



# VALIDATION REPORT

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## FUEL SWITCH AT BSM SUGAR MILLS PROJECT IN MEXICO

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DET NORSKE VERITAS



## VALIDATION REPORT

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Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Beta San Miguel	Client ref.: Luis Alberto Radilla Padilla

DET NORSKE VERITAS  
CERTIFICATION LTD

Palace House  
3 Cathedral Street  
London SE19DE  
United Kingdom  
Tel: +44 (0)20 7357 6080  
Fax: +44 (0) 20 7407 1239  
<http://www.dnv.com>

### Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the Fuel Switch at BSM Sugar Mills project in Mexico 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 and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

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.

In summary, it is DNV's opinion that the "Fuel Switch at BSM Sugar Mills project", as described in the project design document version 03 of 19 March 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AM0036 (version 01 of 29 Sep 2006). Hence, DNV requests the registration of the "Fuel Switch at BSM Sugar Mills" project as a CDM project activity.

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Work carried out by: Felipe Lacerda Antunes, Michael Lehmann and Luis Filipe Aboim Tavares			
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## ***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
ICSA	Ingenio Constancia (Sugar Mill Constancia)
IPCC	Intergovernmental Panel on Climate Change
ISRP	Ingenio de San Rafael de Pucté (Sugar Mill San Rafael de Pucté)
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PPA	Purchase Power Agreement
SINEIA	Sistema Nacional de Evaluación de Impacto Ambiental (National System of Evaluation of Environmental Impact)
UNFCCC	United Nations Framework Convention on Climate Change



## 1 INTRODUCTION

Beta San Miguel has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the Fuel Switch at BSM Sugar Mills Project located in Mexico. The project encompasses two plants: Ingenio Constanica (ICSA), which is located in Tezonapa, Vera Cruz State; and Ingenio de San Rafael de Pucté (ISRP), which is located in Othón P. Blanco, Quintana Roo State.

This report summarizes 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:

Mr. Felipe Lacerda Antunes	DNV Certification, Brazil	Team Leader GHG auditor;
Mr. Luis Filipe Tavares	DNV Certification, Brazil	CDM Validator
Mr. Michael Lehmann	DNV Certification, Oslo	Sector Expert
Mr. Miguel Rescalvo	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, 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, including the approved baseline and monitoring methodology AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006 /14/. The validation team has, based on the recommendations in the Validation and Verification Manual /13/ 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 Description of Proposed CDM Project

The Fuel Switch at BSM Sugar Mills Project proposes to eliminate the consumption of fuel oil in steam boilers at Ingenio Constanica (ICSA) and Ingenio de San Rafael de Pucté (ISRP).

Before the implementation of the project activity, BSM sugar mills used fuel oil and bagasse as energy sources. Fuel oil and bagasse were burned together in cogeneration systems that generated both steam and electricity to serve internal process demands. The implementation of



the project activity began during the sugar harvest 2001/2002, at ISRP, while a second project phase was implemented at ICSA during the harvest in 2004/2005. The project activity included replacements and improvements of several equipments in the two sugar mills. Consequently, the use of fuel oil will be eliminated, with bagasse becoming the only energy source of the mills. The objective of the project is to completely eliminate the use of fuel oil in the next years.

The project is already implemented and its starting date is 14 April 2000.

Emission reductions are claimed from avoiding fossil fuel use. The estimated amount of GHG emission reductions from the project is calculated to be 254 326 tonnes CO<sub>2</sub> equivalents (tCO<sub>2</sub>e) during the first renewable 7-year crediting period (with the potential of being renewed twice), resulting in estimated average annual emission reductions of 36 332 tCO<sub>2</sub>e.

## 2 METHODOLOGY

The validation consists 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 customised for the project, according to the Validation and Verification Manual /13/. 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 initial validation protocol for the Fuel Switch at BSM Sugar Mills 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* (CL) may be used where additional information is needed to fully clarify an issue.



<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>			
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>	<b>Cross reference</b>
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 ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> 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.

  

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
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 ( <b>OK</b> ), or a <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.

  

<b>Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification</b>			
<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
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 initial PDD /1/ (version 01 of 23 December 2005) submitted by Beta San Miguel and Ecoinvest Carbon S.A. was assessed by DNV. However, this PDD was based on the baseline and monitoring methodology ACM0006, which was later considered as not applicable to the project. Hence, a revised version of the PDD /2/ (version 02 of 16 February 2007) applying AM0036 (version 01 of 29 Sep 2006) was submitted by the client and assessed by DNV. After the DNV's assessment of this new version of the PDD Beta San Miguel and Ecoinvest Carbon S.A. submitted for validation a further revised PDD (03 of 19 March 2007) /3/ addressing outstanding issues raised by DNV.

In addition to the PDD, other documents were sent by Beta San Miguel and Ecoinvest Carbon S.A. were assessed by DNV both during the phases of desk review and resolution of outstanding issues. These documents include, among others listed in the section "References": updated spreadsheets containing detailed calculations of project's emission reductions /4/, environmental licences, project's investment analysis (IRR calculation), Letter of Approval issued by the Designated National Authority (DNA) of Mexico /9/ and communication to local stakeholders.

## 2.2 Follow-up Interviews

On March 2007 DNV team conducted interviews with representatives from Ecoinvest Carbon S.A. (on behalf of Beta San Miguel) in order to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
Ecoinvest	<ul style="list-style-type: none"> <li>➤ Management System</li> <li>➤ Environmental Licenses.</li> <li>➤ Consultation of local stakeholders</li> <li>➤ Additionality argumentation</li> <li>➤ Cash flow analysis and IRR</li> <li>➤ Baseline emission calculations</li> <li>➤ The present and past consumption of the biomass and its composition (percentages)</li> <li>➤ Monitoring, reporting and QA/QC procedures.</li> </ul>

## 2.3 Resolution of Clarification and Corrective Action Requests

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

The initial validation of the project identified some *corrective action requests* and requests for *clarification*. The project participant's responses to the findings presented in DNV's draft validation report were resolved during communications between the project participants and DNV leading to the issuance of revisions of the PDD. The latest versions of the PDD successfully addressed all the *corrective action requests* and requests for *clarification* to DNV's satisfaction and incorporated the requirements of the latest version of the applied methodology and the latest PDD template.





To guarantee the transparency of the validation process, the concerns raised and the response provided by the project participants are documented in more detail in the validation protocol in Appendix A.

## **2.4 Internal Quality Control**

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

## **3 VALIDATION FINDINGS**

The findings of the validation of the Fuel Switch at BSM Sugar Mills Project 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 PDD version 03 of 19 March 2007.

### **3.1 Participation Requirements**

The project participant is Beta San Miguel. The host Party Mexico meets all relevant participation requirements and has provided written approval of voluntary participation in the project. No participating Annex I Party is yet identified.

The Fuel Switch at BSM Sugar Mills Project already received the Letter of Approval from the DNA of Mexico (dated 08 March 2007) /9/. The Mexican Government confirmed the project's contribution to the sustainable development of the country.

The project is expected to bring environmental benefits (elimination of fuel oil use, reducing emission of air pollutants and avoiding the environmental impacts associated, elimination of the truck transportation of fuel oil to sugar mills) as well as improvement of work conditions at the site. These benefits are confirmed to contribute to the sustainable development objectives of the Mexican Government.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Mexico.

