispatched centrally by ONS in the S-SE-CO grid. Actual fuel use data is not publicly available in Brazil due to competitiveness concerns. The project does not apply the IEA study's fuel data. It only applies the average plant efficiencies for different power plant types established in the IEA study. Together with IPCC carbon emission factors for specific fuels these are multiplied by the actual electricity generation to arrive at the total CO₂ emissions. In the absence of publicly available fuel use data in Brazil, the use of average plant efficiencies for different power plant types established in the IEA study and IPCC carbon emission factors for specific fuels are deemed appropriate.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “São João Landfill Gas to Energy Project (SJ)” at São Paulo Municipality; São Paulo State, Brazil, (hereafter called “the project”). The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participant are Biogás Energia Ambiental S/A and the Municipality of São Paulo. The participating host Party Brazil meets the requirements to participate in the CDM and have provided written approval of voluntary participation in the project. No Annex I Party has yet been identified.

The project plans to install a LFG collection and treatment system to increase the LFG collection efficiency to 80% and aims to utilize the collected LFG to generate electricity by installing gas engines with a total capacity of 20 MW. The project is not expected to have considerable environmental impacts. An Environmental Impact Study as required by Brazilian law has been carried out and the project has received the environmental licences by CETESB.

By promoting renewable energy, the project is in line with the current sustainable development priorities of Brazil. The DNA of Brazil confirmed that the project assists in achieving sustainable development.

The project applies the approved baseline and monitoring methodology ACM0001, i.e. “Consolidated baseline and monitoring methodology for landfill gas projects activities” for the capture and destruction of methane contained in landfill gas. For determining emission reductions from the displacement of grid electricity the project applies ACM0002, i.e. “Consolidated methodology for grid-connected electricity generation from renewable sources”. The baseline methodologies have been applied correctly and the assumptions made for the selected baseline scenario are sound. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in the absence of the project activity.

A combined margin emission coefficient of 0.2677 tCO₂e/MWh (weighted average of the build and operating margin) is calculated in accordance with the baseline methodology ACM0002. The determination of this combined margin emission coefficient is based on actual electricity generation data provided by the National Electricity System Operator (ONS) for the years 2002-2004 in the South-Southeast-Midwest grid.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

By burning of methane of landfill gas and by displacing fossil fuel-based electricity, the project results in reductions of CH₄ and CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project is operated as designed, the project is likely to achieve the estimated amount of emission reductions.

Local stakeholder comments were invited according to the Brazilian DNA Resolution 1 and Parties, stakeholders and NGOs were invited to comment on the validation requirements. The comments received have been taken into account.



In summary, it is DNV's opinion that the "São João Landfill Gas to Energy Project (SJ)" as described in the revised and resubmitted project design document of 21 December 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology for ACM0001 in combination with ACM0002. Hence, DNV will request the registration of the "São João Landfill Gas to Energy Project (SJ)" as CDM project activity.



REFERENCES

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

- /1/ Econergy: *Project Design Document for the São João Landfill Gas to Energy Project*. Version 1 (January 2005)
- /2/ Econergy: *Project Design Document for the São João Landfill Gas to Energy Project*. Version 2 (August 2005)
- /3/ Econergy: *Project Design Document for the São João Landfill Gas to Energy Project*. Version 2B (21 December 2005)
- /4/ Econergy: *Spreadsheet for Calculation of Combined Margin* (ONS Emission Factor SSECO 2001-2003 v 2005-11-29.xls)
- /5/ Comissão Interministerial de Mudança Global do Clima (DNA of Brazil): *Letter of Approval*. 5 April 2006

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

- /6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /7/ Approved Baseline and Monitoring Methodology ACM0001: "Consolidated baseline and monitoring methodology for landfill gas projects activities". Version 02 of 30 September 2005.
- /8/ Approved Baseline and Monitoring Methodology ACM0002: "Consolidated methodology for grid-connected electricity generation from renewable sources" Version 04 of 28 November 2005.
- /9/ Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A. F. Simoes, H. Winkler and J.-M. Lukamba: *Road testing baselines for greenhouse gas mitigation projects in the electric power sector*. OECD and IEA information paper, October 2002.

