

**VALIDATION OF THE PROJECT:
PANUCO BAGASSE COGENERATION PROJECT**

**Ingenio Panuco Sapi de CV
(MEXICO)**

REPORT NO. CDMVAL-14-001-0.3

APRIL, 2015

VALIDATION REPORT VVS



Date of first issue:	24/06/2014	Project No.:	Pending
Audit team:	Erika Lucia Urrego Ortiz ICONTEC Lead Auditor Fernando Gomez Technical Expert	Organizational unit:	Instituto Colombiano de Normas Técnicas y Certificación – ICONTEC Carrera 37 No. 52-95 Bogotá - Colombia
Version No.:	0.3	Last version date:	April 2015
Client:	Ingenio Panuco Sapi de CV	Client ref.:	CDM – VAL 14-001

Summary:

ICONTEC has performed the validation of the project: *Panuco Bagasse Cogeneration 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 proposed project activity under the validation process is based on methodology ACM0006 - Version 12.1.1. The project will replace the actual cogeneration plant that operates with fossil fuel (bunker) and bagasse by a new cogeneration plant that will operate with only bagasse. The actual cogeneration plant has an installed capacity around of 17 MW, with the new plant will increase the installed capacity on 100 MW for a total of 117 MW to the sugar mill.

The CDM project activity is compose by two phases:

1st Phase: (2016 to 2019)

This phase involves the installation of a new boiler that will combust only bagasse with operational conditions around 83 bar and 538°C and a new back- pressure steam turbine of around 40 MW, which will substitute the current turbines, totalizing an installed capacity of 57MW (17 MW back-up and 40 MW new back-pressure turbine). As a result, the site will continue to cover its entire energy consumption and will export around 29 MW to the national power grid, which represents about 147,207 MWh per year of net electricity.

2nd Phase (2020)

This phase involves the installation of other new boiler that will operate only bagasse with operational conditions around 83 bar and 538°C and a new condensing steam turbine of around 60 MW totalizing 117 MW of installed capacity in the cogeneration plant. On the sugar mill will continue to cover its entire energy consumption and will export to the national power grid around 162,883 MWh per year of net electricity.

The CDM project activity will reduce an annual average of 99,633 tCO₂e for total GHG emission reduction of 697,430 tCO₂e.

The validation process 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 ICONTEC's opinion that the project *Panuco Bagasse Cogeneration*, as described in the version 04 of the project design document, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0006 - Version 12.1.1. Hence, ICONTEC requests the registration of the project as CDM project activity.

VALIDATION REPORT VVS



<i>Report No:</i>	14-001-0.3	<i>Subject Group:</i>	1 Energy industries (renewable - / non-renewable sources) TA 1.2. Renewables	<i>Indexing terms:</i>
<i>Report title:</i> Panuco Bagasse Cogeneration Project				Climate Change; Kyoto Protocol; Validation; Clean Development Mechanism

<i>Work verified by</i>	Eng. Francy Ramirez ICONTEC Technical reviewer Eng. Cristian Grisales ICONTEC Technical Expert reviewer	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution
<i>Technical review date:</i>	28-29/07/2014	
<i>Number of pages:</i>	78	

This report should not be read without reference to the annex A, Validation Protocol.

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CFE	Comisión Federal de Electricidad (Federal Electricity Commission)
CERs	Certified emission reductions
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon dioxide equivalent
CRE	Comisión Reguladora de Energía (Energy Regulatory Commission)
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
GHG	Greenhouse Gases
I	Interview
ICONTEC	Colombian Institute of technical standards and certification (Instituto Colombiano de Normas Técnicas y Certificación)
IPCC	Intergovernmental Panel on Climate Change
MoC	Modalities of Communication
MoV	Means of verification
MP	Monitoring Plan
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
VVS	CDM Validation and Verification Standard
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales (Secretariat of Environment and Natural Resources)

Table of Contents

1.	INTRODUCTION.....	6
1.1.	OBJECTIVE.....	6
1.2.	SCOPE	6
1.3.	GHG PROJECT DESCRIPTION	7
2.	METHODOLOGY.....	9
2.1.	FOLLOWUP INTERVIEWS.....	10
2.2.	RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS.....	11
2.3.	INTERNAL QUALITY CONTROL	11
2.4.	VALIDATION TEAM	11
3.	VALIDATION FINDINGS	12
3.1.	OVERVIEW.....	12
3.2.	GENERAL REQUIREMENTS	12
3.2.1.	APPROVAL AND AUTHORIZATION	12
3.2.2.	MODALITIES OF COMMUNICATION	13
3.3.	PROJECT DESIGN.....	14
3.3.1.	PRIOR CONSIDERATION OF THE CDM	19
3.4.	BASELINE DETERMINATION AND ADDITIONALITY	20
3.5.	MONITORING PLAN	30
3.6.	CALCULATION OF GHG EMISSIONS.....	33
3.7.	ENVIRONMENTAL IMPACTS	36
3.8.	COMMENTS BY LOCAL STAKEHOLDERS	36
4.	GLOBAL STAKEHOLDERS CONSULTATION.....	37
5.	VALIDATION OPINION	37
6.	REFERENCES.....	39
7.	ANNEXES.....	41

LIST OF TABLES

Table1: Follow up Interview	10
Table2: Validation Team	11
Table3: Approval Letter	13
Table4: Methodology Applicability Conditions Analysis	15
Table5: Assessment of baseline	22
Table6: Parameters of Cash Flow	26
Table7: Investment Analysis Parameters	26
Table8: NPV of the scenarios	28
Table9: Sensitivity analysis	28
Table10: Parameters Ex-Ante Validation	30
Table11: Parameters Ex-Post Validation	32
Table A 1: Validation Protocol	43
Table A 2: Resolution of Corrective Action, Forward Action and Clarification Request	61

1. INTRODUCTION

Ingenio Panuco Sapi de CV has commissioned ICONTEC to perform the Validation of Panuco Bagasse Cogeneration Project (hereafter called “the project”).

This report summarizes the findings in the validation of the project, which was performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

According to the documentation the proposed project activity is a new bagasse cogeneration plant that will be part of the existing sugar mill that currently processes approximately 1,500,000 tonnes of sugar cane per year.

The project will replace the actual cogeneration plant that operates with fossil fuel (bunker) and bagasse by a new cogeneration plant that will operate with only bagasse. The actual cogeneration plant has an installed capacity around of 17 MW, with the new plant will increase the installed capacity on 100 MW for a total of 117 MW to the sugar mill.

1.1. OBJECTIVE

The purpose of a validation is to secure the opinion of an independent third party in order to assess the project’s design: the project’s baseline, the monitoring plan, and the project’s compliance with relevant UNFCCC.

Host Party’s 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 involves an independent and objective review to determine that the project design meets the following criteria:

- UNFCCC criteria: The Kyoto Protocol Article 12 criteria, modalities and procedures for CDM (Marrakech Accords) and the relevant decisions by the CDM Executive Board, and
- Host Party criteria: National CDM requirements, including sustainable development priorities and potential specific requirements contained in, for example, the preliminary approval by the Designated National Authority or project agreements between involved parties.

ICONTEC carries out audits according to its ethics code and internal procedures for

carrying out validation, verification and certification audits of CDM project activities, which, in turn, are based on the Validation and Verification Standard (VVS). Likewise, ICONTEC focuses on the identification of significant risks for CER generation, and verification of the mitigation during its audits.

The validation does not intend to provide any consulting for the project participants. However, states requests for clarifications and/or corrective actions can provide inputs for improvement of the project design.

1.3. GHG PROJECT DESCRIPTION

The proposed project is a new bagasse cogeneration project in México, located in the Panuco municipality basin in the Veracruz State which belongs to Pantaleon Group. Pantaleon Group is an agro industrial organization dedicated to the processing of sugar cane for the production of sugar, molasses, alcohol and electricity. Currently, as a group is the largest producer in Central America and is ranked among the top ten in Latin America. <http://www.pantaleon.com/acerca-de-pantaleon>.

Prior to the project activity, steam demand for cogeneration purposes was covered by 5 boilers that totalize an installed capacity of 210 t/h of superheated steam at 23 bar and 331°C. Part of the steam produced by these boilers is delivered to the process and another part to feed 3 steam turbines that totalize an installed capacity of 17 MW. All electricity produced is consumed by the plant processes and there is no surplus of electricity to be exported to the national grid.

Therefore, the purpose of the project activity is to supply electricity and heat to the various processes of the Panuco sugar mill by replacing fossil fuel (Bunker) by biomass combustion only. In addition, the project will also export the excess of electricity to the grid, further contributing to reduction of greenhouse gas emissions.

The new cogeneration plant will be part of the existing sugar mill that process approximately 1,500,000 tonnes of sugar cane per year.

The following description corresponds to the information validated during interviews and documental review undertaken by ICONTEC to validate accuracy and completeness of the project description.

The CDM project activity is compose by two phases:

1st Phase: (2016 to 2019)

This phase involves the installation of a new boiler with operational conditions around 83 bar and 538°C and a new back- pressure steam turbine of around 40 MW, which will substitute the current turbines, totalizing an installed capacity of 57 MW (17 MW back-up and 40 MW new back-pressure turbine). As a result, the site will continue to cover its entire energy consumption and will export around 29 MW to the national power grid, which represents about 147,207 MWh per year of net electricity.

2nd Phase (2020)

This phase involves the installation of other new boiler with operational conditions around 83 bar and 538°C and a new condensing steam turbine of around 60 MW totalizing 117 MW of installed capacity in the cogeneration plant. As a result, the site will continue to cover its entire energy consumption and will export to the national power grid around 162,883 MWh per year of net electricity.

The equipments that will be used by the project activity are:

- Two boilers type Bidrum/ISGEC each one with capacity of 200 t/h, steam pressure of 1200 lb/in² and efficiency of 85%. /6/ /7/.
- Back- Pressure Steam Turbine type TGM/RENK with input steam pressure 1200 lb/in², output steam pressure 28.5 lb/in² and efficiency of 75%. /5/.
- Condensing Steam Turbine 2 type TGM/RENK with input steam pressure 1200 lb/in², output steam pressure 28.5 lb/in² and efficiency of 75%. /5/.
- Two Electrical Generators type GE one with active power of 40 MW and other with active power of 60 MW, both with efficiency of 100%. /12/.

ICONTEC confirmed during on site visit and through the reviewing of documents /5/, /6/, /7/ and /12/ that the description of the project activity presented on the project design document version 04 is accurate and complete.

The estimate of:

- Annual average GHG emission reductions is 99,633 tCO₂e;
- Total GHG emission reductions is 697,430 tCO₂e.

The methodology and tools used are:

- Approved consolidated baseline methodology ACM0006: Consolidated methodology for electricity and heat generation from biomass - version 12.1.1
- “Tool for the demonstration and assessment of additionality”, version 7.0.0
- “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 01
- “Tool to calculate the emission factor for an electricity system”, version 04.0
- “Tool to determine the remaining lifetime of equipment”, version 01
- “Tool for Project and leakage emissions from transportation of freight”, version 01.1.0
- “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”, version 02
- “Tool to determine the baseline efficiency of thermal or electric energy generation systems”, version 01

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) Resolution of outstanding issues and the issuance of a final validation report and opinion.

As mentioned in clause 1.2 of this report ICONTEC, based on its ethics code and internal procedures, carries out validation, verification and certification audits of CDM project activities (which, in turn, are based on the validation and verification manual) focused on the identification of significant risks for CER generation and the verification of the contribution to climate change mitigation.

All documentation review during the validation process has been including in chapter 6 - references.

The validation protocol resulting from the Validation of Panuco Bagasse Cogeneration Project is enclosed in Annex A of this report.

Findings established during the validation can be seen as:

- A non-fulfillment of validation protocol criteria, or
- An identified risk to the fulfillment of the project objectives

The findings could take the form of a Corrective Action Request (CAR), Forward Action Request (FAR) or a Clarifications Request (CL).

Corrective action requests (CAR) are issued where:

- i) The project participants have made mistakes which directly influence the ability of the project activity to achieve real, measurable and additional emission reductions;
- ii) The CDM requirements have not been met; or
- iii) There is a risk that emission reductions cannot be monitored or calculated

A Forward Action Request is made to highlight issues related to project implementation that will require review during the next verification of the project activity.

A Clarification Request is required when information is insufficient or not clear enough to establish whether a requirement has been met.

ICONTEC resolve or “close out” CARs and CLs only if the project participants modify the project design, rectify the PDD or provide additional explanations or evidence that satisfy the ICONTEC’s concerns. VVS (V 07.0).

This validation report explains the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting

changes in the PDD or supporting annexes. VVS (V 07.0).

2.1. FOLLOW UP INTERVIEWS

ICONTEC performed interviews with project stakeholders to confirm the selected information and to resolve issues identified during the desk review. The main topics of the interview are summarized in Table 1.