### **3.2 Project Design**

The project represents a fuel switch from fossil fuel to biomass residues in boilers for steam generation at the two sugar factories.

BSM sugar mills are autonomous in terms of energy demands for the processes (thermal, electrical and mechanical). The sugar mills operate with steam boilers producing steam that drives electromechanical loads and serve thermal needs.

Before implementation of the project activity, fuel oil and bagasse were burned in the five steam boilers at ISRP and one steam boiler at ICSA with fuel oil as the main fuel. Bagasse was used as



a secondary fuel in both plants. The project activity aims to gradually decrease the consumption of fuel oil in the steam boilers by replacing fuel oil with bagasse. After the full implementation of the project activity, the consumption of fuel oil is expected to be totally eliminated.

Table 2 presents general specification about the equipments installed in the two cogeneration plants included in the project activity:

**Table 2 Equipment installed in plants which are part of the Fuel Switch at BSM Sugar Mills Project**

Plant	General equipment specification
ISRP	<ul style="list-style-type: none"> <li>5 steam boilers at 29 kgf/cm<sup>2</sup>, 360°C, 58 t/h, efficiency: 60%. Installed in 1978. Most recent retrofit: 2001.</li> </ul>
ICSA	<ul style="list-style-type: none"> <li>1 steam boiler at 42 kgf/cm<sup>2</sup>, 400°C, 110 t/h, efficiency: 78%. Installed in 1999. Most recent retrofit: 2002/2003.</li> <li>Steam turbines with electricity generation capacity of 12.5 MW (for internal electricity consumption)</li> </ul>

The project design engineering reflects good practice through the use of Rankine steam cycle technology for steam generation.

A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 01 December 2001. The starting date of the project activity is 14 April 2000. The expected operational lifetime of the project is 25 years.

### 3.3 Baseline Determination

The project applies the approved baseline methodology AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006 /14/. This methodology is applicable to the “Fuel Switch at BSM Sugar Mills” project as this project consists of a switch from use of fossil fuels to biomass residues in existing boilers which are retrofitted under the project. The project meets the applicability conditions of AM0036:

- i) The project activity switches from use of fossil fuels to biomass residues, in existing boilers, according to scenario 1 of the AM0036 methodology;
- ii) The project activity is based on the operation of (a) heat generation boiler(s) in an agro-industrial plant generating the biomass residues, which are used in the activity;
- iii) The annual power generated from heat does not increase more than 10% than the highest annual power generation in the most recent 3 years due to the project activity. The highest annual value correspond to the harvesting season 00/01 for the case of ISRP mill (19 164MWh) and the harvesting season 01/02 for the ICSA mill (11 791MWh). It is justified that the increase in power production is not attributable to the project activity but to an increase in sugar production due to a higher market demand for the product. The installed capacity in the baseline configuration would allow increasing the power generation as in the project scenario by the use of bunker oil as fuel.



- iv) It was not possible the use of biomass residues without a significant capital investment in the retrofit of existing boilers;
- v) Existing boilers at the project site have used only bagasse (and no other type of biomass) for heat generation during the most recent three years prior to the implementation of the project activity;
- vi) The analysis of the historic increases in sugar production in both mills included in the PDD, together with the expected increase in sugar production in countries like Mexico, show that an increase in the sugar production would have also occurred in the baseline scenario due to the increase in sugar demand. Hence, any increase in sugar production is not attributed to the CDM project activity but to the normal development of the sugar mill's business;
- vii) Only small quantities of bagasse were used for the start up at the beginning of the sugar can season are stores and always for less than one year;
- viii) No treatment of the bagasse is required for using it as fuel;
- ix) The bagasse is directly generated in the two mills. No additional bagasse is used;
- x) It has been demonstrated that the existing boilers could have operated until the end of the crediting period without any retrofitting. The boilers at ISRP mill were installed in 1978 and the boiler in ICSA mill in 1999. This has been evidenced by different documents provided by the client. Due to the seasonal characteristics of the sugar production and the maintenance practices it can be assumed a lifetime over 50 years for the boilers. This has been confirmed by the company "Servicios de Inspección, Ingeniería y Diagnostico S.A. de C.V" /8/ and is also referenced in technical literature /8/.

The PDD analyzes the alternatives to the project activity and correctly concludes that the most plausible baseline scenario for heat generation is H2 (continuation of operation of the existing boilers using the same fuel mix or less biomass residues as in the past) and the most plausible baseline scenario for the use of biomass residues for the case of the ICSA mill is B3 (the additional biomass residues are burnt in an uncontrolled manner without utilizing them for energy purposes) and for ISRP mill is B3 and B6 (one part of the additional biomass residues is burnt in an uncontrolled manner without utilizing them for energy purposes; another part of the biomass residues were used as fertilizer).

The project boundary is identified as the boilers and related equipment at the project sites (ISRP and ICSA mills).

### 3.4 Additionality

In accordance with AM0036, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality" /15/, which includes the following steps:

Step 0 - Preliminary screening based on the starting date of the project activity: The project was contracted on 14 April 2000 and commissioned on 01 December 2001. The project starting date is therefore 14 April 2000. Evidence that Beta San Miguel seriously considered the CDM in the decision to proceed with the project is provided by a letter from ABTECH (Consultancy firm) dated of 04 February 2000 which refers that retrofit in boilers in order to allow fuel switch could be considered or eligible under the CDM /7/.



Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations: The possible alternative scenarios identified for heat generation:

- H1: The proposed project activity not undertaken as a CDM project activity (heat generation with biomass residues);
- H2: Continued operation of the existing boilers using the same fuel mix or less biomass residues as in the past;
- H4: Improvement of the performance of the existing boilers;
- H5: Continued operation of the existing boilers using the same fuel mix or less biomass residues as in the past as well as installation of new boilers that are fired with the same fuel types and the same fuel mix (or a lower share of biomass) as the existing boilers;
- H6: Replacement of the existing boilers with new boilers.

The possible alternative scenarios identified for the use of biomass are:

- B1: The biomass residues are dumped or left to decay under mainly aerobic conditions (i.e. dumping and decay of biomass residues on fields);
- B2: The biomass residues are dumped or left to decay under clearly anaerobic conditions. (i.e. deep landfills with more than 5 meters);
- B3: The biomass residues are burnt in an uncontrolled manner without utilizing them for energy purposes;
- B7: The proposed project activity not undertaken as a CDM project activity (use of the biomass residues for heat generation).

Given that at the time the PDD was submitted there was no legislation or sectoral policy regulating or promoting the use of bagasse or non-use of fuel oil for heat generation in Mexico, all provided alternatives are to be considered in compliance with the legal and regulatory requirements.

*Step 2 - Investment analysis:* The project IRR has been verified to be 6.7% in phase 1 and -2.8% in phase 2 /5/ Such IRR values are below the selected benchmark IRR (The passive interest rate in Mexico was in 2000 above 15% for phase 1 and above 6% in 2003 for phase 2 of the project, according to the Center of Studies of Public Finance Of Mexico).

Since the project has no revenues, the IRR was estimated based on possible savings due to displacement of fuel oil. Even considering an increase in the price of fuel oil during the project (higher price for fuel oil is considered for ISRP in the IRR calculations as shown in the spreadsheet “BSM IRR two phases ISRP - ICSA.xls”), the project’s IRR is lower than the referred benchmark. Hence, it can be concluded that the project is not financially attractive under normal financial conditions.