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

- /10/ Manoel Antonio Avelino Silva - Engineer of Logos Engineering
- /11/ Helvécio Guimarães – Consultant of Econergy

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for 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	-	Table 2, Section E.4.1 No participating Annex I Party is identified yet
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, CDM Modalities and Procedures §40a	OK	Table 2, Section A.3
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, CDM Modalities and Procedures §40a	OK	DNA of Brazil: Letter of Approval, 5 April 2006
5. The emission reductions shall 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
6. Reduction in GHG emissions shall 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. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
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 designated national authority for the CDM is the "Comissão Interministerial de Mudança Global do

Requirement	Reference	Conclusion	Cross Reference / Comment
			Clima ²
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Brazil 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	N/A	No participating Annex I Party is identified yet.
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	N/A	No participating Annex I Party is identified yet.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	OK	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	OK	Table 2, Section B.1.1 and D.1.1
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	OK	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	OK	The PDD was published for public comments in the period 17 February 2005 to 19 March 2005 on www.dnv.com/certification/ClimateChange and comments were invited via the UNFCCC CDM website. Two comments were received and addressed in the validation.

Requirement	Reference	Conclusion	Cross Reference / Comment
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectorial policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	OK	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	OK	PDD is in accordance with CDM-PDD (version 02 of July 2004)

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The São João Landfill Gas to Energy Project is located in the municipality of São Paulo at km 33 of Sapopemba road.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project system's boundaries are limited to the geographic area of the São João Landfill site and include a landfill gas capture, a flaring system and an electricity generation system that supplies electricity to the South-Southeast-Midwest grid.		OK
A.2. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	The project design engineering reflects good practice through the use of the top and bottom cover of the landfill, a landfill gas recovery system, a flaring system and electricity generation facilities.		OK
A.2.2. Does the project use state of the art technology	/1/	DR	Common practice in Brazil is a sanitary landfill		OK

* MoV = Means of Verification, DR= Document Review, I= Interview, N/A=Not Applicable