Table1: Follow up Interview

DATE	PLACE	INTERVIEW DELEGATE	ORGANIZATION	INTERVIEW TOPICS
11/02/2014	PANUCO SUGAR MILL	JOSE AUGUSTO MONTOYA ENTERPRISE MANAGEMENT COORDINATOR	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical aspects).
11/02/2014	PANUCO SUGAR MILL	DANIEL SOTO ESTRADA ENTERPRISE MANAGEMENT	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical Aspects).
11/02/2014	PANUCO SUGAR MILL	JOSE ANTONIO GONZALEZ	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical Aspects).
11/02/2014	PANUCO SUGAR MILL	ERIC CONTRERAS SANCHEZ PROJECT COORDINATOR	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical Aspects).
11/02/2014	PANUCO SUGAR MILL	DANIEL ARELLANOS MARTINEZ PROJECTS	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical Aspects).
11-12-13/02/2014	PANUCO SUGAR MILL	ERNESTO CAVAZOS ENTERPRISE MANAGEMENT	INGENIO PANUCO SAPI DE CV	Description of the technology. Construction and operation of the project activity (Technical Aspects). Description and explanations about CDM prior consideration, start date of the project activity. Onsite visit to the CDM Project Activity to evaluate the baseline.
11-12-13/02/2014	PANUCO SUGAR MILL	JAVIER MONTALVO ECONERGY	INGENIO PANUCO SAPI DE CV	Baseline and emission reductions calculations. Validation of application of

				methodology and tools. Additionality analysis. Financial Analysis. Common practice.
13/02/2014	PANUCO SUGAR MILL	JUAN CARLOS ESPEL COUNTRY MANAGER	INGENIO PANUCO SAPI DE CV	Additionality analysis. Financial Analysis. Common practice.
13/02/2014	PANUCO SUGAR MILL	TERESITA DE JESUS VILLEGAS ENVIRONMENTAL MANAGEMENT COORDINATION	INGENIO PANUCO SAPI DE CV	Local stakeholder consultation. Documentation related to local stakeholder consultation and environmental topics

2.2. RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

Corrective action and clarification requests raised by ICONTEC were presented to the project participants and resolved through communication and meetings between Ingenio Panuco Sapi de CV and ICONTEC. 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 Annex A.

Since modifications to the project design document were necessary to resolve ICONTEC's concerns, the client decided to review the PDD and re-submit corrected versions of the PDD. After the period of public consultation (22/01/2014 to 20/02/2014) and after reviewing the last version of the PDD /1/, ICONTEC issued this validation report and opinion.

2.3. INTERNAL QUALITY CONTROL

This report includes the validation findings that underwent a technical review before being submitted to the project participants.

The technical review and the quality control of the process was performed by an internal technical reviewer in accordance with ICONTEC internal procedures for carrying out validation, verification and certification audits of CDM project activities. The technical reviewers are qualified in accordance with ICONTEC's professional qualification scheme for CDM validation and verification.

2.4. VALIDATION TEAM

The validation team consists of the following personnel:

Table2: Validation Team

ROLE/QUALIFICATION	LAST NAME	FIRST NAME	COUNTRY
Lead Auditor	Urrego Ortiz	Erika Lucia	Colombia
Technical expert	Gomez Gomez	Fernando	Colombia
CDM Audit reviewer	Ramirez	Francy	Colombia

Technical reviewer

Grisales

Cristian

Colombia

The validation team is qualified in accordance with the ICONTEC's qualification scheme for CDM validation and verification.

3. VALIDATION FINDINGS

3.1. OVERVIEW

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

3.2. GENERAL REQUIREMENTS

3.2.1. APPROVAL AND AUTHORIZATION

The project participant of the project is: Ingenio Panuco Sapi de CV

The participation of the project participant has been approved by the Commission on Climate Change as Designated National Authority of Mexico /2/

The host country meets all participation requirements, and the Designated National Authority of the host country has approved the project with the letter of approval describing as follows:

Table3: Approval Letter

Date of issue:	28/02/2014			
Description:	It provides confirmation that the project contributes to the country in the search of sustainable development.			
Supporting documentation (if it is applicable)	Letter of approval No. 340 / 2014 signed by Luis Alfonso Muñozcano Álvarez, focal point to CDM executive board coordinator, Mexican Committee for greenhouse gases emissions reduction and carbon sequestration projects and Ministry of the Environment and Natural Resources.			
Date of ICONTEC reception	20/08/2014			
Entity that sent the letter to ICONTEC	Project participants	Directly from the DNA		
	X			
Means of validation employed to assess the authenticity	Not apply because ICONTEC does not doubt of authenticity of the letter.			
Additional specification (if it is applicable)		YES	NO	version number
	PDD	x		04
ICONTEC Conclusion	All parties involved have approved the project activity. The letters is authentic and valid for the proposed CDM project activity under validation. It confirms and it is unconditional with respect to: (a) The Party is a Party to the Kyoto Protocol; (b) Participation is voluntary; (c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country; (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration.			

3.2.2. MODALITIES OF COMMUNICATION

The audit team validated the corporate identity of all project participants and focal points included in the Modalities of Communication (MoC). This validation was performed by comparing the identities and signatures of the people referred on the MoC, through of the document legal power /4/ that indicated at Eng. Juan Carlos Alfonso Espel Bohorquez as the legal representative and the focal point to UNFCCC since 11/01/2013. This designation is supported on document legal power presented to Notary Public Miguel Espinola Bustillos Notary No.120 of Federal District and Federal Property Heritage /4/.

Lastly, the audit team concludes that, MoC document was presented in accordance to the general CDM rules and requirements as well as latest versions of the applicable templates.

Also, ICONTEC was able to confirm through the reviewing of the record: constitution minutes /3/ that Ingenio Panuco is a Mexican mercantile society registered at Notary 74 F. Javier Arce Gargollo.

3.3. PROJECT DESIGN

The project has been developed using the methodology and tools:

Approved consolidated baseline methodology ACM0006: Consolidated methodology for electricity and heat generation from biomass - version 12.1.1.

“Tool for the demonstration and assessment of additionality”, version 7.0.0

“Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 01

“Tool to calculate the emission factor for an electricity system”, version 04.0

“Tool to determine the remaining lifetime of equipment”, version 01

“Tool for Project and leakage emissions from transportation of freight”, version 01.1.0

“Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”, version 02

“Tool to determine the baseline efficiency of thermal or electric energy generation systems”, version 01

According to this methodology the spatial extent of the project boundary encompasses the plants generating power installed that are directly affected by the CDM project activity and also the plants generating power located at the same site as the CDM project activity, whether fired with biomass, fossil fuels or a combination of both. Thus power and heat generation, grid powers are considered for the whole site where the CDM project activity is located and all facilities are included in the power and heat balances./29/.

On the baseline the sources of emissions included of the project boundary by Electricity and heat generation are CO₂, CH₄ and NO₂, which are excluded by the methodology.

On the project activity the sources of emissions included on the project boundary by on-site fossil fuel consumption, off-site transportation of biomass and combustion of biomass for electricity and heat are CO₂, CH₄ and NO₂, which are excluded for simplification.

ICONTEC validated the information through interviews during the on-site visit. On this, It was confirmed the place where will be localized the new equipments. Also, it was cross checked the project design with Cogeneration and Expansion Study elaborated by Sugar Power Systems, INC (Consultores de Ingenios Azucareros S.A.) /33/, the Purchase order No. W-13000015 dated: 17/04/2013 /7/ and equipment description /5/, /6/.

During the validation the audit team issued CL 1 for clarify the description of the project activity. This situation was corrected on the last version of the PDD and the description of how each finding was closed is found in the Table A 2: Resolution of Corrective Action, Forward Action and Clarification Request of Annex A (validation protocol).

The PP correctly choice the methodology ACM0006: Consolidated Methodology for Electricity and Heat Generation From Biomass - version 12.1.1 because the CDM project activity includes the combinations of the following activities:

The installation of new plants at a site where currently power and heat generation occurs. The new plant replaces to existing plants and; the total replacement of fossil fuels

(bunker) by biomass in a new plant that would have been built in the absence of the project (fuel switch projects).

The project complies with the applicability criteria of the methodology as was verified by ICONTEC, as follows:

Table 4: Methodology Applicability Conditions Analysis

Applicability condition ACM	Means of validation
No biomass types other than biomass residues and/or biomass from dedicated plantations are used in the project plant	During the validation, ICONTEC confirmed on interview with the Project Manager, that the biomass used is only biomass residues from the sugar cane processing in the Panuco mill (sugar cane bagasse). No other biomass types are used. Also it was confirmed that biomass from dedicated plantations is not present in the project, because the main objective of this plantation is the sugar production. This information was confirmed with the Constitution minutes of Panuco sugar mill dated on 01/06/2011 which indicates that the social objective of the company is the sugar production. /3/.
Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on an energy basis.	The boiler operates 100% with bagasse; this means that the boiler will not operate with fossil fuel. This condition was confirmed with the technical specification elaborated by ISGEC HEAVY ENGINEERING LIMITED (ISGEC). File: Revised Technical Proposal - 200 TPH,1200 psig, 1000F.pdf /6/
The implementation of the project does not result in an increase of the processing capacity of raw input or in other substantial changes in the process;	<p>The information of increase of sugarcane crushed is presented on the file: Forecast Electricity.xls /8/, in this file projecting growth of the company is presented and the information is cross checked by ICONTEC with file: Proyeccion de superficies a cultivo 40 MK.xlsx /9/ . Also the information was confirmed on interviews with the Chief of management enterprise corporation and project manager.</p> <p>In this way ICONTEC has validated that the company has a projected growth in sugar production in accordance with corporate guidelines of Pantaleon group. According to this information ICONTEC valid that the project activity does not result in an increase in production capacity. In fact, the project activity is intended to produce changes in the prime energy source and in the amount of energy produced, not in the sugar production capacity.</p>
The biomass used by the project facility are not stored for more than one year	The harvest is since November to June when it finishes , the bagasse that was not used is storage for four to six months until November when it is used on the next harvest. This information was confirmed by ICONTEC

	<p>on interview with the project manager who said that the bagasse is not stored for more than one year, because the storage for more than one year decreases the calorific power and affects the operation of boilers. Also, on the projections of sugarcane plantation is possible confirm this information. /8/, /9/.</p>
<p>The biomass used by the project facility are not obtained from chemically processed biomass prior to combustion. Moreover, the preparation of biomass-derived fuel do not involve significant energy quantities, except from transportation or mechanical treatment so as not to cause significant GHG emissions.</p>	<p>During on site visit the audit team confirmed that the biomass used is the residue of sugar mill plant and it is not obtained from a chemical process.</p> <p>Besides that, ICONTEC confirmed that the energy consumptions derived from the transportation between the sugar mill plant and the bagasse boilers are not significant because the transport will be with bagasse conveyors. The electricity consumed by these equipments is included on the file: forecast electricity.xls. /8/.</p>
<p>In the case of fuel switch project activities, the use of biomass or the increase in the use of biomass as compared to the baseline scenario is technically not possible at the project site without a capital investment in:</p> <ul style="list-style-type: none"> a. The retrofit or replacement of existing heat generators/boilers; or b. The installation of new heat generators/boilers; or c. A new dedicated biomass residues supply chain established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or d. Equipment for preparation and feeding of biomass. 	<p>ICONTEC verified during on site visit that the project is not a fuel switch project. The project consists on the installation of new boilers that replace the existents.</p>
<p>In the case that biogas is</p>	<p>During on site visit ICONTEC confirmed that the CDM</p>

used in power and/or heat generation, this methodology is applicable under the following conditions:

- a. The biogas is generated by anaerobic digestion of wastewater (to be) registered as a CDM project activity and the details of the registered CDM project activity must be included in the PDD. Any CERs from biogas energy generation should be claimed under the proposed project activity registered under this methodology;
- b. The biogas is generated by anaerobic digestion of wastewater that is not (and will not) be registered as a CDM project activity. The amount of biogas does not exceed 50% of the total fuel fired on an energy basis.

activity project does not generate biogas. This condition does not apply.

In the case of biomass from dedicated plantations:

- a. The cultivated land can be clearly identified and used only for dedicated energy biomass plantations;
- b. The CDM project activity does not lead to a shift of pre-project activities outside the project boundary, i.e. the land under the proposed project activity can continue to provide at least the same amount of goods and services as in the absence of the project;
- c. The plantations are established:
 - On land which was, at the start of the project implementation, classified as degraded or degrading;

This condition was confirmed by ICONTEC through visit on site, the sugarcane plantation is for sugar production /9/, for this reason this condition does not apply to CDM project activity.

or

- On a land area that is included in the project boundary of one or several registered A/R CDM project activities;
- d. The plantations are not established on organic soil (notably peatlands);
- e. The land area of the dedicated plantations will be planted by direct planting and/or seeding;
- f. After harvest, regeneration will occur either by direct planting, seeding or natural sprouting;
- g. Grazing will not occur within the plantation;
- h. No irrigation is undertaken for the biomass plantations;
- i. The land area where the dedicated plantation will be established is, prior to project implementation, severely degraded and in absence of the CDM project activity would have not been used for any other agricultural or forestry activity;
- j. Only perennial plantations are eligible.

The last applicability condition of methodology is validated on section 3.4.1. Step 1: Identification of alternative scenarios.

ICONTEC issued the CAR 3, CAR 4, CL 2 and CL 3, regarding to applicability conditions of the methodology, the information was clarified on the last version of the PDD /1/ and the answers are presented on Annex 2 of this report.

The project activity includes the installation of a new biomass cogeneration plant at a site where currently power and heat generation occurs (capacity expansion project). The description of equipment was confirmed by ICONTEC through the technical specifications and order purchases. /5/, /6/, /7/. The old cogeneration system will be retained as backup (boilers from b1 to b5 and turbo generators from g1 to g5). ICONTEC issued the CL 5 because there was an inconsistency on description equipment. The inconsistency was

clarified on the new version of the PDD and the finding was closed.