*Step 3 - Barrier analysis:* Commercial, institutional and technological barriers as well as barriers due to prevailing practice are presented in the PDD. These barriers show a negative investment environment in the sugar sector in Mexico due to the decrease in sugar prices, the approval of the “*Law for Sustainable Development of the Mexican Sugar Industry*” which dramatically increases the costs of sugar producers and the different government interventions. DNV acknowledges these barriers create a negative incentive for developing the project.



*Step 4 - Common practice analysis:* Co-firing of bagasse in the sugar industry is a wide-spread practice but normally the rate of fuel used per sugar cane processed is high. Hence, it is not representing common practice to have low ratio for fuel used/sugar cane, which is one of the main objectives and also represents the technical challenges of this project. The web page of the *Comite de la Industria Azucarera* of Mexico shows a comparison of the rate of fuel oil consumption (litres) /tonnes of sugar cane for the harvesting season 2005/2006 in 58 sugar mills in Mexico. Out of these 58 mills, only 12 have a rate below 1.0. Two of them have a rate at zero. One of these two is the Constancia mill, which is included in this project. The other mill, ISRP (San Rafael) is ranked at position 8, with a fuel rate of 0.64. It can be concluded from the referred study that only 20% of the sugar mills have a rate under 1.0 and only 3.4% have rate zero, hence it can be considered that this kind of project is not the common practice in Mexico.

*Step 5 - Impact of CDM registration:* Besides adding a positive value to the company, the registration of the proposed project activity under the CDM will result in financial benefits from the revenue obtained by selling CERs. The project participants were able to demonstrate that the sale of CERs will provide the complementary incentives for the project to alleviate the barriers presented above.

Given the above, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional.

### 3.5 Monitoring Plan

The project applies the approved monitoring methodology AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006 /14/.

Data to be monitored includes the quantity of bagasse fired in the boilers and its NCV, the heat generated in the boilers, the quantity of fuel oil used yearly and the electricity generated. The amount of biomass will be measured continuously and will be cross-checked via the quantity of heat generated and the fuel invoices.

Leakage effects for the bagasse that was not internally consumed before the project implementation will be annually evaluated. The company will assess the market to conclude if any new market is emerging for the bagasse.

The company has maintenance and operations procedures, which include the monitoring of process variables, instruments calibration and quality control, according to company policies and engineering best practices. The data is kept electronically in the system, with back-up available. Monthly reports are produced from these data.

Beta San Miguel is responsible for the project monitoring and reporting.

Algorithms and formulas used for emission reduction calculations are clearly established.

### 3.6 Calculation of GHG Emissions

Baseline emissions include CO<sub>2</sub> emissions from fossil fuel combustion in the boilers in the absence of the project activity, determined by multiplying the heat generated with fossil fuels that are displaced by biomass residues with the CO<sub>2</sub> emission factor of the fossil fuel (fuel oil) that would be used in the absence of the project activity and by dividing by the average net efficiency of heat generation in the boilers (60% for ISRP and 78% for ICSA /6/). The project



does not claim any emission reductions for the bagasse left to decay or burnt in the baseline scenario.

According to AM0036, the determination of the heat generated with fossil fuels that are displaced by biomass residues ( $BE_{HG,y}$ ) depends on whether only fossil fuels would be used for heat generation in the absence of the project activity (case A) or whether along with fossil fuels some biomass residues also would be used in the absence of the project activity (case B). Case B is the alternative for “Fuel Switch at BSM Sugar Mills” project. In this case, only the use of biomass residues beyond historical levels should be attributed to the CDM project activity. The heat generated with fossil fuels that are displaced by biomass residues is to be taken as the minimum value among the following two options:

- a) The difference between the total quantity of heat generated from biomass residues in all boilers at the project site in the year  $y$  and the highest annual historical heat generation with biomass residues among the most recent three years prior to the implementation of the project activity; and
- b) The difference between the total quantity of heat generated from biomass residues in all boilers in the year  $y$  and the total heat generation during the year  $y$  multiplied with the highest historical fraction of heat generation with biomass residues from the most recent three years.

The estimated baseline emissions are on the average 36,332 tCO<sub>2</sub>/year over the seven years crediting period.

No project emissions are foreseen as the bagasse is not transported from any other site and the electricity consumption in the project scenario would also occur in the baseline and thus not cause any additional emissions.

The main source of leakage in the methodology AM0036 is considered to be any increase of fossil fuel consumption outside the project boundary due to the diversion of biomass consumed in the baseline outside such boundary. In the baseline scenario the bagasse was fired in the cogeneration system and the remaining bagasse was left to decay or burnt in uncontrolled manner. In the case of ISRP mill, a part of the bagasse was used for producing fertilizers. As the fertilizer is made based on the bagasse ash, there will be no leakage caused by substitution of this in the project scenario. It has been demonstrated that any viable commercial demand for bagasse in the regions of ISRP and ICSA is inexistent. The project developer will monitor the probable leakage affects every year assessing the potential markets for the bagasse that would not have been consumed in the baseline and, if necessary, will calculate the leakage effects.

The estimated amount of GHG emission reductions from the project is calculated to be 254 326 tCO<sub>2</sub>e during the selected first 7-year crediting period (with the potential of being renewed twice), resulting in estimated average annual emission reductions of 36 332 tCO<sub>2</sub>e.

In summary, the GHG calculations are complete and transparent, and the data accuracy has been verified.

### 3.7 Environmental Impacts

In Mexico there are three environmental legislation spheres: municipal, state and federal. SERMANAT – *Secretaría de Medio Ambiente y Recursos Naturales* is the federal organ, each State and Municipality has its main environmental organ. According to *Ley General del Equilibrio Ecológico y la Protección al Ambiente* (Environmental Protection Law), Beta San





Miguel sugar mills are subject to legislation concerning atmospheric emissions and dangerous waste management.

The current legislation regarding registration and transfer of contaminant establishes that the sugar mills must control the atmospheric emissions to assure that it is in accordance with the technical standards; have an emergency plan in case of deviation regarding the standards; and develop and publicize annually atmospheric emissions inventory and submit it to authorized laboratories for analysis. All the sugar mills are under licensing process.

In order to obtain the *Registro de Empresa Generadora de Residuos Peligrosos* (Registry of Dangerous Waste Generator Company) and the *Registro de Empresa Generadora de Residuos no Peligrosos* (Registry of No Dangerous Waste Generator Company), the sugar mills made an inventory of all the dangerous waste under their management, determine generated and transferred volumes, utilize only authorized transportation companies to carry the products, keep daily registration of all this, and inform it half-yearly to SEMARNAT.

Aware of the importance of having a responsible behaviour, in 2005 ISRP joined the *Programa Industria Limpia* (Clean Industry Program). The program requires that members develop an environmental auditing program with the objective of understanding, controlling and continuous improvement of its environment aspects. The first phase of the project is expected to end by 2007. The environmental auditing results were approved by PROFEPA – *Procuraduría Federal de Protección al Medio Ambiente* (Federal Agency of Environmental Protection), which has quarterly followed up and validated the program.

The environmental impact of the project activity is not considered significant and a complete environmental impact assessment was not required. After the assessment of the preliminary environmental report by the state environmental authority some minor requirements were made in order to issue the licenses. Project proponents attended all the requirements.