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
or would the technology result in a significantly better performance than any commonly used technologies in the host country?			without landfill gas treatment and LFG flaring only for safety reasons.		
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	The project is unlikely to be substituted by other more efficient technologies.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	The project needs expertise for the operation of the gas collection and treatment system and the biogas power plant. These operation capabilities will be transferred to the landfill operators by Van der Wiel, a Dutch firm, shareholder of Biogás, and expert on LFG recovery and utilization technologies.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	See A.2.4		OK
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Yes, the biogas power plant has the required Previous Operation License issued by CETESB according EIA presented to SMA/DAIA. It was verified during the site visit that the project received the necessary ANNEL authorization (Resolution ANEEL 328 of 18 Jun 2002 for Electric Energy Generation with 20 MW of capacity).		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The consultation of local stakeholders was carried out according Resolution 1 of Brazilian DNA.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The letters sent were verified and also the comment received from CETESB. The answer from Econergy to the comment received demonstrates that the comment was taken into account appropriately.		
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. The DNA of Brazil confirmed that the project assists in achieving sustainable development		OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is expected to create many jobs during its implementation and some staff will be employed for operation. The project will also create environmental benefits by avoiding odour emanated from the landfill.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved baseline methodology ACM0001 "Consolidated Baseline Methodology for Landfill Gas Project Activities". In addition, ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources" is applied for determining an emission factor for		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			displacing grid electricity.		
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	Yes, the project fulfils the conditions under which AM0001 defines the applicability, it means that the captured gas is used to produce electricity and emission reductions are claimed for displacing energy generated from other sources.		OK
B.2. Baseline Determination <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	<p>Yes, the arguments, which are presented, demonstrate that the project's establishment is in compliance with the chosen baseline methodology ACM0001.</p> <p>The application of the baseline methodology ACM0002 for determining the emission factor for displacing electricity is not documented in the PDD and must be included.</p>	CAR-1	OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	It is mentioned that an Adjustment Factor (AF) of 20 % was selected to account for occasional flaring in the baseline. However, in the CER calculation this figure seems to be omitted.	CAR-2	OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	The baseline methodology was applied taking into account project specific circumstances, such as the project specific requirements contained in the license for operating the landfill and a project specific financial analysis.		OK
B.2.4. Does the baseline scenario sufficiently take into	/1/	DR	Environment regulation in Brazil is more		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
account relevant national and/or sectorial policies, macro-economic trends and political aspirations?			concerned with waste disposal in an adequate way (landfill) and no changes are foreseen regarding new requirements to LFG recovery and destruction.		
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	The baseline emissions are estimated based on IPCC's First Decay Order Methodology, using the amount of waste dumped from 1992 until 2006 when the landfill is foreseen to be closed. However the AF of 20% was not used when calculating the baseline emissions.	CAR-2	OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	The PDD presents, according to the "Tool for demonstration and assessment of additionality" two scenarios (continued LFG release and implementation of electricity generation with LFG).		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?	/1/	DR	<p>The PDD, on section B.3 includes a series of questions according to the "Tool for demonstration and assessment of additionality" to justify why the project is not a likely baseline scenario, by means of an investment analysis.</p> <p>Step 0 does not apply as the project has not yet started.</p> <p>Step 1a - the possible scenarios considered the possibility of only burning LFG in flares.</p> <p>Step 1b - No legal requirement is likely to be implemented with respect capture and destruction of LFG.</p> <p>Step2 The approach was the benchmark analysis, considering the Brazilian interest rate (SELIC) as a comparable index with IRR.</p>	CAR-3	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>However, the demonstration of IRR was made by separating the cash flow of two companies (Biogás and another sub unit) without detailing and relating important figures, like price for LFG sold from Biogás to Second Unit, and the impact on the IRR, the price of this same gas, the price of electricity saved (or sold) in a commercial level and the impact of these on the IRR.</p> <p>DNV requests more information in order to assure more transparency in the additionality justification. Moreover, in accordance with the requirements in the "Tool for demonstration and assessment of additionality", the investment analysis shall be presented in a transparent manner and all the relevant assumptions shall be provided in the PDD, so that a reader can reproduce the analysis and obtain the same results. Critical technical-economical parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rates or capital costs) must be clearly presented and justified in a manner that can be validated by the DOE.</p> <p>Step 4 - Considers that only some few landfills in Brazil are implementing electricity generation with LFG.</p> <p>Step 5 - It is demonstrated that the registration of the project as CDM project activity will alleviate the economic and financial hurdles for the project, overcoming the government bond rate threshold of 23.3% and thus making the</p>		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			whole initiative attractive to its investors.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	The monitoring plan includes the review of Brazilian regulations with respect to LFG regulations.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes		OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	The project is foreseen to start at 30 June 2006 and the project's expected operational lifetime is 21 years.		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 renewable 7 years of crediting period starting on 30 June 2006 has been chosen.		OK