During the on site visit the PP presented to the audit team the request of interconnection to the electricity grid sent by Ingenio Panuco to the Federal Electricity Commission - CFE dated on 28/11/2013 /10/. The electricity will be sold to CFE. Other licenses are being requested through of CRE. /11/.

The Project participant did not request deviation of the methodology, given that all conditions of the methodology comply.

In accordance with the project activity and the selected methodology the emission sources are properly described in the final PDD /1/ in compliance with CDM-PDD-FORM (Project Design Document Form for CDM Project Activities), version 05.0 and its attachment: Instructions for filling out the project design document form for CDM project activities.

The greenhouse gas emissions occurring within the project boundary as result of its implementation are all addressed by the applied methodology. There are no greenhouse gas emissions within the project boundary caused by the implementation of the project activity that contribute to more than 1% of the expected annual emission reductions and that are not addressed by the applied methodology. This was verified by ICONTEC by means of the onsite visit to the sugar mill and interviews.

In summary, the audit team assessed the proposed project activity in order to determine its compliance against the rules and requirements set out for the CDM project activities, finding this project description to be accurate and complete.

The audit team agrees with the application of methodology ACM0006 version 12.1.1. since PP correctly addressed Project boundary, Baseline identification, Algorithms and/or formulae used to determine emission reductions, Additionality and Monitoring methodology.

3.3.1. PRIOR CONSIDERATION OF THE CDM

The start date of the project was identified as 12/02/2013. According to this date the project is considered as a new project (project activity with a start day on or after 02 August 2008). In this framework, ICONTEC verified the following evidence to ensure the early consideration of the CDM.

This date correspond to the proof of early payment to electric generator supplier 12/02/2013, between Ingenio Panuco SAPI de CV and Gevisa S.A./12/.

PDD version 1 was published for global stakeholder consultation on 22/01/2014 to 20/02/2014 and the PP notified (Form F-CDM-Prior consideration) /13/ to the UNFCCC Secretariat of their intention to seek CDM status by means of communication published in the UNFCCC framework at 01/08/2013, as the DOE verified in <http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html> .

Also, the PP sent to SEMARNAT through e-mail /14/ dated on 01/08/2013 the Prior consideration of the CDM form version 02.0, it was confirmed with the response /14/ sent by General director of climate change projects of SEMARNAT dated on 01/08/2013 to the focal point of Panuco, where he confirms the reception of the document. Therefore the DOE deems that the prior consideration requirement is fulfilled.

This evidence indicates:

- a) Awareness of the CDM project prior to the project activity start and that benefits were decisive factors in proceeding with the project,
- b) Reliable evidence that indicates that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation, and
- c) CDM project activity complies with the requirements of the latest version of the Guidance on prior consideration of CDM.

3.4. BASELINE DETERMINATION AND ADDITIONALITY DEMONSTRATION

The baseline determination has been developed jointly with additionality demonstration using the steps defined in the methodology ACM0006: Consolidated methodology for electricity and heat generation from biomass - version 12.1.1.

3.4.1. Step 1: Identification of alternative scenarios

This step was executed by combining alternative scenarios for power and heat generation, and for biomass residues uses, as follow:

For power generation P1 (the proposed project activity not undertaken as a CDM project activity), P2 (the continuation of power generation in existing power plants at the project site) and P7 (generation of power in the power grid) scenarios were selected; scenarios P3 to P6 were discarded. Reasons for selecting and discarding P scenarios, as presented in Table 1 of the PDD /1/, are deemed well justified by the DOE based on the following reasons:

P1, representing the proposed project activity, in the power component, was selected as methodological requirement, so the DOE is agree.

P2 was selected as applicable because of it represents the continuation of power generation in existing power plants at the project site operating at the same historic conditions, i.e. maximum capacity, which is realistic.

P3, representing the continuation of power generation in existing power plants at the project site operating at different conditions was discarded because of it is not possible to operate over the maximum capacity, which is a valid argument.

P4, representing retrofit of existing power plants, was discarded because “the retrofitting would include an installation of high pressure boilers, but this scenario is the project activity (100 MW)”. The DOE agrees that increasing the power generation in existing plants by means of retrofitting, it has not sense without increasing the heat generation capacity as well, which lead to the project scenario.

P5, representing the installation of new power plants at the project site different from those installed under the CDM project activity, is considered by the PP a non-feasible scenario. In the view of the DOE installing a new cogeneration plant bagasse fuelled is the same as the proposed project activity and installing a new cogeneration plant fuelled other than sugar cane bagasse in this location evidently would be anti-economic, so this solution no way would become a baseline scenario.

P6, representing the generation of power in specific off-site plants, excluding the power grid is considered by the PP a non-feasible scenario. As the DOE verified, an off-site plant does not exist in the neighborhood. Anyway, such a plant only would replace energy importations. Therefore the DOE agrees discarding this scenario.

P7, the generation of power in the power grid, was selected by the PP as a feasible scenario. The DOE agree because it represents the continuation of the current practice.

For heat generation H1 (the proposed project activity not undertaken as a CDM project activity) and H2 (the continuation of heat generation in existing plants at the project site) scenarios were selected; scenarios H3 to H7 were discarded. Reasons for selecting and discarding H scenarios, as presented in Table 2 of the PDD, are deemed well justified by the DOE, and based on the following reasons:

H1, representing the proposed project activity, in the heat generation component, was selected as methodological requirement, so the DOE is agree.

H2 was selected as applicable because of it represents the continuation of heat generation in existing boilers at the project site operating at the same historic conditions, i.e. maximum capacity, which is realistic.

H3, representing the continuation of heat generation in existing boilers at the project site operating at different conditions was discarded because of it is not possible to operate over the maximum capacity, which is a valid argument.

H4, representing retrofit of existing boilers, was discarded because “The retrofitting would include an installation of high pressure boilers, but this scenario is the new project plant (project activity) with capacity of 400 t/h of superheated steam at 83 bar and 538 °C”. The DOE agrees that increasing the heat generation in existing boilers by means of retrofitting lead to the project scenario.

H5, representing the installation of new boilers at the project site different from those installed under the CDM project activity, is considered by the PP a non-feasible scenario. In the view of the DOE installing a new cogeneration plant bagasse fuelled is the same as the proposed project activity and installing a new cogeneration plant fuelled other than sugar cane bagasse in this location evidently would be anti-economic, so this solution no way would become a baseline scenario.

H6, representing the generation of heat in specific off-site plants, is considered by the PP a non-feasible scenario. As the DOE verified, an off-site plant does not exist in the neighborhood. Therefore the DOE agrees discarding this scenario.

H7, the generation of heat from district heating was discarded by the PP as a feasible scenario. As the DOE verified, a district heating does not exist in the zone. Therefore the DOE agrees discarding this scenario.

For the use of biomass residues all scenarios from B1 to B8, were discarded, except scenario B4 (The biomass residues are used for power or heat generation at the project site in new and/or existing plants) that was selected. Reasons for selecting and discarding B scenarios, as presented in Table 4 of the PDD, are deemed well justified by the DOE, and based on the following reasons:

In absence of the project, all of the biomass residues available are used as fuel in the existing cogeneration plant during the crop season and therefore they are not dumped or left to decay neither aerobic nor anaerobic conditions, nor they are burnt in an uncontrolled manner without utilizing them for energy purposes, nor they are purchased from a market, thus discarding scenarios B1, B2, B3 and B8. The former is according to the Mexican common practice, as verified by the DOE in the official document “INICIATIVA PARA EL DESARROLLO DE LAS ENERGÍAS RENOVABLES EN MÉXICO - COGENERACIÓN EFICIENTE” (Initiative for development of the renewable energies in México – Efficient cogeneration) November 2012 /30/.

Scenario B4, (The biomass residues are used for power or heat generation at the project site in new and/or existing plants), is the only scenario B selected by the PP. This is considered the right decision, taking into account that is a common practice in México, due to the economic rationality involved in replacing the energy source in the sugar cane mills and the sale of energy surplus to the grid /30/.

B5 (The biomass residues are used for power or heat generation at other sites in new and/or existing plants) was discarded by the PP. The DOE considers this is coherent with elimination of scenarios P6 and H6.

B6 (The biomass residues are used for other energy purposes, such as the generation of biofuels.) and B7 (The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry) were discarded by the PP. The DOE agrees with this decision, taking into account the common practice in Mexican mills and the energetic policy, as exposed in the official document already cited /30/.

Additionally, taking into account that, by project definition and design, the energy source is the sugar cane bagasse produced in the Panuco mill, the DOE agrees that only one category of biomass residues (bagasse) is present in the Table 5 of the PDD.

Alternative baseline project scenarios were defined by combining P, H and B scenarios, as indicated in Table 5:

Table5: Assessment of baseline

Baseline Alternatives Identified	Eliminated?	Reasons for elimination / non-elimination from list of alternatives	Was the elimination appropriate?	DOE Assessment
P1-P7-H1-B4	No	Considered by the PP as one of the most credible and plausible alternatives	-	Scenario P1-P7-H1-B4 can be seen as the proposed project activity not

		scenarios that could represent the baseline		undertaken as a CDM project activity, and, by methodological predicament, this is a scenario to be considered. Note that besides P1, P7 is necessary in order to satisfy the overall generation under the CDM project activity. Given that power and heat generation from biomass residues are permitted by the Mexican law ¹ this scenario keep consistency with mandatory applicable laws and regulations.
P2-P7-H2-B4	No	Considered by the PP as one of the most credible and plausible alternatives scenarios that could represent the baseline	-	Scenario P2-P7-H2-B4 can be seen as the continuation of the present situation, and, by methodological predicament, this is a scenario to be considered. Note that P2 and P7 are included in the present situation. Given that power and heat

¹ LEY DEL SERVICIO PÚBLICO DE ENERGÍA ELÉCTRICA (Public Service of Electrical Energy Law), paragraph.36

				<p>generation from biomass residues and fossil fuel are traditionally permitted by the Mexican law² this scenario keep consistency with mandatory applicable laws and regulations.</p> <p>The technical characteristics of P2 and H2, as presented in Section 1,3 GHG PROJECT DESCRIPTION of this report constitute suitable justification to be considered as realistic and credible eventual baseline scenario.</p> <p>Besides that, the DOE considers that this scenario could be assumed as a baseline along the whole crediting period: in fact, the remaining lifetime of the existing equipment (boilers and turbo-generators) has been assessed between 25 and 30 years, as verified by the DOE,</p>
--	--	--	--	---

² LEY DEL SERVICIO PÚBLICO DE ENERGÍA ELÉCTRICA (Public Service of Electrical Energy Law), Art.36

				according to the documentation presented by the PP /28/, /25/
Other combinations	Yes	Not considered by the PP as credible and plausible alternatives scenarios that could represent the baseline and the project implementation	Yes	P1 with P2 or H1 with H2 are not feasible combinations, by definition.

Therefore ICONTEC agrees that only the two project scenarios (P1-P7-H1-B4) and (P2-P7-H2-B4) must be further considered.

3.4.2. Step 2: Barrier Analysis

This step was not executed by the PP, which means that barriers are not invoked to eliminate alternative scenarios and the two project scenarios remain for further analysis. Given that the proposed project activity not undertaken as a CDM project activity (Scenario P1-P7-H1-B4) is one of the remaining scenarios, the analysis must proceed to Step 3 (Investment analysis), as the PP did, therefore the DOE agree with this procedure.

3.4.3. Step 3: Investment Analysis

An investment analysis was executed by comparing the economic attractive of the remaining alternative project scenarios by using the NPV as financial indicator. For the Scenario P1-P7-H1-B4, the proposed project activity not undertaken as a CDM project activity, (scenario S1 according to terminology in the “Combined tool to identify the baseline scenario and demonstrate additionality”) the NPV was calculated using a project cashflow model. For the Scenario P2-P7-H2-B4, “*the continuation of the current situation*”, (scenario S3 according to terminology in the “Combined tool to identify the baseline scenario and demonstrate additionality”) and taken into account that the continuation of this scenario involves expenses for operation and maintenance (O&M costs) for the continued use of the existing boilers and costs due to purchase of the imported electricity from the grid; the PP estimated the NPV for this scenario as it was verified by ICONTEC in the cash flow file /22/. Below in table 8 are reported the NPVs for scenario S1 and S3.

Based in the “Combined tool to identify the baseline scenario and demonstrate additionality”, which is considered by the DOE as the most suitable tool to use in this case, this is the right approach to the investment analysis. According to this tool, if one of the alternative scenarios remaining after Step 2 corresponds to the situation described in S2 or S3, as the case is here, then use either the NPV or the IRR as financial indicator in the analysis. Therefore, using NPV is a right decision.