### 3.8 Comments by Local Stakeholders

Beta San Miguel invited, in December 2005, local stakeholders for comments on the CDM project. Several organizations and entities were invited for comments on the project, like city Halls of all the cities involved in the project, City Council of all the cities involved in the project, Environmental Department of all the cities involved in the project, Environmental Agency of the states involved in the project, Public Attorney Entities of the states involved in the project and NGOs of all the cities involved in the project. No comments were received. Mexican legislation does not require local stakeholders to be consulted.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 16 February 2007 was made publicly available on DNV's climate change website ([www.dnv.com/certification/climatechange](http://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 21 February 2007 to 22 March 2007. No comments were received.

Prior to this, the PDD (version 01 of 23 December 2005) was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were, through the CDM website,



invited to provide comments during a 30 days period from 28 December 2005 to 26 January 2006. No comments were received in this earlier call.

## 5 VALIDATION OPINION

*Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Fuel Switch at BSM Sugar Mills” project in México. 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 project participant is Beta San Miguel. The host Party Mexico meets all relevant participation requirements and has provided written approval of voluntary participation in the project. No participating Annex I Party is yet identified.*

*The Fuel Switch at BSM Sugar Mills project received the Letter of Approval from the DNA of Mexico (dated 08 March 2007). The DNA of Mexico has confirmed that the project assists in achieving sustainable development.*

*The project is a fuel switch from fossil fuel to biomass residues in boilers for heat generation. The sugar mills operate with steam boilers producing steam that drives electromechanical loads and that attends thermal needs. Before the project implementation, the mills used to operate the boilers with fuel oil as main fuel and bagasse as secondary fuel. The project activity reduced the consumption of fuel oil in the steam boilers. After the implementation of the project activity, the use of fuel oil has decreased significantly and is expected to be eliminated in the following years.*

*By promoting renewable energy, the project is in line with the current sustainable development priorities of Mexico.*

*The project applies the approved baseline methodology AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006. This methodology is applicable to the “Fuel Switch at BSM Sugar Mills” project as this project consists of a switch from use of fossil fuels to biomass residues in existing boilers. The project meets the applicability conditions of AM0036. The baseline methodology has been correctly applied 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.*

*The monitoring methodology AM0036 is correctly applied. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.*

*By displacing partly fossil fuel used for heat generation with heat generated from a renewable source, the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project operates as designed, the project is likely to achieve the estimated amount of emission reductions.*

*Local stakeholder comments were invited. No comments were received. Parties, stakeholders and NGOs were invited to comment on the validation requirements via the UNFCCC web-site. No comments were received.*





*In summary, it is DNV's opinion that the Fuel Switch at BSM Sugar Mills project, as described in the revised and resubmitted project design document version 03 of 19 March 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AM0036 - version 01 of 29 Sep 2006. Hence, DNV will request the registration of the Fuel Switch at BSM Sugar Mills project as a CDM project activity.*



## REFERENCES

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

- /1/ Beta San Miguel and Ecoinvest Carbon S.A.: *Project Design Document for the "Fuel Switch at BSM Sugar Mills"*. Version 01 of 23 December 2005;
- /2/ Beta San Miguel and Ecoinvest: *Project Design Document for the Fuel Switch at BSM Sugar Mills* Version 02 of 16 February 2007.
- /3/ Beta San Miguel and Ecoinvest: *Project Design Document for the Fuel Switch at BSM Sugar Mills* Version 03 of 19 March 2007.
- /4/ Spreadsheet – BSM CERs Calculation – AM0036 - 2007-03-19
- /5/ Spreadsheet – BSM IRR Two Phases IRSP – ICSA 2007.03.22
- /6/ Spreadsheet – BSM Boilers Efficiency Calculation IRSP
- /7/ Letter from ABTECH about technical consultancy. 04 February 2000.  
BSM CDM evidence.jpg
- /8/ Remaining lifetime of boilers  
Setter from Servicios de Inspección, Ingeniería y Diagnostico S.A. de C.V,  
Technical literature:
  - Babcock & Wilcox Corporation. "Our boilers and environment equipment. (catalog);
  - Perez, G. L. "La remodelación de la caldera alemana de 25t/h". *Energia*, no. 5, pp. 14-27, 1985;Foster Wheeler Corporation. "Heat engineering. CFB technology aids in redevelopment", 1999.
- /9/ Climate Change Intersecretarial Comission (Comisión Intersecretarial de Cambio Climático) (DNA of Mexico): Letter of Approval dated 08 March 2007.
- /10/ Letter from Servicios de Inspección Ingeniería y Diagnóstico S.A. de C.V. 14 March 2007.
- /11/ Letters sent to local stakeholders
- /12/ Environmental and Urban Development Secretary of Quintana State: protocol of requirement of renewal of the Environmental License for ISRP.  
  
Environmental and Urban Development Secretary of Vera Cruz State: protocol of requirement of issue of the Environmental License for ICSA.  
  
Environmental, Natural Resources and Fishing Secretary: Registry of Dangerous Waste Generator for ISRP and ICSA

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

- /13/ International Emission Trading Association (IETA) & the World Bank's Prototype



Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>

- /14/ CDM-EB: Approved Consolidated Baseline and Monitoring Methodology AM0036 - "Fuel switch from fossil fuels to biomass residues in boilers for heat generation", version 01 of 29 Sep 2006.
- /15/ CDM Executive Board: Tool for the demonstration and assessment of additionality. Version 02 of 28 November 2005.

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

- /16/ Ricardo Besen – Ecoinvest

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## **APPENDIX A**

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### **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	OK	Table 2, Section E.4.1 No participating Annex I Party is yet 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, CDM Modalities and Procedures §40a	OK	Table 2, Section A.3 DNA of Mexico: Letter of Approval dated 08 March 2007
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 Mexico: Letter of Approval dated 08 March 2007
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. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	NA	The project has no public funding.
8. Parties participating in the CDM shall designate a national	CDM Modalities and	OK	The DNA of Mexico is the

Requirement	Reference	Conclusion	Cross Reference / Comment
authority for the CDM	Procedures §29		“Comisión Intersecretarial de Cambio Climático”.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Mexico ratified the Kyoto Protocol on 07 September 2000.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	Not applicable	No participating Annex I Party yet 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	Not applicable	No participating Annex I Party yet identified
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.

Requirement	Reference	Conclusion	Cross Reference / Comment
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 of 16 February 2007 was made publicly available on DNV's climate change website ( <a href="http://www.dnv.com/certification/climatechange">www.dnv.com/certification/climatechange</a> ) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 21 February 2007 to 22 March 2007. No comments were received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral 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 03 of 28 July 2006).