D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved monitoring methodology ACM0001 "Consolidated monitoring methodology for landfill gas to		OK

* MoV = Means of Verification, DR= Document Review, I= Interview, N/A=Not Applicable

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			project activities” and ACM0002 for determining the emission factor for displacing electricity.		
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	Yes, the GHG emissions reductions will be obtained through direct measurement according to the approved monitoring methodology.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	The monitoring table D.2.2.1 does not mention for how long archived data will be kept.	CL-1	OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	In line with one of the applicability conditions, the captured gas is used to produce energy and emission reductions are claimed for LFG destruction and displacing energy generation from other sources.		OK
D.2. Monitoring of Project Emission Reductions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	<p>The monitoring methodology of ACM0001 is correctly applied and project emission reductions are directly monitored. However, the monitoring plan does not mention for how long archived data will be kept</p> <p>The monitoring plan does not apply the relevant elements of ACM0002 monitoring methodology that was used to determine the emission factor for displacing energy generation from other sources. The monitoring plan must include the relevant monitoring indicators of ACM0002.</p>	CL-1 CAR-4	OK OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	Yes		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Yes		OK
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	/1/	DR	Yes		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	Yes		OK
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	No leakage needs to be accounted for as per AMC0001 methodology.		OK
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	Not applicable. According to the approved methodology AMC0001, project emission reductions are directly monitored.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Neither ACM0001 nor ACM0002 nor the Brazilian DNA requires monitoring of sustainable development indicators.		OK
D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Procedures established on QA/QC of PDD and operational and management structure that the project proponent will implement when starting up the project can be considered adequate. The implementation of these procedures and management structure should be verified during the first period verification of emission reductions.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	See 6.1.		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	See 6.1.		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	See 6.1.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	See 6.1.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	See 6.1.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	See 6.1.		OK
D.6.8. 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/	DR	See 6.1.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	See 6.1.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	See 6.1.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	See 6.1.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	See 6.1.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See 6.1.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E. Calculation of GHG Emissions by Source <i>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.</i>					
E.1. Predicted Project GHG Emission Reductions <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	<p>IPPC's first order decay model has been applied to estimate expected LFG generation based on the historic and expected future waste volume. Based on the LFG generation rate, the CH₄ emissions avoided by the project are directly estimated.</p> <p>The project considers the methodology AMC0002 to calculate the Carbon Emission Factor. However the emission coefficient considered was not demonstrated and the mentioned emission coefficient does not match the emission coefficient datasheets provided on March.</p> <p>DNV requests more information about the source off these figures and requests the inclusion of a transparent calculation of this emission factor in the PDD.</p>	CL-5	OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	The expected collection efficiency of the LFG recovery system and the assumed methane fraction in LFG is not mentioned.	CL-2	OK OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The figures k_0 and L_0 considered in the First Order Decay model were verified and considered conservative compared with IPCC default values. However the calculation of LFG production was not evidenced. Electricity displacement: See E.1.1	CL3	
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	See E.1.1 and E.1.2		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	See E.1.1 and E.1.2		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes.		OK
E.2.Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions that occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	No leakage must be considered because the energy used for pumping LFG and operating other project equipment is generated on site.		OK
E.3.Baseline Emissions <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	Not applicable, because emission reductions are directly calculated.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview, N/A=Not Applicable