Next is the list of parameters used in this cash flow as presented by the PP in the PDD:

Table 6: Parameters of Cash Flow

PANUCO Bagasse Cogeneration Project			
Assumptions			
Parameter	Value	Unit	Reference
Discount rate	11.20%	%	Guidelines on the assessment of investment analysis - version 05, Group 1 (Mexico).
Asset's Life time	25	years	The option c of the "Tool to determine the remaining lifetime of equipment" - version 1 (Electric Generators, air cooled)
Total installed capacity	100.0	MW	Determined in CERs spreadsheet
Price per MW installed	1,098.66	k\$/MWe	Calculated in cashflow
Total investment in the CDM project	109,865.72	k\$	Calculated in cashflow
O&M costs of electricity generation	10.34	\$/MWh	Calculated as the average of the whole period
Electricity price	90	\$/MWh	Calculated in electricity price tab
Income tax	30.0%	%	See the law of income tax (Ley de Impuesto Sobre la Renta 2012.pdf), page 10
Depreciation	20	years	(http://www.dof.gob.mx/nota_detalle.php?codigo=5264340&fecha=15/08/2012)
Long-term debt interest tax	3.94%	%	Calculated by Pantaleon group (3% Banamex tax + 0.94% Labor tax). Labor tax: http://www.banxico.org.mx/
Leverage	50.00%	%	Default Share of the project value as per "Guidelines on investment analysis", version 5
Debt term	5	years	Panuco loan from Banamex (Internal document of Pantaleon Group). http://www.banamex.com/
Salvage value	3,532.1	k\$	Calculated in cashflow
Aggregated Value Tax (IVA)	16%	%	See law of aggregated value tax (LIVA_071209.pdf)

Next is the validation by the DOE of main parameters used in the cash flow model, at the time of the investment decision:

Table 7: Investment Analysis Parameters

Parameter	Value	Unit	Validation Analysis
Discount rate	11.2	%	This is the default expected return on equity for energy industries in México, according to the "Guidelines on the assessment of investment analysis", version 5, which is considered a suitable value as discount rate for NPV calculations in this cash flow.
Asset's life time	25	Years	The PP presented the document /25/ "CR-088-13 PJ Reporte vida CALDERAS N° 1, N° 2, N° 3, N° 4 y N°5 Rev 2.pdf" where the conclusion is "Parts subject to pressure boilers No.1, No. 2, No. 3, No. 4 and No. 5 is in good enough condition to operate "Twenty-five years". The DOE confirmed that 25 years is the plant lifetime assumed in the world energy model of the IEA for biomass based power generation. See WORLD ENERGY MODEL – METHODOLOGY AND ASSUMPTIONS, page 13 /31/. Taking into account that, in Panuco the project equipment is new one, the DOE considers that Asset's life time of 25 years is adequate for the investment analysis. Additionally, 25 years corresponds with the "Tool to determine the remaining lifetime of equipment Version 01 – Option (c) Default Values", given that conditions (i) to (iii) are met.
Total installed capacity	100.0	MW	Confirmed by the DOE through technical proposals /5/, Offers /6/, Cogeneration and Expansion Study /33/ and Purchase orders /7/, /12/
Forecast Electricity/ Load Factor of CG	See Spreadsheet "Panuco cash flow v3 2015 03 17 FES.xls"	%	ICONTEC verified from the cogeneration expansion study /33/ of the project the following: <ul style="list-style-type: none"> - Forecast for the sugarcane planted area for the next years - Performance of the equipment in milling sugar cane - Performance of the new cogeneration plant - Forecast of electricity generation with different scenarios and the

VALIDATION REPORT VVS



			<p>corresponding energy balance.</p> <p>From the above mentioned information, It was determined the Load Factor of CG, which, ICONTEC deems as reliable and feasible.</p>
Total investment in the CDM project	109,865.72	US k\$	<p>Confirmed by the DOE through technical proposals /5/, Offers /6/ and Purchase orders /7/, /12/ for main equipment, and cross checked with the Investment Report /18/. Detailed breakdown presented in the spreadsheet <i>Panuco cash flow v3 2015 03 17 FES.xlsx</i> /22/, tab CAPEX was found appropriate and reasonably acceptable, based on the knowledge and experience of the validation team.</p> <p>The verified total investment of US k\$109,865.72 yields an investment index of 1,098 US/kW (980 US/kW first stage, 1,177 US/kW second stage), which is deemed reasonable and conservative by the DOE, when compared with worldwide mean values for this type of project. For instance, the Study: <i>Determinación de inversiones y gastos de administración, operación y mantenimiento para la actividad de generación en zonas no interconectadas utilizando recursos renovables</i> /36/ (Determination of Investments and AOM Expenditures for generation in ZNI zones using renewable resources), demonstrate 1,898 US\$/kW for a 50 MW biomass residues plant to the year 2010, envisioning a reduction to 1,830 US/kW to the year 2012, which is far higher (167%) than the Panuco project value of 1,098 US/kW.</p>
O&M costs of electricity generation	10.34	US \$/MWh	<p>Detailed breakdown for O&M costs presented in the spreadsheet <i>Panuco cash flow v3 2015 03 17 FES.xlsx</i> /22/, tab O&M was found appropriate and reasonably acceptable, based on the knowledge and experience of the validation team.</p> <p>The O&M costs for electricity generation of 10.34 US\$/MWh are deemed reasonable by the DOE, when compared with worldwide mean values for this type of project. For instance, the Study <i>Determinación de inversiones y gastos de administración, operación y mantenimiento para la actividad de generación en zonas no interconectadas utilizando recursos renovables</i> /36/ (Determination of Investments and AOM Expenditures for generation in ZNI zones using renewable resources), demonstrate 9.5 US\$/MWh for a 50 MW biomass residues plant to the year 2010, envisioning a reduction to 9.2 US/MWh to the year 2012, which is fairly near (89%) than the Panuco project value of 10.34 US/MWh)</p>
Electricity price	90	US \$/MWh	<p>Electricity price was estimated as the mean value of electric tariff for industry in the last three years in México. This assumption is deemed adequate by the DOE, taking into account that the industrial market in México in 2012 was nearby 58.24% of the total /26/. Since industrial tariffs are the highest, as compared with residential and other services /26/, the DOE deems that this estimation is conservative and acceptable.</p>
Income tax	30	%	<p>By law of income tax (LEY DEL IMPUESTO SOBRE LA RENTA), therefore it is a valid assumption http://www.diputados.gob.mx/LeyesBiblio/pdf/LISR.pdf</p>
Depreciation	20	Years	<p>By General Governmental Accounting Law (Ley General de Contabilidad Gubernamental), therefore it is a valid assumption http://www.dof.gob.mx/nota_detalle.php?codigo=5264340&fecha=15/08/2012</p>
Long term debt interest rate	3.94	%	<p>Calculated by Pantaleon group (3% Banamex tax + 0.94% Libor tax). Libor tax: http://www.banxico.org.mx/ The DOE verified the Banamex tax and the Libor tax used. Given that the PP is the only possible project developer the DOE considers that this calculation is representative of the interest rate to be paid for the PP for this type of debt in México.</p>
Leverage	50	%	<p>This is the default value in guideline 17 of the GUIDELINES ON THE</p>

			ASSESSMENT OF INVESTMENT ANALYSIS, therefore it is a valid assumption.
Debt term	5	Years	As defined between Banamex and Panuco, therefore is acceptable www.banamex.com
Salvage value	3,532.1	US k\$	ICONTEC validated that this value corresponds to the depreciation of the assets at the end of the analysis period, which is a common assumption in making a project cashflow and it this value was considered in accordance with Aswath Damodaran (Applied Corporate Finance: A User's Manual, pg 56- 57). /32/
Aggregate value tax	16	%	By law of value added tax (Ley del Impuesto al Valor Agregado), therefore it is a valid assumption /37/

After the validation analysis ICONTEC confirmed that NPV calculations were made under appropriate data and assumptions and the financial calculations were correctly executed, according to the GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS.

The NPV of the scenarios analyzed are shown in the next table:

Table 8: NPV of the scenarios

Scenario	NPV (k\$)
Scenario (S1) P1-P7-H1-B4	-9,260.29
Scenario (S3) P2-P7-H2-B4	-2,090.11

According to this result, the scenario S3 (continuation of the current situation) is the most attractive; therefore this is the baseline scenario. Given that the baseline scenario is not the proposed project activity undertaken without being registered as a CDM project activity (S1), the project activity is additional.

3.4.3.1. Sensitivity analysis:

A sensitivity analysis was made with the results depicted in the following table:

Table 9: Sensitivity analysis

	Variation	NPV (k\$)	
		Alternative scenario 1 (CDM Project)	Alternative scenario 2 (the continuation of the current practice)
CapEx	-10%	-6,144	0
	10%	-12,377	0
Revenues	-10%	-15,238	0
	10%	-5,076	0
O&M	-10%	-7,992	-1,881
	10%	-10,528	-2,299
Base Case	0.0%	-9,260	-2,090
Discount rate	11.20%		

Where Alternative scenario 1 corresponds to S1 and Alternative scenario 2 corresponds to S3.

In the view of the DOE these results demonstrate that the conclusion regarding the financial attractiveness of Scenario S3 is robust to reasonable variations in the critical assumptions, named investment, revenues and O&M. A further breakeven point analysis showed that variations of scenario 3 in CapEx, Revenues and O&M would have to be - 29.7%, +15.5% and -73% respectively in order to reach the same level of attractiveness as scenario S2, i.e NPV=-2,090. Such variations are deemed unrealistic, whereas they are far enough of the 10%.

Therefore the baseline scenario S3 is confirmed and the additionality of the project activity is confirmed as well.

3.4.4. Step 4: Common practice analysis

The common practice analysis was made using the steps defined in the Guidelines on Common Practice, version 2.0 as described in the PDD.

ICONTEC deeply verified the assumptions and data used on file: common practice analysis.xlsx /23/, verified information through www.cre.gob.mx /24/, as well as the correct application of the steps, therefore the DOE is agree with the following results:

$F = 0$ and $N_{all} - N_{diff} = 0$.

Given that the factor F is not greater than 0.2 and the difference $N_{all} - N_{diff}$ is not greater than 0.3, according to the Guidelines on common practice, the proposed project activity is not a “common practice”.

Additionality Conclusion

ICONTEC found that all information, assumptions and data used in the identification of the baseline scenario are relevant, justified appropriately, correctly quoted and interpreted, supported by evidence and able to be deemed reasonable.

According to the previous description ICONTEC found that the project participant has correctly applied the selected methodology with respect to the Baseline identification. The scenario selected reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

Additionally, ICONTEC verified by interview and visit on site that the project is not expected to result in emissions other than those allowed by the methodology.

According to this information the total emission in absence of the project are 697,430 tons of CO₂e during the 7 years crediting period.

3.5. MONITORING PLAN

Monitoring plan presented on PDD complies with requirements of the methodology approved consolidated baseline methodology ACM0006: Consolidated methodology for electricity and heat generation from biomass - version 12.1.1 and tools.

During validation were raised CL 6, CL 7 and CL 11 with regard to the completeness of the monitoring plan. Details of the finding and the resolutions are in table 2 of appendix A of this report.

ICONTEC verified through interviews with relevant personnel and document review /5, 6, 7, and 12/, that the project will be equipped with an extensive monitoring system. Staff training by technology providers and the monitoring plan will be established to maintain installed equipment and technology performance, as well as to ensure the measurements accuracy and the data reported.

Validation team checked all parameters presented at the monitoring plan of the latest version of the PDD /1/, against methodology and applied tools requirements; no deviations to the project activity were found.

3.5.1. Parameters ex-ante

Table10: Parameters Ex-Ante Validation

Data / parameter	ICONTEC's means of validation
Biomass categories and quantities used for the selection of the baseline scenario and assessment of additionality	The type of biomass (bagasse) was confirmed by ICONTEC on site visit and historical registers /15/. Also, the PP presented historical information since 1991 until 2013 related with the sugar production, cane crushed and biomass (bagasse) generation on file: Desarrollo operativo.xlsx (Development operative) /16/. ICONTEC confirms that only bagasse is used like biomass to the operation of boilers.
$BR_{HIST, K1, x}$ $BR_{HIST, K1, 2013} = 461,903$ Tonnes $BR_{HIST, K1, 2012} = 362,920$ Tonnes $BR_{HIST, K1, 2011} = 390,808$ Tonnes	The quantity of biomass residues used for power and heat was confirmed by ICONTEC through historical registers since 2011 until 2013 /15/, /16/. The information was consistent and traceable.
$BR_{K1, h, x}$ $BR_{K1, 2013} = 461,903$ Tonnes $BR_{K1, 2012} = 362,920$ Tonnes $BR_{K1, 2011} = 390,808$ Tonnes	
$FF_{f, h, x}$ $FF_{BunkerC, b1-b5, 2013} = 6,385,057$ Liters $FF_{BunkerC, b1-b5, 2012} = 5,148,968$ Liters $FF_{BunkerC, b1-b5, 2011} = 2,885,782$ Liters	Quantity of fossil fuel type bunker fired in heat generator b1 to b5, was confirmed by ICONTEC on site visit and historical registers /16/. The information was consistent and traceable.
$HG_{h, x}$ $HG_{b1-b5, 2013} = 2,211,224$ GJ/yr $HG_{b1-b5, 2012} = 1,364,437$ GJ/yr $HG_{b1-b5, 2011} = 1,683,284$ GJ/yr	Net quantity of heat generated in heat generators b1 to b5, was confirmed by ICONTEC on site visit and historical registers /15/. The information was consistent and traceable.