**Table 2 Requirements Checklist**

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <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	Yes. The "Fuel Switch at BSM Sugar Mills", is located in the municipality of Tezonapa, Vera Cruz State, México and in Othón P. Blanco, Quintana Roo State, México		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Project boundary is defined as the boilers and related equipment at the project site.		OK
<b>A.2. Technology to be employed</b> <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	Yes. The project design engineering reflects good practice through the use of the steam Rankine cycle technology for steam rising.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	Yes. The technology used is the Rankine technology adopted worldwide. The project involves switching from use of fossil fuels to biomass residues in existing boilers. DNV requests evidence of the boilers'	CL1	OK

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



Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			efficiency, as well specification of the equipment installed for the boiler's retrofit.		
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No. The project is unlikely to be replaced by other more efficient technologies, at least within the first 7-year crediting period.		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	During the implementation of the project activity, special training was required for the operation of the new equipment installed.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The monitoring plan is straightforward and no specific procedures beyond the established QA/QC procedures will be necessary. The established procedures reflect good monitoring and reporting practices.		OK
<b>A.3. Contribution to Sustainable Development</b> <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. Beta San Miguel environmental licenses have been granted by the national environmental agency (SERMANAT – Secretaría de Medio Ambiente y Recursos Naturales) after all possible environmental impacts were analyzed through an EIA (Environmental Impact Assessment). Besides that, ISRP joined the Programa Industria Limpia (Clean Industry Program). The program requires that members develop an environmental auditing program with the objective of understanding, controlling and continuous improvement of	CL 10	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			its environment aspects. The environmental auditing results were approved by PROFEPA – Procuraduría Federal de Protección al Medio Ambiente (Federal Agency of Environmental Protection). No evidence of the environmental licenses and compliance to legal environment requirements was provided.		
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The project is in line with host country specific requirements.		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 Mexico.		OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is expected to bring environmental (elimination of fuel oil use, reducing emission of air pollutants and avoiding the environmental impacts associated, elimination of the truck transportation of fuel oil to sugar mills) and safety (improvement of work conditions at the site) benefits, thus contributing to the sustainable development objectives of the Mexican Government.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>B. Project Baseline</b> <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>B.1. Baseline Methodology</b> <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	Yes. The project applies the approved baseline methodology AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006 .		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	The project meets the applicability conditions of AM0036 as i) The project activities switch from use of fossil fuels to biomass residues, in existing boilers, according to scenario 1 of the methodology; ii) The project activity is based on the operation of (a) heat generation boiler(s) in an agro-industrial plant generating the biomass residues, which are used in the activity; iii) The heat generated in the boilers is not used for power generation; iv) The use of biomass residues or increasing the use of biomass residues beyond historical levels is technically not possible at the project site without a significant capital investment in the retrofit of existing boilers; v) Existing boilers at the project site have	CL-2 CL-3	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>used only biomass residues (and no other type of biomass) for heat generation during the most recent three years prior to the implementation of the project activity; vi) No biomass types other than biomass residues are used in the boiler(s) during the crediting period (some fossil fuels are co-fired); vii) This project does not have an impact in processing capacity of sugar, as they will not increase their installed capacity because of this project; viii) The biomass residues used at the project site, site where the project activity is implemented, are not stored for more than one year; ix) No significant energy quantities, except from mechanical treatment of the biomass residues, are required to prepare the biomass residues for fuel combustion; x) The biomass residues are directly generated at the project site; xi) All boiler(s) existing at the project site prior to the implementation of the project activity were able to operate until the end of the crediting period without any retrofitting; xii) the most plausible baseline scenario for heat generation is H2: continued operation of the existing boilers using the same fuel mix or less biomass residues as in the past; and xiii) the most plausible baseline scenario for the use of biomass residues is B3: the additional biomass residues are burnt in an uncontrolled manner without utilizing them for energy purposes.</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			DNV requests further clarification about the variables represented in the graph of the incrementing trend of sugar mills. DNV requests further evidences of the technical lifetime of the equipment used prior to the retrofitting in the Mexico industry.		
<b>B.2. Baseline Determination</b> <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>The baseline scenario was identified through the analysis of all realistic and credible alternatives to the project activity that are consistent with current laws and regulations. The chosen baseline scenario is H2 (Continued operation of the existing boiler(s) using the same fuel mix or less biomass residues as in the past) and B3 (The additional biomass residues are burnt in an uncontrolled manner without utilizing them for energy purposes).</p> <p>Section B.4 of the PDD should explicit the steps used for selecting the more plausible scenario, according to the methodology AM 0036.</p>	CL-4	OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	See B.2.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	The baseline has been specifically designed for this project.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. All the national and/or sectoral policies implemented during the initial phase were considered.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Yes		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	See B.2.1		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	<p>In accordance with AM0036, the additionality of the project is demonstrated through the "<i>Tool for the demonstration and assessment of additionality</i>" /15/, which includes the following steps:</p> <p><i>Step 0 - Preliminary screening based on the starting date of the project activity:</i> The project was contracted on 14 April 2000. The project was commissioned on 01 December 2001. Evidence that Beta San Miguel seriously considered the CDM in the decision to proceed with the project was a letter from ABTECH on 04 February 2000 /7/. The letter refers to a possible consultancy of changes in the boilers' systems aiming carbon credits.</p> <p><i>Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations:</i> The possible scenarios are identified, i.e. for heat generation: H1 The proposed project activity not undertaken as</p>	<del>CAR-2</del>	OK

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

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>a CDM project activity (heat generation with biomass residues); H2 Continued operation of the existing boiler(s) using the same fuel mix or less biomass residues as in the past; H4 Improvement of the performance of the existing boiler(s); H5 Continued operation of the existing boiler(s) using the same fuel mix or less biomass residues as in the past AND installation of (a) new boiler(s) that is/are fired with the same fuel type(s) and the same fuel mix (or a lower share of biomass) as the existing boiler(s); H6 Replacement of the existing boiler(s) with new boiler(s). And for the use of biomass: B1 The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields; B2 The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters; B3 The biomass residues are burnt in an uncontrolled manner without utilizing them for energy purposes; B7 The proposed project activity not undertaken as a CDM project activity (use of the biomass residues for heat generation).</p> <p>The provided alternatives are in compliance with the legal and regulatory requirements.</p> <p><i>Step 2 - Investment analysis:</i> The project IRR has been verified /6/ to be 6.7% in phase 1 and -2% in phase 2, which is</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>below the benchmark IRR selected (above 15%, on average, in 2000, when the decision for phase 1 of the project was made; and above 6%, on average, in 2003, when the decision for phase 2 of the project was made, according to the Center of Studies of Public Finance, institution linked to the Mexican Government).</p> <p>Since the project has no revenues, the only possible analysis would be done with an increase in the price of oil that would be replaced by the bagasse. A future increase in the price of oil was already foreseen by BSM for ISRP (please see spreadsheet "BSM IRR two phases ISRP - ICSA.xls"), so that the project's IRR is lower than the benchmark even when the conditions change in favor of the project. Hence, it can be concluded that the project is not financially attractive and thus is additional.</p> <p><i>Step 3 - Barrier analysis:</i> Technological barriers and Investment barriers are presented.</p> <p>At the time the investment decision was made, the Mexican sugar industry faced severe commercial barriers; as international prices decreased, increasing domestic costs and reductions in sales volume were negatively impacting the cash flows of the mills. This situation has led the sugar industry to experience negative cash flows, increasing the difficulties for investment and</p>		