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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 scenario?	/1/	DR	The project is expected to abate - during the first credit period – 5 450 477 tonnes of CO ₂ e due to LFG destruction and 268 105 tonnes of CO ₂ e due to electricity displacement. However the amount of emission reductions due to LFG destruction was not deducted according to the selected AF of 20%.	CAR-2	OK
F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/		Yes, a Previous Environment License was issued by CETESB according to EIA presented to SMA/DAIA.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	See F.1.1		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	Not foreseen		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Not foreseen		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	No negative environment impacts were foreseen on the project, only positive impacts as methane combustion/destruction and odour reduction.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes		OK
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	<p>The consultation of local stakeholders was carried out according Resolution 1 of Brazilian DNA.</p> <p>The letters sent were verified and also the comment received from CETESB. The answer from Econergy to this comment demonstrates that the comment was taken in account appropriately.</p>		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See G.1.1.		OK
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/	DR	See G.1.1		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	See G.1.2		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See G.1.2		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The application of the baseline methodology ACM0002 for determining the emission factor for displacing electricity is not documented in the PDD and must be included.	B.2.1	According to this request the PDD has been revised to incorporate all emission factor calculation.	OK. The revised PDD (V2 of August 2005) provides the requested clarification, including new figures to calculate the combined margin according to ACM0002 which is presented in complementary spreadsheets and made available for consultation by Econergy.
CAR 2 An Adjustment Factor AF of 20 % as established in the baseline methodology is mentioned in the PDD. However, in the ER calculation this figure was not considered.	B.2.2 B.2.5 E.4.1	The ER calculation considers that 20% of the methane would be flared anyway in the venting equipment (the Effectiveness Adjustment Factor). Therefore, it is mentioned in the PDD at the baseline calculation section.	OK. The revised PDD (V2 of August 2005) and the complementary datasheets identified more clearly the application of the AF. The calculation of the emissions was improved: more recent for the years 2003 and 2004 and only the gas emitted after the start up of the project (2006) is considered.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 3</p> <p>DNV request more information in order to assure more transparency in the additionality justification. Further information is required on important figures, like price of LFG selling from Biogás to Second Unit, and the impact of IRR, the price of this same gas, the price of electricity saved (or sold) on commercial level and the impact of these on IRR of Second Unit. Moreover, in accordance with the requirements in the "Tool for demonstration and assessment of additionality", the investment analysis shall be presented in a transparent manner and all the relevant assumptions shall be provided in the PDD, so that a reader can reproduce the analysis and obtain the same results. Critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital) must be clearly presented and justified in a manner that can be validated by the DOE.</p>	B.2.7	<p>According to the meeting with the auditor Luis Filipe, the financial figures were made available, as well as the PDD was updated to clarify such request.</p>	<p>OK. The clarifications provided during a site visit and complementary information included in the PDD of August 2005 sufficiently state the relevant assumptions for the investment analysis.</p>
<p>CAR 4</p> <p>The monitoring does not apply the relevant elements of the monitoring methodology In ACM0002, "Consolidated methodology for grid-connected electricity generation from renewable sources", which is applied for determining a emission factor for displacing energy generation from other sources. The monitoring plan must include the relevant monitoring indicators of ACM0002.</p>	D.2.1	<p>ACM0001 does not require monitoring of the mentioned data, only of the emission factor, which is done accordingly, as put in table D.2.2.1 in the PDD.</p> <p>Nevertheless, in the revised version of the PDD, the emission factor calculation was considered, as requested in ACM0002The spreadsheets for determining this value are attached to this protocol as supporting documents.</p>	<p>OK. The complementary datasheets document the figures used to calculate the combined margin carbon emission factor. As the combined margin is determined ex-ante and neither the OM nor the BM is monitored ex-post (OM and BM are only updated at renewal of the crediting period), the information included in the monitoring plan was considered satisfactory.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 5</p> <p>The project considers the methodology ACM0002 to calculate the Carbon Emission Factor. However, the PDD considers an adjusted operating margin of 0,453 tCO₂e/MWh instead 0,274 tCO₂e/MWh (weighted average of the adjusted and operating margin). The PDD must be revised accordingly and Annex 3 of the PDD should include further details on the calculations of the emission coefficient.</p>	E.1.1	The decision on whether or not to use only the operating margin instead of the average between both the operating and the build margin is to be taken during the 19 th meeting of the CDM Executive Board.	The revised PDD (V2 of August 2005) consider the emission factor through combined margin as ACM0002 calculated with operation margin and build margin with the weight 50% each. However, the data base considers only the units generation dispatched centrally by ONS and include only 120 units. As ACM0002 establish "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints", DNV request consider the units dispatched by others energy distributors or justify the conservativeness of the figures.
<p>CAR 5 (Continued)</p> <p>However the data base considers only the units generation dispatched centrally by ONS and include only 120 units. As ACM0002 establish "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints", DNV request consider the units dispatched by others energy distributors or justify the conservativeness of the figures.</p>		This has been revised in the PDD. Please refer to section E.4 and Annex 3 for details on the emission factor calculation and all the pertinent justifications.	<p>OK. The revised baseline emission calculations are according to the baseline methodology ACM0002 CDM project activities for energy production for the grid.</p> <p>It is justified to only include plants dispatched by ONS although they only represent about 80% of the total installed capacity. Data for the remaining plants is not publicly available. Also, these plants operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Hence, these plants are not likely to be affected</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
			<p>by a CDM project and the power plants dispatched by ONS are thus representative for the operating margin. The build margin emission coefficient is correctly calculated considering the 20% capacity additions of the most recently installed plants dispatched by ONS.</p> <p>Even though the S-SE-CO grid is connected with the North-Northeast grid, the energy flow between these grids is heavily limited by the transmission lines capacity. S-SE-CO grid for the purpose of determining the BM and OM emission coefficient and consider imports from the North-Northeast grid at 0 tCO₂/MWh in accordance with ACM0002,</p> <p>It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid /10/ is deemed to represent the best data that is currently available.</p> <p>This CAR is therefore closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CL 1 The monitoring table D.2.2.1 does not mention for how long archived data is kept.	D.1.3 D.2.1	There is a conflict between the table used in the approved methodology ACM0001 and the one presented by the CDM-EB in its PDD version 2. Nevertheless, in the "comments" column in the revised PDD, project participants state data will be kept for two years after the end of the crediting period, as requested by ACM0001.	OK. The reviewed PDD (V2 of August 2005) provides the requested clarification.
CL 2 The expected collection efficiency of the LFG recovery system and the assumed methane fraction in the LFG is not mentioned,	E.1.2	This is clarified in the baseline section.	OK. The reviewed PDD (V2 of August 2005) provides the new calculation and considers the efficiency of LFG capture of 80%, what was considered reasonable.
CL 3 The figures k_0 and L_0 considered in the First Order Decay model were verified and considered conservative compared with IPCC default values. However the calculation of LFG production is not evidenced.	E.1.2	The LFG production calculation is submitted attached to this protocol.	OK. The LFG production calculation datasheet provides the requested clarification and could evidence the adequate applicable of reasonable assumptions.

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