$HG_{BR,CG,x,i}$ $HG_{BR,CG,2013}=136,145 \text{ GJ/yr}$ $HG_{BR,CG,2012}=84,008 \text{ GJ/yr}$ $HG_{BR,CG,2011}=103,640 \text{ GJ/yr}$	<p>Quantity of heat used in cogeneration heat engines g1 to g5, was confirmed by ICONTEC on site visit and historical registers /15/. The information was consistent and traceable.</p>
$HC_{BR,CG,x,i}$ $HC_{BR,CG,2013}=947,953 \text{ GJ/yr}$ $HC_{BR,CG,2012}=584,935 \text{ GJ/yr}$ $HC_{BR,CG,2011}=721,625 \text{ GJ/yr}$	<p>Quantity of process heat extracted from the cogeneration type heat engines (g1 to g5) was confirmed by ICONTEC on site visit and historical registers /15/. The information was consistent and traceable.</p>
$EL_{BR,CG,x,i}$ $EL_{BR,CG,2013}=20,067 \text{ MWh/yr}$ $EL_{BR,CG,2012}=15,152 \text{ MWh/yr}$ $EL_{BR,CG,2011}=19,057 \text{ MWh/yr}$	<p>Quantity of electricity generated in heat engines (g1 to g5) was confirmed by ICONTEC on site visit and historical registers /15/. The information was consistent and traceable.</p>
$CAP_{HG,b1-b5}=560.28 \text{ GJ/h}$	<p>Baseline capacity of boilers (b1 to b5) was confirmed by ICONTEC through of visit on site and registers. It corresponds to design capacity of 210 ton/h of steam with a differential enthalpy of 2,75 GJ/ton aprox. related to average operational conditions of temperature and pressure.</p>
$CAP_{EG,CG,g1-g5}=17 \text{ MW}$	<p>Baseline electricity generation capacity of heat engines (g1 to g5) was confirmed by ICONTEC through of visit on site and historical registers of steam production and capacity /15/. The information was consistent and traceable.</p>
$LFC_{HG,h}=76\%$	<p>Baseline load factor of heat generators b1 to b5. ICONTEC verified the reported load factor through review of the load factor calculation file /38/. In the load factor calculation file the PP included the prior three years of electricity and steam consumption and calculated the average of the baseline load factors of heat engine ($LFC_{EG,CG,i}$) cogeneration mode and heat generators ($LFC_{HG,h}$). ICONTEC did not identified any material mistatement in the calculations and deems as reliable and feasible the reported figure.</p>
$HPR_{BL,i}=13.12$	<p>Baseline heat-to-power ratio of the heat engines (g1 to g5) was confirmed by ICONTEC through of visit on site and calculations.</p>
$LFC_{EG,CG,i}=48.00\%$	<p>Baseline load factor of heats engines (g1 to g5). ICONTEC verified the reported load factor through review of the load factor calculation file /38/. In the load factor calculation file the PP included the prior three years of electricity and steam consumption and calculated the average of the baseline load factors of heat engine ($LFC_{EG,CG,i}$) cogeneration mode and heat generators ($LFC_{HG,h}$). ICONTEC did not identified any material mistatement in the calculations and deems as reliable and feasible the reported figure.</p>
$NCV_{BR,k1,x 2011, 2012, 2013}=14.44 \text{ GJ/tones on dry-basis}$	<p>The PP contract an accredited laboratory that used the method UNE 164001:2005 and the instructive for measuring the calorific value of biomass. ICONTEC confirms this information through of visit on site and IPCC guidelines 2006</p>
$NCV_{FF,fuel oil,x}=41.86 \text{ MJ/kg}$	<p>ICONTEC confirms that the value is take of an official source PEMEX. (Petróleos Mexicanos) www.pemex.com /17/. This file is issued by Pemex Refinación and it is a declaration of conformity dated 24/06/2013.</p>

3.5.2. Parameters ex-post

Table11: Parameters Ex-Post Validation

Data / parameter	ICONTEC's means of validation
Biomass categories and quantities used in the CDM project activity	ICONTEC confirms that only bagasse will be used like biomass to the operation of boilers and that the PP has capacity to use weight meters to bagasse. /18/. The file: Reporte de inversiones_Cogeneración.pdf presents the information of the investment that will do the company and include measures equipments.
BR _{PJ,n,y} BR _{B4,n,y}	ICONTEC confirms that the bagasse will be on-site measurement and that the PP has capacity to use weight meters to bagasse and it is adjusted for the moisture content to determine the quantity of dry biomass /18/. The file: Reporte de inversiones_Cogeneración.pdf presents the information of the investment that will do the company and include measures equipments.
EF _{FF,y,f}	The PP indicated that the value will be provided by fuel supplier in invoices or it will use IPCC default values limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol 2. (Energy) of 2006 IPCC guidelines on National GHG Inventories. Therefore, the value more conservativeness will be used. ICONTEC considers that the PP can use any options and both are factible.
FF _{f,h,x}	The PP will install a volumetric meter. ICONTEC verified that the quantity of fossil fuel to be fired in the heat generator will depend if it is necessary or not uses backup existing heat generator. /18/
HC _{BL,y}	ICONTEC confirms that the parameter will be calculated with on-site measurements made by the PP. The PP will use the difference of the enthalpy of the process heat (steam or hot water) supplied to process heat loads in the CDM project activity minus the enthalpy of the feed-water, the boiler blow-down and any condensate return to the heat generators.
EL _{PJ,gross,y} EL _{PJ,imp,y} EL _{PJ,aux,y}	The PP will install an electricity meter bidirectional on comply with the regulations of CRE to take on-site measurement. It will be calibrated yearly./18/
NCV _{BR,n,y} Moisture content of the biomass residues	ICONTEC confirms through of interview with project manager that the PP can use accreditation laboratories for obtain this value and the frequency established on the monitoring plan is viable and realistic for do.
NCV _{FF,f,x}	ICONTEC confirms through of interview with project manager that is viable obtain the information of the fuel supplier in invoices or national data where available.
h _{LOW,y} h _{HIGH,y}	ICONTEC confirms that the parameter will be calculated with on-site measurements made by the PP. The PP will use thermocouple and pressure meter to obtain the data required for use the tables or thermodynamic equations to calculate the enthalpy.
LOC _y	ICONTEC confirms through of interview with project manager that is viable register the hours of operation on-site measurement yearly.

With the above information, ICONTEC confirmed that the monitoring plan established by the PP, is feasible and that the PP has the means of implementation sufficient to ensure that the emission reductions achieved as a result of the proposed project activity, can be reported ex-post and verified.

3.6. CALCULATION OF GHG EMISSIONS

3.6.1 BASELINE EMISSIONS FORMULATION

Baseline emission are to be calculated with the formula

$$BE_y = EL_{BL,GR,y} \cdot EF_{EG,GR,y} + \sum_f FF_{BL,HG,y,f} \cdot EF_{FF,y,f} + EL_{BL,FF/GR,y} \cdot \min(EF_{EG,GR,y}, EF_{EG,FF,y}) + BE_{BR,y}$$

which just corresponds to formula (2) of methodology ACM0006. According to the descriptions in Section B.6.1 of the PDD “*Explanation of methodological choices*” usage of the formula will be made by following the flow chart in Figure 2 of the methodology, where each step will be applied under the specific conditions of the project activity.

The DOE found that the formulation to be used in calculating the baseline emissions is correct, by comparing the specific PDD statements with the general statements of the methodology, applied to the identified baseline scenario to the project activity.

3.6.2 PROJECT EMISSIONS FORMULATION

Project emission are to be calculated with the formula:

$$PE_y = PE_{FF,y} + PE_{GR1,y} + PE_{GR2,y} + PE_{TR,y} + PE_{BR,y} + PE_{WW,y} + PE_{BG2,y} + PE_{BC,y}$$

which just corresponds to formula (37) of methodology ACM0006.

The DOE found that the formulation to be used in calculating the project emissions is correct, by comparing the specific PDD statements with the general statements of the methodology, applied to the specific characteristics of the project scenario, where only $PE_{FF,y}$ and $PE_{GR1,y}$ are considered. Other components of project emissions, by project definition, do not exist.

3.6.3 Emissions reduction formulation

Emissions reduction are to be calculated with the formula

$$ER_y = BE_y - PE_y - LE_y$$

which just corresponds to formula (1) of methodology ACM0006. The DOE agrees that due to the specific conditions of the project definition, an increment in emissions from fossil fuel combustion due to diversion of biomass residues from other uses to the project does not exist, therefore LE_y is zero.

3.6.4 Baseline emissions, Project emissions and Emission reductions calculations and Results

Ex-ante calculations of GHG emissions are presented in the PDD, Section B.6.3 *Ex ante calculation of emission reductions*, and in the spreadsheet *Panuco CERs Calculation 2015 03 17 FES v3.xls /27/*, where the methodology is applied with historic operational data for

years 2011 to 2013 and forecasted values for project performance along the crediting period. The spreadsheet has tabs for each step and sub step of baseline emissions calculation and for project emissions and emission reductions. The formulation is just as described in Sections 3.6.1, 3.6.2 and 3.6.3 above. The data and parameters used in GHG calculations have been validated by the DOE as presented in Sections 3.5.1 and 3.5.2 above.

In particular, calculation of the grid emission factor, step 1.7 of baseline calculation, is presented in a separate spreadsheet named *Emission Factor Calculation 2014 03 17 JMA.x/sx*. As explained in the PDD, Sections B.6.1 and B.6.3, the grid emission factor was calculated using the Tool to calculate the emission factor for an electricity system, version 04.0.

The DOE found that the formulation used in calculating the grid emission factor is correct, by comparing the specific PDD statements with the general statements of the tool. Steps defined in the tool for calculating the OM, BM and CM emission factors were suitably followed by the PP:

In Step 1, the Mexican grid was correctly selected as the project electricity system, inasmuch as the Panuco project is to be connected to the national grid.

In Step 2, the PP decided to include only grid power plants in the calculation, which is a valid option.

In Step 3, option (a), i.e. the Simple Operating Margin method was selected. In the view of the DOE this is correct decision, inasmuch as in the Mexican electric system low-cost/must-run resources constitute less than 50% of total grid generation in the average of the five most recent years, as verified in <http://egob2.energia.gob.mx/portal/electricidad.html>. Ex ante option was chosen by the PP, arguing accessibility of data and simplification with respect to project monitoring and further emission reduction verification. In the view of the DOE, choosing ex ante option has been suitably documented.

In Step 4, the simple OM grid emission factor has been calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (t CO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units for the period 2010-2012, using the following formula for each year in the period:

$$EF_{grid,OMsimple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y})}{EG_y}$$

This approach corresponds to Option B provided by the tool. The DOE verified that conditions to use Option B are met, therefore this option is acceptable. Data of total net generation (EG_y) and amount of fuel type i consumed in the project electricity system ($FC_{i,y}$) were verified by the DOE in

<http://egob2.energia.gob.mx/portal/electricidad.html>. NCV and EF_{CO2} parameters were verified in the IPCC Guidelines 2006. The OM obtained and validated by the DOE is 0.4869 t CO₂/MWh

In **Step 5**, the BM grid emission factor has been calculated as the generation-weighted average emission factor (tCO₂/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, using the following formula:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

This is just the approach provided by the tool, where the sample *m* has been identified as SET_{≥20%}, given that AEG_{SET-≥20%} is greater than AEG_{SET-5-units}. The DOE verified that CO₂ emission factor of power unit *m* in year *y* (*EF_{EL,m,y}*) was calculated using Option A2, with CO₂ emission factor of fuel type (*EF_{CO2,m,i,y}*) from the IPCC Guidelines 2006, and default values for energy conversion efficiency of power unit *m* (*η_{m,y}*). The BM obtained and validated by the DOE is 0.3497 t CO₂/MWh

In **Step 6**, the CM grid emission factor has been calculated as the weighted average of OM and BM, using 0.5 as weighting factor. Emission factor (tCO₂/MWh). This is the preferred option of the tool, so that the DOE is agree.

The CM grid emission factor obtained and validated by the DOE is 0.4183 t CO₂/MWh

Final results of annual Baseline emissions, Project emissions and Emissions reduction along the crediting period, obtained and validated by the DOE are showed in the following table:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
2016	25,695	0	0	25,695
2017	80,894	0	0	80,894
2018	93,673	0	0	93,673
2019	94,410	0	0	94,410
2020	98,883	0	0	98,883
2021	102,453	0	0	102,453
2022	116,142	0	0	116,142
2023	85,279	0	0	85,279
Total	697,430	0	0	697,430
Total number of crediting years	7			
Annual average over the crediting period	99,633	0	0	99,633

All data that are not monitored were correctly applied and values were cross-checked with publicly available data or supporting documents (see section 3.6.1 and References) and are thus deemed precise and conservative. The values for the monitoring parameters are

plausible. The estimation of emission reductions is deemed plausible and conservative, as described in detail in section B.6 of the PDD.

3.7. ENVIRONMENTAL IMPACTS

Ingenio Panuco sent the letter No. IPA-GF-016-VII/2013 dated 02/08/2013 to SEMARNAT with the information of the CDM activity project requesting the concept of whether the project requires or not environmental impact study.

The SEMARNAT office issued concept on letter No. SGPARN.02.IRA.515413, indicated that the Project does not require permission related with environmental impact.

ICONTEC confirms on site visit that the project does not generate negative environmental impacts, otherwise replace the bunker decreases the negative environmental impacts of the normal operation of the sugar mill.

ICONTEC verified the permits required to build CDM project activity:

- Construction license No. 1061/DOP/ Noviembre/2013. Issued Panuco Municipality, dependence on public works. Dated 15/11/2013.
- License Land use No. 64 at the site established Alto del Estero S / N Location Alto del Estero, Municipality of Panuco, Veracruz, Mexico. Issued by the Public Works Dependence on 15/11/2013. Director of public works and urban development.