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



Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>the risk of any investment made.</p> <p>The Project faces barriers related to current legal requirements both on the energy and sugar industry sectors. The “Law for Sustainable Development of the Mexican Sugar Industry” considers the payment of sugar cane to growers not only based on the sugar produced by the mill, but also based on all the byproducts produced from sugarcane (e.g. ethanol). In this sense, regardless of the efforts made by the companies to become more competitive and diversify their activities (e.g. by producing ethanol), this law increases the costs of alternative activities, reducing the expected financial returns and consequently their financial attractiveness.</p> <p>The Project faces institutional barriers related to the commercial situation and structure of the sugar industry in Mexico. The relationship between the sugar companies and sugar growers has been punctuated by yearly disputes, triggered by sugarcane’s price establishment. In solving such differences sugar growers usually undertake strikes and takeover the mills before the harvesting season begins. Such a situation represents a constant risk to all sugar mills, increasing the investment risk within the sector. On the other hand, the importance of the sugar industry to Mexico’s economic well-being entails ever-present risk of governmental intervention. This</p>		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>produces a risky environment for investment.</p> <p>As a result of the uncertainty associated with the industry, Mexico currently lags behind other major sugar producing countries in the areas of technology, efficiency and the production of other co/byproducts from sugar cane. BSM had to require services of technical consultancy in order to develop the project.</p> <p><i>Step 4 - Common practice analysis:</i> the project has been demonstrated not to be a common practice.</p> <p><i>Step 5 - Impact of CDM registration:</i> The registration of this project activity in the CDM will add positive value to the company, as well as result in financial benefits from the revenue obtained by selling CERs. The project participants were able to demonstrate that the sale of CERs will provide the complementary incentives for the project to alleviate the above presented barriers.</p> <p>Given the above, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional.</p>		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	Yes		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>C. Duration of the Project/ Crediting Period</b>					
<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	Yes. The project start date is 14 April 2000 with an expected lifetime of 25 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 7-year crediting period was defined, starting in 01 December 2001.		OK
<b>D. Monitoring Plan</b>					
<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>					
<b>D.1. Monitoring Methodology</b>					
<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 AM0036 – “Fuel switch from fossil fuels to biomass residues in boilers for heat generation”, version 01 of 29 Sep 2006		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	AM0036 methodology is applicable to the “Fuel Switch at BSM Sugar Mills” as this project consists of a fuel switch from fossil fuels to biomass residues in boilers for heat		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			generation.		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	Data to be monitored includes the quantity of biomass residue fired in the boilers and its NCV, the heat generated in the boilers, and the quantity of fuel oil used yearly.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	Yes		OK
<b>D.2. Monitoring of Project Emissions</b> <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>No potential project emission sources were established.</p> <p>The PDD states that energy is used for the mechanical treatment of the biomass residues. However, project emissions were not considered.</p>	CAR 1	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	See D.2.1		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	See D.2.1		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	See D.2.1		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	See D.2.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>D.3. Monitoring of Leakage</b> <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 potential emission sources of leakage were established. Leakage effects are sufficiently identified and potential leakage will be monitored.		OK
D.3.2. Are the choices of leakage indicators reasonable?	/1/	DR	NA		OK
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/1/	DR	NA		OK
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/	DR	NA		OK
<b>D.4. Monitoring of Baseline Emissions</b> <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	Data to be monitored includes the quantity of biomass residue fired in the boilers and its NCV, the heat generated in the boilers, and the quantity of fuel oil used yearly. The monitoring frequency of each data and parameter is not established in the PDD. According to the methodology AM 0036, the unit used to the data $HG_{PJ, total, y}$ is GJ/yr, and not TJ/yr, as stated in the PDD.	<del>CL-7</del> <del>CL-8</del>	OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	See D.4.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	See D.4.1		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	See D.4.1		OK
<b>D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <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	AM0036 and the Mexcian DNA do not require the monitoring of social or environmental indicators.		OK
D.5.2. Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/	DR	See D.5.1.		OK
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	See D.5.1.		OK
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	See D.5.1.		OK
<b>D.6. Project Management Planning</b> <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	Project management authority and responsibility are clearly described.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	Beta San Miguel is responsible for the registration, measurement and reporting.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	During the implementation of the project activity, special training was required for the operation of the new equipment installed.		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	The current legislation regarding registration and transfer of contaminant establishes that the sugar mills must have an emergency plan in case of deviation regarding the standards. All the sugar mills are under licensing process.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	The company has maintenance and operations procedures, which include the monitoring of process variables, instruments calibration and quality control, according to company policies and engineering best practices.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	See D.6.5.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	See D.6.5.		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	All data necessary for the monitoring of the project activity is normally monitored as part of plants operations. Therefore, there are several existing reports from which the information will be obtained, depending on the area involved. The data is kept electronically in the system, with back-up available. Monthly reports are produced from these data. The NCV of the bagasse is planned to be measured each six months, in line with the methodology.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and	/1/	DR	See D.6.5.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
uncertainties?					
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	See D.6.5.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	Beta San Miguel is the first Mexican sugar group to achieve ISO 9001:2000. The quality management system of its mills is annually audited according this international quality standard.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	See D.6.5.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See D.6.11.		OK
<b>E. Calculation of GHG Emissions by Source</b>					
<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>					
<b>E.1. Project GHG Emissions</b>					
<i>The validation of ex-ante estimated 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	No potential project emission sources were established. The PDD states that energy is used for the mechanical treatment of the biomass residues. However, project emissions were	<del>CAR-1</del>	OK