ICONTEC through documental review and interviews, determined that the project participants conducted an analysis of the environmental impacts of the proposed project activity, including transboundary impacts.

3.8. COMMENTS BY LOCAL STAKEHOLDERS

The Project participant invited to local stakeholders through of radio Contacto Informativo and Milenio newspaper, year 23, Num 364, 22/10/2013. This information was confirmed with physical newspaper. Both sources of communication cover the influence area of project.

Also, the project participants sent invitation letters /19/ to procuraduria federal environmental protection – PROFEPA, SEMARNAT, State Association of producers in the fisheries, municipality and aquaculture industry in the state of Veracruz, cane farmers, universities, school, in others. ICONTEC confirm the list of invited through of file: recepcion de invitaciones.pdf /20/.

The meeting was made on 23/10/2013 at 16:00, on Hotel Plaza of Panuco city. This information was confirmed with the attendance list /21/.

During the meeting there were not questions or people against the project, however expressed their acceptance. Previous information was confirmed by ICONTEC through interview with Mr. Tomas Cruz representing to State Association of producers in the fisheries, municipality and aquaculture industry in the state of Veracruz and Mr. Martin

Romero Biologist, who confirmed their acceptance to the CDM project activity and that there were no comments during the consultation.

ICONTEC confirmed that the description in the PDD (Section E) is correct and that the stakeholder consultation was in line with the CDM and host country requirements /34/, /35/. Stakeholders that can reasonably be considered relevant for the proposed CDM project activity have been invited. ICONTEC was therefore able to determine that the stakeholder consultation was adequate.

4. GLOBAL STAKEHOLDERS CONSULTATION

The PDD version 1 submitted by Ingenio Panuco, was made publicly available at UNFCCC website during a 30 day period from 22/01/2014 to 20/02/2014.

During the global publication no comments were received from stakeholders, this information being confirmed in the following link:

<http://cdm.unfccc.int/Projects/Validation/DB/WZ1VLUE0N0K0TZAHD6ZLIVRIR7PXN/view.html>

Parties, stakeholders and NGOs were invited to provide comments through the website. No comments were received during the public consultation.

5. VALIDATION OPINION

ICONTEC has performed a validation of the “Panuco Bagasse Cogeneration Project”, in Mexico. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the Project Design Documentation and the subsequent follow up interviews has provided ICONTEC with sufficient evidence to determine the fulfillment of the stated criteria.

The project activity is being proposed as a unilateral project by Ingenio Panuco S A P I de CV. Mexico, has provided approval of voluntary participation and meets all requirements to participate in CDM. The Mexican DNA confirmed that the project helps in achieving sustainable development.

The project correctly applies the methodology ACM0006 - Version 12.1.1.

The project consists on replace the actual cogeneration plant that operate with bunker and bagasse with an installed capacity around of 17 MW by a new that will operate only with bagasse to increase the installed capacity of a sugar mill around 117 MW. The project involves two phases on the first a turbine of around 40 MW and the second a turbine of 60 MW.

The total emission reductions from the project are estimated to be on average 99,633 tCO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved because the underlying assumptions do not change.

In summary, it is ICONTEC's opinion that the "Panuco Bagasse Cogeneration Project", in Mexico, as described in the PDD version 4, dated on 17/03/2015 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0006 - Version 12.1.1.

ICONTEC thus requests the registration of the project as a CDM project activity.

Bogotá D.C., April 13th, 2015



Monica Vivas Rodríguez
Director of conformity assessment
ICONTEC

6. REFERENCES

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

/1/	CDM Project Design Document, including Baseline Methodology and the Monitoring Plan. Panuco Bagasse Cogeneration Project. Version 01. 09/12/2013 Panuco Bagasse Cogeneration Project. Version 02. 28/04/2014 Panuco Bagasse Cogeneration Project. Version 03. 27/06/2014 Panuco Bagasse Cogeneration Project. Version 04. 17/03/2015
/2/	Letter of approval No. 340/2014 Issued by Designated National Authority of Mexico
/3/	Constitution minutes. Acta de Constitución.pdf.
/4/	Legal power. File: Poder legal.pdf
/5/	Technical proposal for Turbogenerators No.0376/12, Dated: 04-02-2013 presented by TGM turbinas. www.grupotgm.com.br . File: Proposed technical Turbogenerators.pdf.
/6/	Offer Ref No.: CEM/ISGEC/700595-50 to boilers, Dated: 02-01-2013 presented by ISGEC. www.isgec.com . File: Revised Technical Proposal - 200 TPH,1200 psig, 1000F.pdf.
/7/	Purchase order No. W-13000015 to boilers, dated: 17/04/2013. Signed between Ingenio Panuco S.A.P.I de C.V and ISGEC Heavy Engineer Limited of India.
/8/	Forecast Electricity of Panuco Bagasse Project.xls. Elaborated by Pantaleon – Ingenio Panuco. The projection is since 2014 until 2037.
/9/	Proyeccion de superficies a cultivo 40 MK.xlxs. Elaborated by Pantaleon – Ingenio Panuco. The projection is since 2014 until 2037.
/10/	Ingenio Panuco 001 Carta CFE.jpg. Register of 28/11/2013. The letter corresponds to the interconnection request sent by Ingenio Panuco to the Federal Electricity Commission.
/11/	Status cogeneration licenses. (Avance cogeneración permisos.pdf). Internal report presented on January, 2014.
/12/	Purchase order No. W-13000014 to electric generator dated: 12/02/2013. Signed Ingenio Panuco S.A.P.I de C.V and GEVISA S.A. of Campinas SP-Brazil.
/13/	Prior consideration of the CDM form version 02.0. File: Prior Consideration - Panuco Bagasse Cogeneration Project.pdf
/14/	File: RE Proyecto Mecanismo de Desarrollo Limpio Panuco
/15/	File: Histórico de generacion de energia y vapor (Zafra 2011-2013).xlxs
/16/	File: Desarrollo operativo.xlxs (Development operative).
/17/	File: Poder calorifico Bunker.pdf.
/18/	File: Reporte de inversiones_Cogeneración.pdf.
/19/	File: Invitacion.ppt
/20/	File: recepcion de invitaciones.pdf
/21/	File: registro de invitados.pdf
/22/	File: Panuco cash flow v1 2013 12 06 GDP.xlsx File: Panuco cash flow v2 2014 04 29 JMA.xlsx File: Panuco cash flow v2 2014 06 20 GDP.xlsx File: Panuco cash flow v3 2015 03 17 FES.xlsx
/23/	File: Common practice analysis.xlsx
/24/	File: www.cre.gob.mx_articulo.aspx_id=171.pdf
/25/	File: Reporte análisis de vida útil calderas N° 1; N° 2; N° 3; N° 4 Y N° 5 DEL INGENIO PÁNUCO, S. A. DE P. I. DE C. V. (Lifetime boilers report).
/26/	http://www.cfe.gob.mx/ConoceCFE/1_AcercadeCFE/Estadisticas/Paginas/Clientes.asp
/27/	Spreadsheet versions: Panuco CERs Calculation 2013 12 08 JMA Panuco CERs Calculation 2014 03 17 JMA

	Panuco CERs Calculation 2014 07 18 v2 Rev GDP(1) Panuco CERs Calculation 2015 03 17 FES v3
/28/ /29/	Files: Reportes vida remanente TGE Panuco (1) Balance de massa e energia_Projeto Nuevo.xlsx Balanço de massa y energia_planta actual.xlsx
/30/	http://www.energia.gob.mx/webSener/res/0/D121122%20Iniciativa%20Renovable%20SENER_Cogeneraci%C3%B3n.pdf
/31/	http://www.iea.org/media/weowebiste/energymodel/WEM_Methodology_WEO2011-1.pdf
/32/	Aswath Damodaran, Applied Corporate Finance: A User's Manual, Wiley Frontiers in Finance, Wiley, 2005
/33/	File:Estudio Ampliación y cogeneración.pdf (Cogeneration and Expansion Study) Elaborated by Sugar Power Systems, INC (Consultores de Ingenios Azucareros S.A.) December, 2012.
/34/	http://www.dof.gob.mx/nota_detalle.php?codigo=2096504&fecha=27/10/2005 Agreement that establishes the procedures for the issuance of letters of approval of projects to reduce or capture emissions of greenhouse gases. Issued by SEMARNAT dated 27/10/2005. http://www.inecc.gob.mx/descargas/2012_lgcc.pdf
/35/	General law of climate change. Issued by Mexican Congress dated 10/10/2012.
/36/	Determinación de inversiones y gastos de administración, operación y mantenimiento para la actividad de generación en zonas no interconectadas utilizando recursos renovables, http://www.corpoema.com/web/IMG/pdf/informe_zni_renovables.pdf
/37/	http://www.gonzalezchevez.com/wp-content/uploads/2012/04/LIVA_071209.pdf
/38/	Load factor calculation file for Panuco Bagasse Cogeneration Project, issued by Ingenio Panuco Sapi de CV, dated on 17/03/2015. File: "Panuco Load factor calculation prior the CDM Project 2015 03 17 FES.xls"

ANNEXES

Annex A

Validation Protocol

VALIDATION REPORT VVS



The audit team conducts a thorough, independent assessment of the registered project activities.

The next table contains questions that the audit team shall follow in order to determine whether the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. The audit team ensures that only the verification activities, undertaken after the publication of the monitoring report on the UNFCCC CDM website, were used as the basis for ICONTEC to conclude the verification and submission of a request for issuance of CERs to the board.

Questions were answered on the right column using the following scores:

- Full: When the audit team had full access to the required information, the information is complete and satisfactory
- Partial: When the audit team did not have access to the information, or the information is incomplete, or not satisfactory. In this case, indicate finding type and number.
- Resolved: When a partial score is assigned, indicate the date when the finding was closed
- N/A: Shall be used when the question does not apply.

When raising a clarification request, corrective action request and forward action, it is in accordance with VVS V 07.0

Table A1: Validation Protocol

CHECKLIST QUESTION	REFERENCES	Final Conclusion
1. Global Stakeholder Consultation		
1.1 Has the validation team received and taken into account all comments on the PDD of the proposed project activity during the whole validation process? (not only during GSC) VVS (V 07.0)	Section 4 Global Stakeholder Consultation	Full
1.2 If comments indicate that the proposed project activity does not comply with the CDM requirements, did the validation team request further clarification from the entity providing the comment? VVS (V 07.0)	Section 4 Global Stakeholder Consultation	Full
2. Approval		

VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
2.1 Has the designated national authority (DNA) of each Party indicated (as being involved in the proposed CDM project activity in the PDD) provided a written letter of approval? VVS (V 07.0)	Section 3.2.1 Approval and authorization	Full
2.2 Is the letter(s) of approval issued by the respective Party's DNA the confirmation of: (a) The Party is a Party to the Kyoto Protocol; (b) Participation is voluntary; (c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country; (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration? VVS (V 07.0)	Section 3.2.1 Approval and authorization	Full
3. Authorization		
3.1 All project participants have been listed in a consistent manner in the project documentation, and their participation in the project activity has been approved by a Party to the Kyoto Protocol. VVS (V 07.0) paragraph. 46	Section 3.2.1 Approval and authorization	Full
3.2 Are there entities other than those authorized as project participants included in these sections of the PDD? VVS (V 07.0)	Section 3.2.1 Approval and authorization	Full
3.3 The approval of participation has been issued from the relevant DNA. VVS (V 07.0)	Section 3.2.1 Approval and authorization	Full
4. Modalities of communication		
4.1 All focal points included in the MoC, as well as the personal identities, including specimen signatures and employment status, have been validated by corporative, personal identify and other relevant documentation like notarized documentation. VVS (V 07.0)	Section 3.2.2 Modalities of communication	Full
4.2 Was the MoC correctly completed and duly authorized? - The last version of the form F-CDM-MOC has been used?	Section 3.2.2 Modalities of communication	Full

VALIDATION REPORT VVS



<p>- The information required as per the F-CDM-MOC, including its annex 1, is correctly completed.</p> <p>-The authorized project participants signing the F-CDM-MOC correspond to the authorized project participants included in F-CDM-MOC, annex 1.</p> <p>VVS (V 07.0)</p>		
5. Project design document		
<p>5.1. The PDD was completed using the last version of the PDD form and guidance appropriate to the type of project activity.</p> <p>VVS (V 07.0)</p>	Section 3.3. Project Design	Full
6. Description of the project activity		
<p>6.1 The PDD is accurate, complete, and provides an understanding of the proposed CDM project activity (by reviewing available designs and feasibility studies and conducting comparison analysis with equivalent projects).</p> <p>VVS (V 07.0)</p>	Section 3.3. Project Design	Partial CL 1 Resolved 05/06/2014
<p>6.2 The project is correctly classified as large scale, non-bundled small-scale projects with emission reductions exceeding 15,000 tons per year or bundled small-scale projects, each with emission reductions not exceeding 15,000 tonnes per year.</p> <p>VVS (V 07.0)</p>	Section 3.3. Project Design	Full
<p>6.3 For other individual proposed small-scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, the DOE should conduct a physical site visit as appropriate. If not, it shall be justified by the DOE.</p> <p>VVS (V 07.0)</p>	Section 3.3. Project Design	Full
<p>6.4 If applicable, was the use of any sampling approach made according to the "Standard for sampling and surveys for CDM project activities and programme of activities"?</p> <p>VVS (V 07.0)</p>	N/A	N/A
7. Application of the selected Baseline and monitoring methodology		
<p>7.1 The baseline and monitoring methodologies selected by the project participants are the valid versions of those approved by the Board. The selected version is valid at the time of submission of the proposed project activity for registration.</p> <p>VVS (V 07.0)</p>	Section 3.3. Project Design	Full

VALIDATION REPORT VVS



7.2 The selected methodology applies to the project activity and was correctly applied with respect to: Project Boundary, baseline identification, algorithms and/ formulae used to determine emission reduction, additionality, monitoring methodology. VVS (V 07.0)	Section 3.3 Project design	Partial CAR 3, CAR 4, CL 2 and CL 3 Resolved 27/06/2014
7.3 Has each applicability condition listed in the approved methodology selected been confirmed? VVS (V 07.0)	Section 3.3 Project design. Table 4: Methodology Applicability Conditions Analysis	Partial CAR 3, CAR 4, CL 2 and CL 3 Resolved 27/06/2014
8. Deviation from an approved methodology		
8.1 Did the project request a deviation from an approved methodology before the publication of the PDD? VVS (V 07.0)	N/A	N/A
8.2 if there are any requests for deviation from an approved methodology, the applicability of the appendix 1 of Project standard must be applied. VVS (V 07.0)	N/A	N/A
9. Clarification on the applicability of an approved methodology		
9.1 In the cases where the DOE cannot make a determination regarding the applicability of the selected methodology or selected standardized baseline to the proposed project activity, Was there requested any clarification on the applicability of the approved methodology? VVS (V 07.0)	N/A	N/A
10. Project boundary		
10.1 Are all main GHG emission sources, the physical delineation of the proposed project activity and other relevant project and baseline emission sources covered in the methodology or selected standardized baseline, included within the project boundary for the purpose of calculating project and baseline emissions for the proposed project activity? VVS (V 07.0)	Section 3.3. Project design	Partial CL 1 Resolved 27/06/2014

VALIDATION REPORT VVS



<p>10.2 Does the methodology allow project participants to choose whether a source or gas is to be included within the project boundary? -Has the project participant justified that choice? The DOE shall determine whether the justification provided is reasonable, based on an assessment of supporting documented evidence provided by the project participants and corroborated by observations if required. VVS (V 07.0)</p>	Section 3.3. Project design	Full
<p>10.3 For the project activities that have both A/R and non-A/R components, please confirm that the emissions associated with the A/R activity will be accounted for and documented by the A/R project activity. VVS (V 07.0)</p>	N/A	N/A
11. Baseline scenario identification and description		
<p>11.1 The Baseline identified for the proposed project activity is the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed project activity. In addition, when if the project activity uses a standardized baseline, the DOE determined baseline scenario complies with the proposed on the selected standardized baseline. VVS (V 07.0)</p>	Section 3.4. Baseline determination and additionality	Full
<p>11.2 Please confirm that all tools required by the methodology have been used by the PP. VVS (V 07.0)</p>	Section 3.3 Project design	Full
<p>11.3 Assess the baseline scenarios based on financial expertise and local and sectoral knowledge, crosscheck the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available, relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector. VVS (V 07.0)</p>	Section 3.4. Baseline determination and additionality	Full
12. Algorithms and/or formulae used to determine emission reductions		
<p>12.1 Do the steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring methodology? VVS (V 07.0)</p>	Section 3.4. Baseline determination and additionality	Partial CL 4 Resolved 27/06/2014

VALIDATION REPORT VVS



12.2 If the methodology allows for selection between various equations or parameters, the DOE shall determine whether adequate justification has been provided and if the justification provided is reasonable, based on an assessment of supporting documented evidence provided by the project participants and corroborated by observations if required. VVS (V 07.0)	Section 3.4. Baseline determination and additionality	Partial CAR 2 Resolved 27/06/2014
12.3 Verify the justification given in the PDD for the choice of data and parameters used in the equations (appropriate, conservative and reasonable). Data sources must be provided for each parameter. VVS (V 07.0)	Section 3.4. Baseline determination and additionality	Partial CAR 1, CL 8 Resolved 27/06/2014
13. Additionality of a project activity		
13.1 Assess and verify the reliability and credibility of all data and any assumptions, justifications and documentation provided by project participants to support the demonstration of additionality. Critically assess the evidence presented, using local knowledge and sectoral and financial expertise. VVS (V 07.0)	Section 3.4. Baseline determination and additionality	Partial CAR 1 Resolved 27/06/2014
13.2 Please confirm that all tools required by the methodology have been used by the PP. VVS (V 07.0)	Section 3.4. Baseline determination and additionality	Full
13.3 For small scale project activities or micro scale project activities, the project participant used the applicable Guidelines, procedures and documents issued by the EB VVS (V 07.0)	N/A	N/A
14. Assessment of prior consideration of the clean development mechanism		
14.1 has the start date of the project activity been identified in accordance with the CDM glossary of terms? VVS (V 07.0)	Section 3.3.1. Prior consideration of the CDM	Full
14.2 Prior consideration assessment must be done according to the latest version of the "guidelines on the demonstration and assessment of prior consideration of the CDM." VVS (V 07.0)	Section 3.3.1. Prior consideration of the CDM	Full
14.3 Depending of the gap between the evidence documented, does the PP justify the validation opinion of the CDM status? VVS (V 07.0)	Section 3.3.1. Prior consideration of the CDM	Full

VALIDATION REPORT VVS



15. Identification of alternatives (if apply)		
15.1 Have the alternatives in accordance with the approved methodology and/or the tool of additionality been identified? VVS (V 07.0)	Section 3.4.1. Step 1.	Partial CAR 1, CL 9 Resolved 24/06/2014
15.2 Does the DOE evaluate if the list of alternatives includes as one of the following options that the project activity is undertaken without being registered as a proposed project activity, contains all plausible alternatives of viable means of supplying the comparable outputs or that services are to be supplied by the proposed project activity and compliant with all applicable and enforced legislation? VVS (V 07.0)	Section 3.4.1. Step 1. Table 5: Assessment of baseline	Partial CAR 2 Resolved 27/06/2014
16. Investment analysis (if applicable)		
16.1 Was it applied for the PP's the latest version of Guidelines on the assessment of investment analysis? VVS (V 07.0)	3.4.3. Step 3: Investment Analysis	Full
16.2 Does the DOE verify if the project activity is not the most economically or financially attractive alternative: <ul style="list-style-type: none"> Does not produce financial or economic benefits other than CDM-related income, Is less economically or financially attractive than at least one other credible and realistic alternative: The financial returns of the proposed project activity would be insufficient to justify the required investment? VVS (V 07.0)	3.4.3. Step 3: Investment Analysis	Full
16.3 Was verified: <ul style="list-style-type: none"> suitability of the financial indicator selected, assessment of all parameters and assumptions used in calculating such financial indicators, as well as a determination of accuracy and suitability cross-check the parameters against a third-party, review, as appropriate, feasibility reports, public announcements, annual financial reports 	3.4.3. Step 3: Investment Analysis	Partial CAR 4, CL 10 Resolved 05/06/2014

VALIDATION REPORT VVS



<ul style="list-style-type: none"> sensitivity analysis All computations, the accuracy of implementation and documentation by PP's VVS (V 07.0)		
<p>16.4 Was verified:</p> <ul style="list-style-type: none"> Determine whether the type of benchmark applied is suitable for the type of financial indicator presented Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark. VVS (V 07.0)	3.4.3. Step 3: Investment Analysis	Full
<p>16.5 Was verified (if apply):</p> <ul style="list-style-type: none"> The FSR is the basis for the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short that it is unlikely in the context of the underlying project activity that the input values would have materially change The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE shall assess the appropriateness of the values The input values from the FSR are valid and applicable at the time of investment decision. The DOE shall confirm this on the basis of its specific local and sectoral expertise and by cross-checking or other appropriate means. VVS (V 07.0)	3.4.3. Step 3: Investment Analysis	Full
17. Barrier Analysis (if applicable)		
<p>17.1 Does the DOE determine whether the proposed project activity faces barriers that:</p> <p>(a) Prevent the implementation of this type of proposed project activity (See the latest "Guidelines for objective demonstration and assessment of barriers")</p> <p>(b) Do not prevent the implementation of at least one of the alternatives.</p> VVS (V 07.0)	N/A	N/A
<p>17.2 Did the DOE determine if the issues that have a direct impact on the financial returns of the project activity are not considered barriers and shall be assessed by investment analysis? This does not refer to either:</p> <p>(a) Risk related barriers, for example risk of technical failure, that could have</p>	N/A	N/A

VALIDATION REPORT VVS



negative effects on financial performance; or (b) Barriers related to the unavailability of sources of finance for the project activity. VVS (V 07.0)		
17.3 Did the DOE apply the two step process to evaluate the barrier analysis performed and determine if the barriers are real and if so prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives? VVS (V 07.0)	N/A	N/A
18. Common Practice Analysis(if applicable)		
18.1 For proposed large-scale project activities, unless the proposed project type is first-of-its-kind as determined in accordance with the relevant guidelines, the DOE has assessed whether the project participants have conducted a common practice analysis. VVS (V 07.0)	3.4.4. Step 4: Common practice analysis	Full
18.2 Did the DOE use official sources and its local and sectoral expertise to: (a) assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity, (b) Determine to what extent similar and operational projects (e.g. using similar technology or practice), other than project activities, have been undertaken in the defined region; (c) Assess, if similar and operational projects, other than project activities, are already “widely observed and commonly carried out” in the defined region, and whether there are essential distinctions between the proposed project activity and the other similar activities. (See the Tool for assessing the additionality and/or the latest version of the Guidelines for assessing the common practice) VVS (V 07.0)	3.4.4. Step 4: Common practice analysis	Full
19. Monitoring Plan		
19.1 The Audit team identified the list of parameters required by the selected approved methodology including applicable tool(s), and confirmed that it includes the data management and quality assurance and quality control procedures to ensure that the proposed project activity can be reported ex post and verified. To assess the implementation of the plan the DOE shall, by means of review of	Section 3.5: Monitoring plan. Table 10 and 11.	Partial CL 6, CL 7, CL 11 Resolved 03/06/2014

VALIDATION REPORT VVS



<i>the documented procedures, conduct interviews with relevant personnel, project plans and any physical inspections of the proposed project activity site.</i> VVS (V 07.0)		
20. Environmental Impacts		
20.1 Did the project participants develop an environmental impact analysis including trans boundary impacts? VVS (V 07.0)	Section 3.7. Environmental impacts	Full
20.2 Did the project participant conduct an environmental impact assessment, if required to do so by the host Party, in accordance with the host Party's procedures?	Section 3.7. Environmental impacts	Full
21. Local stakeholder consultation		
21.1. Have the project participants completed a local stakeholder consultation process and were due steps were taken to engage stakeholders and solicit comments for the proposed project activity? VVS (V 07.0)	3.8. Comments by local stakeholders	Full
21.2 Did the DOE determine whether: (a) Comments have been invited from local stakeholders that are relevant for the proposed project activity; (b) The summary of the comments received as provided in the PDD is complete; (c) The project participants have taken due account of all comments received and have described this process in the PDD. VVS (V 07.0)	3.8. Comments by local stakeholders	Full
22. Specific validation requirements		
23.1. For certain specific validation activities such as SSC, A/R, and PoA, the DOE shall comply with the general validation requirements described in the sections above as well as those that follow, including the simplified modalities and procedures for small-scale project activities, the modalities and procedures for afforestation and reforestation project activities, and Standards for PoA. VVS (V 07.0)	N/A	N/A
23. Small-scale project activities (if applicable)		
	N/A	N/A

VALIDATION REPORT VVS



<p>1. Project activity eligibility</p> <ul style="list-style-type: none"> - The project activities fall within the threshold of the three possible types of small project activities. - The DOE verified that the small-scale methodologies were applied in conjunction with the general guidance to the methodologies. - The DOE verified that the project activity is not a debundled component of a large-scale project, in accordance with the rules defined in the appendix C of the simplified modalities for small-scale CDM project activities <p>VVS (V 07.0)</p>		
<p>2. Debundling</p> <ul style="list-style-type: none"> - <i>The DOE shall verify that the proposed small-scale project activity is a debundled component of a large-scale project activity if there is a registered small-scale project activity or an application to register another small-scale project activity.</i> - <i>The DOE, where appropriate, has taken into account specific debundling requirements for Type I project activities and small-scale transport project activities.</i> <p>VVS (V 07.0)</p>	N/A	N/A
<p><i>The proposed small-scale project activity is not a debundled component of a large-scale project activity in accordance with the Guidelines on assessment of debundling for SSC project activities</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p><i>The proposed small-scale project activity is a debundled component of a large-scale project activity if there is a registered small-scale project activity or an application to register another small-scale project activity.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p><i>The Project participant takes into account specific debundling requirements for Type I project activities and small-scale transport project activities.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>3. Additionality</p> <ul style="list-style-type: none"> - <i>The DOE verified that the proposed SSC project activity is additional in accordance with CDM requirements applicable for small-scale project activities.</i> 	N/A	N/A