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



Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			not considered.		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	See E.1.1		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	See E.1.1		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	See E.1.1		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	See E.1.1		OK
<b>E.2. Leakage</b> <i>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 and estimated ex-ante.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	No potential emission sources of leakage were established .		OK
E.2.2. Have these leakage effects been properly accounted for in calculations?	/1/	DR	See E.2.1		OK
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	/1/	DR	See E.2.1		OK
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	See E.2.1		OK
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/	DR	See E.2.1		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/	DR	See E.2.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>E.3. Baseline Emissions</b> <i>The validation of ex-ante estimated 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	<p>Baseline emissions include CO2 emissions from fossil fuel combustion in the boilers in the absence of the project activity, determined by multiplying the heat generated with fossil fuels that are displaced by biomass residues with the CO2 emission factor of the fossil fuel (bunker oil) that would be used in the absence of the project activity and by dividing by the average net efficiency of heat generation in the boiler(s).</p> <p>According to AM0036, the determination of the heat generated with fossil fuels that are displaced by biomass residues depends on whether only fossil fuels would be used for heat generation in the absence of the project activity (case A) or whether along with fossil fuels some biomass residues also would be used in the absence of the project activity (case B). Case B is the alternative for this project. In this case, only the use of biomass residues beyond historical levels should be attributed to the CDM project activity. The heat generated with fossil fuels that are displaced by biomass residues be taken as the minimum value among the following two options:</p>	<del>CL-5</del> L-6	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>a) The difference between the total quantity of heat generated from biomass residues in all boilers at the project site in the year y and the highest annual historical heat generation with biomass residues among the most recent three years<sup>2</sup> prior to the implementation of the project activity; and</p> <p>b) The difference between the total quantity of heat generated from biomass residues in all boilers in the year y and the total heat generation during the year y multiplied with the highest historical fraction of heat generation with biomass residues from the most recent three years.</p> <p>DNV requests an explanation about the sources consulted to determine the following parameters used in CER calculation: <math>LHV_{\text{bagasse}}</math>, <math>h_{\text{water}}</math>, <math>h_{\text{steam}}</math>, <math>EF_{\text{oil}}</math>, <math>OXID_{\text{oil}}</math>, <math>COEF_{\text{oil}}</math>, <math>LHV_{\text{oil}}</math> and <math>D_{\text{oil}}</math>.</p> <p>DNV requests an explanation about the source of data selected to measure the net efficiency of the boilers when fired with fossil fuels.</p>		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	See E.3.1		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	See E.3.1		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	See E.3.1		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the	/1/	DR	See E.3.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
documentation?					
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes		OK
<b>E.4.Emission Reductions</b> <i>Validation of ex-ante estimated emission reductions.</i>					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to reduce CO2 emissions to the extent of 254 326 tCO2e (36 332 tCO2e / year average) over the first renewable 7-year crediting period.		OK
<b>F. Environmental Impacts</b> <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/	DR	In Mexico there are three environmental legislation spheres: municipal, state and federal. SEMARNAT – Secretaría de Medio Ambiente y Recursos Naturales is the federal organ, each State and Municipality has it main environmental organ. According to Ley General del Equilibrio Ecológico y la Protección al Ambiente (Environmental Protection Law), Beta San Miguel sugar mills are subject to legislation concerning atmospheric emissions and dangerous waste management. The current legislation regarding registration and transfer of contaminant establishes that	CL 10	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>the sugar mills must control the atmospheric emissions to assure that it is in accordance with the technical standards; have an emergency plan in case of deviation regarding the standards; and develop and publicize annually atmospheric emissions inventory and submit it to authorized laboratories analysis. All the sugar mills are under licensing process.</p> <p>In order to obtain the Registro de Empresa Generadora de Residuos Peligrosos (Registry of Dangerous Waste Generator Company) and the Registro de Empresa Generadora de Residuos no Peligrosos (Registry of No Dangerous Waste Generator Company), the sugar mills made an inventory of all the dangerous waste under their management, determine generated and transferred volumes, utilize only authorized transportation companies to carry the products, keep daily registration of all this, and inform it half-yearly to SEMARNAT.</p> <p>Aware of the importance of having a responsible behaviour, in 2005 ISRP joined the Programa Industria Limpia (Clean Industry Program). The program requires that members develop an environmental auditing program with the objective of understanding, controlling and continuous</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			improvement of its environment aspects. The first phase of the project is expected to end by 2007. The environmental auditing results were approved by PROFEPA – Procuraduría Federal de Protección al Medio Ambiente (Federal Agency of Environmental Protection), which has quarterly followed up and validated the program. No evidence of the environmental licenses and compliance to legal environment requirements was provided.		
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	The environmental impact of the project activity is not considered significant and a complete environmental impact assessment was not required. After the assessment of the preliminary environmental report by the state environmental authority some minor requirements were made in order to issue the licenses. Project proponents attended all the requirements.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	See F.1.1		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	See F.1.3		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See F.1.1		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>G. Stakeholder Comments</b> <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	Beta San Miguel invited, in December 2005, local stakeholders for comments on the CDM project. Several organizations and entities were invited for comments on the project, like city Halls of all the cities involved in the project, City Council of all the cities involved in the project, Environmental Department of all the cities involved in the project, Environmental Agency of the states involved in the project, Public Attorney Entities of the states involved in the project and NGOs of all the cities involved in the project. No comments were received. Mexican legislation does not require local stakeholders to be consulted. No evidence of the stakeholder comments was provided.	GL-44	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.1.1		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See G.1.1		OK

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

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**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
<p><b>CAR 1</b></p> <p>The PDD states that energy is used for the mechanical treatment of the biomass residues. However, project emissions were not considered.</p>	<p>D.2.1 E.1.1</p>	<p>Electricity consumption is required only for mechanical treatment of the biomass residues. Since electricity for internal consumption is provided by the mills, and there was no significant increase in the production of bagasse, compared to the consumption in the baseline, project emissions (P<sub>y</sub>) are considered to be zero.</p> <hr/> <p>Both sugar mills had already in the baseline equipments for the mechanical treatment of the sugar cane. No specific mechanical treatment for Bagasse was required in the project.</p> <p>Power consumption for ISRP was, in the last year of the baseline, 20,267 MWh, and in the first year of the project, 19,589 (3.3% decrease).</p> <p>Power consumption for ICSA was, in the last year of the baseline, 12,051 MWh, and in the first year of the project, 14,684</p>	<p>DNV requests information about what the mechanical treatment of the biomass residues consists of and what is its related electrical consumption is. The percentage of bagasse that was used for heat generation before project implementation is not stated, as well as what used to be the mechanical treatment of the biomass residues prior to project implementation, its electrical consumption and if it was necessary to treat the bagasse that was not used for heat generation. Please explain what the final disposal of the bagasse that was not used for heat generation was prior to project implementation.</p> <p>This CAR remains opened.</p> <hr/> <p>It is clearly stated that there is no specific mechanical treatment for bagasse, only the one used in the process. Consequently, there are no project emissions.</p> <p>The former use of bagasse prior to project implementation is now described in the PDD.</p> <p>Therefore this CAR is closed.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<p>(22% increase).</p> <p>Though the installed power of the equipments for sugar mechanical treatment increased, for ISRP, in 14%, and in ICSA, in 44%, after the project, it is clear that this increase of power was not responsible for the increased energy consumption in ICSA (only 22%). In ISRP, the energy consumption even decreased after the project</p>	

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p><b>CAR 2</b> The barriers presented for additionality demonstration are too generic, and no evidences were presented that support them.</p>	B.2.7	<p>Please see detailed barriers in section B.5</p> <hr/> <p>Beta San Miguel required the service of technical consultancy in order to develop the project, as shown in the PDD, pages 20 and 21 (see annexed file "BSM technical consultancy.pdf").</p>	<p>The revised PDD presents commercial, institutional and technological barriers as well as barriers due to prevailing practice. These barriers demonstrate a negative investment environment in the sugar sector in Mexico due to the decrease in sugar prices and the approval of the "<i>Law for Sustainable Development of the Mexican Sugar Industry</i>", which dramatically increases the costs for sugar producers and the different government interventions. However, DNV request a better explanation about the research efforts required to enable the increase of biomass residues use and reduce fuel oil use, described as a technological barrier.</p> <p>This CAR remains opened.</p> <hr/> <p>The content of technical consultancy report aiming to develop the project was received and is deemed satisfactory.</p> <p>Therefore this CAR is closed.</p>
<p><b>CL 1</b> DNV requests evidence of the boilers' efficiency, as well specification of the equipment installed for the boiler's retrofit.</p>	A.2.2	<p>Please see algorithm in annexed file "BSM boilers efficiency calculation.xls".</p> <p>Retrofitted equipments:</p> <p>ISRP:</p> <ul style="list-style-type: none"> <li>- Automation and retrofit of instrumentation in five boilers</li> <li>- Change of grating in five boilers</li> </ul>	<p>The algorithm presented does not explain clearly enough how were obtained the values of the boilers' efficiency (60% for ISRP and 78% for ICSA).</p> <p>Therefore this CL remains opened.</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<ul style="list-style-type: none"> <li>- Installation of bagasse feeders</li> <li>- Change of induced blowers</li> <li>- Retrofit of piping and thermal insulation</li> </ul> ICSA: <ul style="list-style-type: none"> <li>- Substitution of economizer and pre-heater</li> <li>- Substitution of the super-heater</li> <li>- Substitution of bagasse feeders</li> <li>- Substitution of gas washers</li> <li>- Substitution of automation system</li> </ul> <hr/> Please see annexed spreadsheet "BSM boilers efficiency calculation ISRP.xls", with an example of boiler's efficiency calculation for ISRP.	<hr/> The calculations of the boiler's efficiency are clearly presented. Therefore this CL is closed.
<b>CL 2</b> DNV requests further clarification about the variables represented in the graph of the incrementing trend of sugar mills.	B.1.2	Variables in the graph were clarified. Please see section B.2	The graph clearly presents the sugar production in each harvest. The 1999 strategic plan was also presented, evidencing the goal to increase the production. Therefore this CL is closed.
<b>CL 3</b> DNV requests further evidences of the technical lifetime of the equipment used prior to the retrofitting in the Mexico industry.	B.1.2	The remaining lifetime of all the project boilers is larger than the duration of the crediting period, as shown in a document prepared by the company Servicios de Inspección, Ingeniería y Diagnostico S.A. de C.V, which is in	The declaration prepared by the company in charge of the maintenance states the technical lifetime of the equipment used is 50 years. Therefore this CL is closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		charge of the maintenance of BSM's equipments (see annexed file "BSM lifetime equipments.pdf").	

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<b>CL 4</b> Section B.4 of the PDD should explicit the steps used for selecting the more plausible scenario, according to the methodology AM 0036.	B.2.1	Scenario steps were explicated, as shown in section B.4	Section B.4 explicits step 1 and references section B.5 for step 2. Therefore this CL is closed.
<b>CL 5</b> DNV requests an explanation about the sources consulted do determine the following parameters used in CER calculation: $LHV_{bagasse}$ , $h_{water}$ , $h_{steam}$ , $EF_{oil}$ , $OXID_{oil}$ , $COEF_{oil}$ , $LHV_{oil}$ and $D_{oil}$ .	E.3.1	Source for $EF_{oil}$ , $OXID_{oil}$ , $COEF_{oil}$ , $D_{oil}$ : is IPCC 2006  Source for bagasse LHV, $h_{water}$ , $h_{steam}$ are on-site measurements.	Data sources are clearly stated and its consistency was checked. Therefore this CL is closed.
<b>L 6</b> DNV requests an explanation about the source of data selected to measure the net efficiency of the boilers when fired with fossil fuels.	E.3.1	In order to measure the efficiency of the boilers, BSM measures the oxygen content in the combustion gases of each boiler. Besides, Testo portable meters are used to measure oxygen content in the output gases in the chimneys to crosscheck the first results. Additionally, the algorithm shown in annexed file "BSM boilers efficiency calculation.xls" is used.	It is clearly stated in the PDD the methodology for on site measurements of the net efficiency of the boilers when fired with fossil fuels. Therefore this CL is closed.
<b>CL 7</b> The monitoring frequency of each data and parameter is not established in the PDD.	D.4.1	The monitoring frequency of each data and parameter is established in section B.7.1 <hr/> The monitoring frequency of $HG_{PJ,total,y}$ is established in section B.7.1	The monitoring frequency of the data $HG_{PJ,total,y}$ is not yet established in the PDD. <hr/> Therefore this CL remains opened. <hr/> The monitoring frequency of all data and parameter are presented in the PDD. Therefore this CL is closed.
<b>CL 8</b> According to the methodology AM 0036, the unit used to the data $HG_{PJ,total,y}$ is GJ/yr, and	D.4.1	The unit used to the data $HG_{PJ,total,y}$ is GJ/yr, as shown in section B.7.1	The unit used to the data $HG_{PJ,total,y}$ was corrected. Therefore this CL is closed

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
not TJ/yr, as stated in the PDD.			

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<b>CL 9</b> According to the guideline for completing the Project Design Document (CDM-PDD), date should be described in the DD/MM/YYYY format.		Dates are described in the DD/MM/YYYY format.	Dates format were corrected. Therefore this CL is closed.
<b>CL 10</b> No evidence of the environmental licenses and compliance to legal environment requirements was provided.	A.3.1 F.1.1	<p>Please find annexed Environmental Licenses and Registry of Dangerous Waste Generator</p> <hr/> <p>Please find annexed Registry of Dangerous Waste Generator for ICSA.</p> <p>ISRP will present an evidence of the requirement of renewal of the Environmental License.</p> <p>Since ICSA is an old mill, it did not need to have an Environmental License. Anyway, ICSA decided to apply for it and will present a protocol of the requirement of the Environmental License.</p>	<p>The Environmental License of the sugar mill San Rafael de Pucte has expired in 14<sup>th</sup> February 2007.</p> <p>Evidence of request for renewal of the environmental license for San Rafael and compliance to legal environment requirements was provided for the sugar mill Constancia.</p> <p>The CL is thus closed.</p>
<b>CL 11</b> No evidence of the stakeholder comments was provided.	G.1.1	Please see invitations for stakeholders comments in annexed files "BSM_San Rafael de Pucte_cartas invitan comentarios.tif" and "BSM_Constancia_cartas invitan comentarios.tif" (ALREADY SENT).	Letters with invitations for stakeholders were received. Therefore this CL is closed



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## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



## CERTIFICATE OF COMPETENCE

### *Michael Lehmann*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	Yes
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1,2,3 & 9		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes



## CERTIFICATE OF COMPETENCE

***Felipe Lacerda Antunes***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	No	<b>JI Validator:</b>	No
<b>CDM Verifier:</b>	No	<b>JI Verifier:</b>	No
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	No	AM0021	No
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	No	AM0023	No
ACM003, ACM0005, AM0033, AM0040	No	AM0024	No
ACM0004	No	AM0027	No
ACM0006, AM0007, AM0015, AM0036, AM0042	No	AM0028, AM0034	No
ACM0007	No	AM0030	No
ACM0008	No	AM0031	No
ACM0009, AM0008, AMS-III.B	No	AM0032	No
AM0006, AM0016, AMS-III.D	No	AM0035	No
AM0009, AM0037	No	AM0038	No
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	No	AM0041	No
AM0014	No	AM0034	No
AM0017	No	AMS-II.A-F	No
AM0018	No	AMS-III.A	No
AM0020	No	AMS-III.E, AMS-III.F	No



## CERTIFICATE OF COMPETENCE

***Luis Filipe Tavares***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	No
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	No
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 13		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	No	AM0021	No
ACM002, AMS-IA-D, AM0019, AM0026, AM0029	No	AM0023	No
ACM003, ACM0005, AM0033, AM0040	No	AM0024	No
ACM0004	No	AM0027	No
ACM0006, AM0007, AM0015, AM0036, AM0042	No	AM0028, AM0034	No
ACM0007	No	AM0030	No
ACM0008	No	AM0031	No
ACM0009, AM0008, AMS-III.B	No	AM0032	No
AM0006, AM0016, AMS-III.D	No	AM0035	No
AM0009, AM0037	No	AM0038	No
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	No	AM0041	No
AM0014	No	AM0034	No
AM0017	No	AMS-II.A-F	No
AM0018	No	AMS-III.A	No
AM0020	No	AMS-III.E, AMS-III.F	No

Høvik, 6 November 2006

Einar Telnes  
Director, International Climate Change Services

Michael Lehmann  
Technical Director



# CERTIFICATE OF COMPETENCE

***Miguel Rescalvo***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>			
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	--
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	--	AM0041	Yes
AM0014	Yes	AM0034	--
AM0017	Yes	--	
AM0018	Yes	--	
AM0020	Yes	--	

Høvik, March 15, 2007

Einar Telnes  
Director, International Climate Change Services

Michael Lehmann  
Technical Director