VALIDATION REPORT VVS



<ul style="list-style-type: none"> - For the activities type I, II and III, the DOE assessed the fulfillment of the relevant criteria to establish the automatic additionality for these projects - The DOE detailed all the steps taken to make the cross-check of the information contained in the PDD <p>VVS (V 07.0)</p>		
<p>24. Afforestation or reforestation project activities</p>		
<p>In addition to the requirements listed above, the DOE verified the specific requirements for A/R CDM project activities, which include:</p> <ul style="list-style-type: none"> - Project boundary for A/R CDM; - Selection of carbon pool; - Eligibility of land; - Approach proposed to address non permanence; - Timing of management activities, including harvesting cycles and verifications; - Socioeconomic environmental impacts, including impacts on biodiversity and natural ecosystems. <p>VVS (V 07.0)</p>	N/A	N/A
<p>1. Project boundary</p> <p>The DOE described the documentation assessed and oral statements delivered by persons interviewed and approved their acceptability under the legal system of the host country.</p> <p>In case the DOE has applied a sampling approach; the validation report shall describe how many sites have been assessed and how these were selected.</p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>2. Selection of carbon pool</p> <p>The DOE verified whether the selection of the carbon pool complied with the applied approved methodology or whether the exclusion of a certain pool is allowed for the methodology and is correctly justified.</p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>3. Eligibility of land</p> <p>DOE verified the reliable discrimination between forest and non-forest land according to the particular threshold adopted by the host country.</p> <p>VVS (V 07.0)</p>	N/A	N/A

VALIDATION REPORT VVS



<p>4. Addressing non permanence</p> <p>DOE verified the specification of the proposed approach to address nonperformance in accordance with paragraph 38 of the modalities and procedures for A/R CDM projects activities. VVS (V 07.0)</p>	N/A	N/A
<p>5. Timing of management activities</p> <p>The DOE verified how the project participants would ensure that a systematic coincidence of verification and peaks in carbon stocks would be avoided. VVS (V 07.0)</p>	N/A	N/A
<p>6. Socioeconomic and environmental impacts</p> <p>The DOE verified using local official sources whether the project participants have undertaken an analysis of socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems, as well as impacts outside the project boundary. VVS (V 07.0)</p>	N/A	N/A
<p>25. Small-scale A/R project activities</p>		
<p>The DOE determined whether: The project activities qualify as a proposed small-scale A/R CDM project activity and comply with the threshold for the proposed small-scale A/R projects in accordance with the decision 5/CMP.1, annex paragraph 1(i). The project activity complies with one of the types of small-scale A/R project activities defined in appendix B of the annex to decision 6/CMP.1. The base line, monitoring methodology and the methodology is applied correctly. The proposed CDM project activity is not part of a debundled large-scale A/R project activity, in accordance with the rules defined in appendix C of the annex to decision 6/CMP.1. The proposed CDM project activity has been developed or implemented by low-income communities and individuals as confirmed by the host Party in accordance with the decision 5/CMP.1, annex paragraph 1(i). VVS (V 07.0)</p>	N/A	N/A
<p>26. Programme of activities / Component project activities</p>		
<p>1. Coordinating/managing entity and participants in a PoA</p> <p>The DOE assessed the management system described in the PoA</p>	N/A	N/A

VALIDATION REPORT VVS



<p><i>design document (CDM PoA-DD) in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for the programme of activities</i></p> <p>VVS (V 07.0)</p>		
<p>2. CPA design document</p> <p><i>The DOE assessed the proposed CPA that a coordinating/managing entity wished to include in the PoA.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>3. Description of a PoA/CPAs</p> <p><i>The DOE assessed the CDM-PoA-DD and the PoA-specific CDM-CPA-DD that was submitted by the coordinating/managing entity and confirmed the framework developed for the implementation of the PoA, and defined a CPA under the PoA.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>4. Application of multiple methodologies</p> <p><i>The DOE assessed the application of multiple methodologies in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>5. Boundary for the PoA in terms of geographical area</p> <p><i>The DOE verified the boundary of the PoA within which all CPAs included in the PoA will be implemented and if the project participant has taken into account all the applicable national and/or sectoral policies and regulations.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>6. Start date of CPA</p> <p><i>The DOE verified that the start date of the CPA is on or after the start date of the PoA.</i></p> <p>VVS (V 07.0)</p>	N/A	N/A
<p>7. Prior consideration of the CDM</p> <p><i>The DOE shall assess prior consideration of the CDM for the PoA</i></p>	N/A	N/A

VALIDATION REPORT VVS



applying the provisions of paragraph 107 above mutatis mutandis. VVS (V 07.0)		
8. Demonstration of additionality of the PoA as a whole <i>The DOE verified the additionality of a PoA in accordance with the .Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities.</i> VVS (V 07.0)	N/A	N/A
9. Eligibility criteria for inclusion of a CPA in the PoA <i>The DOE assessed the eligibility criteria for inclusion of a CPA in the PoA in accordance with the .Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities.</i> VVS (V 07.0)	N/A	N/A
10. Crediting period of a PoA/CPA <i>The DOE determined that the length of a PoA does not exceed 28 years (60 years for A/R).</i> VVS (V 07.0)	N/A	N/A
11. Monitoring plan for a PoA/CPA <i>The DOE verified that the monitoring plan for a CPA is in accordance with the approved monitoring methodology, including applicable tool(s).</i> VVS (V 07.0)	N/A	N/A
12. Environmental Analysis of a PoA <i>The DOE determined that an analysis of the environmental impacts of the PoA in accordance with CDM-PoA-DD and the CDM-CPA-DD was undertaken.</i> VVS (V 07.0)	N/A	N/A
13. Local stakeholder consultation <i>The DOE verified that the local stakeholder consultation process was carried out for the whole PoA or at the CPA level?</i> <i>If comments by local stakeholders were invited with regard to the whole PoA, the DOE shall determine how these comments were invited; whether the summary of the comments received is complete and how</i>	N/A	N/A

VALIDATION REPORT VVS



<p><i>due account was taken of all comments received.</i> VVS (V 07.0)</p>		
<p><i>If the local stakeholder consultation is conducted at the CPA level, the DOE shall determine whether it is in accordance with the level of consultation specified by the coordinating/managing entity and whether the local stakeholder comments were taken into account and described in the CDM-PoA-DD and the CDM-CPA-DD</i> VVS (V 07.0)</p>	N/A	N/A
<p>14. Determination of occurrences of debundling under a PoA <i>The DOE verified that the proposed small-scale CPA of a PoA is not a debundled component of a large-scale project activity in accordance with the Guidelines on assessment of debundling for SSC project activities.</i> VVS (V 07.0)</p>	N/A	N/A
<p>15. Inclusion or renewal of a crediting period of a CPA under a registered PoA <i>The DOE verified that the specific CDM-CPA-DD is in accordance with the latest version of the PoA and determined that the CPA meets the requirements of the PoA.</i> VVS (V 07.0)</p>	N/A	N/A
<p>27. Validation status and outcomes, opinion, and report</p>		
<p>1. Validation status and outcomes <i>The DOE provided an update of the status of its validation activity, unless the project activity has been submitted for registration 180 days subsequent to the end of the period for the submission of public comments.</i> <i>The updated status presented for the DOE, must contain one of the following conditions:</i></p>	N/A	N/A

VALIDATION REPORT VVS



<p><i>Finalization of the validation contract</i> <i>A negative validation opinion</i> <i>Summary of the issues raised with updates or reconfirmations of the validation status at three month intervals</i> <i>Which party/parties are involved in the absence of sending of a valid letter of approval</i> <i>Explanations about the length of the validation activity and the update of the validation status if the validation activities are ongoing and the CAR or CL have not yet been sent to the project participant.</i> VVS (V 07.0)</p>		
<p>2. Validation opinion <i>It was emitted an opinion of the likelihood of the project activity achieving the anticipated emission reductions stated in the PDD, where the PP has been informed of the validation outcome, whether it is a positive or negative opinion.</i> <i>The DOE's opinion must include:</i></p> <ul style="list-style-type: none"> - <i>A summary of the validation methodology and process used and the validation criteria applied</i> - <i>A description of project components or issues not covered by the validation process</i> - <i>A summary of the validation conclusions</i> - <i>A statement on the validation of the expected emission reductions</i> - <i>A statement as to whether the proposed project activity meets the stated criteria.</i> - <i>The validation opinion confirms whether the project meets the stated criteria and that the methods presented in the project design documentation are acceptable and have been correctly applied.</i> VVS (V 07.0)	<p>Section 5: validation opinion</p>	<p>Full</p>
<p>3. Validation Report <i>Is The validation report in line with IN-P-CC-01?</i> <i>The DOE included in the validation report a validation opinion that integrated:</i></p> <ul style="list-style-type: none"> - <i>Conclusions regarding the proposed project activity's conformity with</i> 	<p>Section 5: validation opinion</p>	<p>Full</p>

VALIDATION REPORT VVS



applicable

- *CDM requirements*
- *Overview of the validation activities*
- *Findings and conclusions*
- *Information on the global stakeholder consultation process carried out.*
- *A list of interviewees and documents reviewed*
- *Details of the validation team*
- *Information on quality control within the team and in the validation process*
- *Appointment certificates or curricula vitae of the DOE's validation team members, technical experts and internal technical reviewers for the project activity.*

VVS (V 07.0)

VALIDATION REPORT VVS



TableA2: Resolution of Corrective Action, Forward Action and Clarification Request

The following table explains how ICONTEC resolve or “close out” CARs and CLs describing how the project participants modify the project design, rectify the PDD or provide additional explanations or evidence that satisfy the ICONTEC’s concerns. VVS (V 07.0).

This table explains the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the PDD or supporting annexes. VVS (V 07.0)

Report clarifications and corrective action requests	Reference	Summary of project owner response	Validation conclusion
CAR 1 Clarify the Biomass residues fate in the absence of the CDM project activity.	ACM 0006 v12.1.1 Table 2	<p>As explained in the section B.4 -Table 1 “Biomass categories identified” the project activity considers only the biomass residues (bagasse) generated in the on-site production of the Panuco sugar mill plant.</p> <p>In the absence of the CDM project activity, all biomass residues would be used as fuel in the existing cogeneration plant to supply the energy and heat for the Panuco sugar mill process because currently is combusted fossil fuel (Bunker C) to supply the lack of bagasse.</p> <p>This practice is common for sugar mills in Mexico as published by the Mexican Energy Secretary in its study: “Iniciativa para el desarrollo de las energías renovables en México” http://www.energia.gob.mx/webSener/res/0/D121122%20Iniciativa%20Renovable%20SENER_Cogeneraci%C3%B3n.pdf</p> <p><u>Second Response:</u></p> <p>The table’s numeration was updated in order to avoid any confusion. Please refer to tables 4 and 5 in the new version o PDD.</p>	<p>Validation Team Opinion</p> <p>The PP correctly described the possible uses of the biomass residues in absence of the CDM project activity on the new version of the PDD.</p> <p>However, the CAR continues open because on the new version of the PDD the Table No.1 does not correspond with the alternative scenarios for the use of biomass residues in the absence of the CDM project activity on section B.4.</p> <p>The numeration was clarified and now the information is completed.</p> <p>Validation Team Conclusion</p> <p>CLOSED 24/06/2014</p>

VALIDATION REPORT VVS



<p>CAR 2</p> <p><i>Verify the justification of plausibility of each alternative scenario, taking into account that they deal with alternative uses for the additional biomass (additional biomass that would be used by the project activity).</i></p>	<p><i>ACM 0006 v12.1.1</i></p>	<p><i>The heat and electricity generation of the actual cogeneration plant is not enough to cover the demand of the Panuco sugar mill plant and for this reason was necessary to burn fossil fuel Bunker C (2,885,782; 5,148,968 and 6,385,057 liters during the 2011, 2012 and 2013 last seasons) and import electricity of the grid (19,057; 15,152 and 20,067 MWh during the 2011, 2012 and 2013 last seasons).</i></p> <p><i>Based on the explained above when the biomass residues quantity increases due to the natural growth of sugar mill plant, because the main business is the production and commercialization of sugar in the market, this additional biomass residues would be used as fuel in the existing cogeneration plant to supply the lack of energy and heat in the Panuco sugar mill process.</i></p> <p><i>Second response:</i></p> <p><i>A better clarification about the election of BR scenario (B4 and B5) has been included in the table 4.</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The explanation given does not correspond to the CAR. As a response to CAR 2 a justification of alternative use of biomass residues used by the activity project, if it would not be executed at all, should be given.</i></p> <p><i>The new presentation in Step 1.4: Determine the baseline availability of biomass residues (page 36 of PDD v3) is now referred to the specific Panuco project activity, so that the Correction Action is accepted.</i></p> <p><i>Validation Team Conclusion</i></p> <p><i>OPEN</i> 24/06/2014</p> <p><i>CLOSED</i> 27/06/2014</p>
<p>CAR 3</p> <p><i>The explanation of applicability of Step 1.4 of the methodology ACM0006, is missing.</i></p>	<p><i>ACM 0006 v12.1.1</i> <i>Page 27-28</i></p>	<p><i>A more detailed explanation of applicability of "Step 1.4 - Determine the baseline availability of biomass residues" of the methodology ACM0006 has been added; please see the Section b.6.1 of the PDD.</i></p> <p><i>In the project activity will be used only biomass residues from an on-site production process (category k1 of the</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The "more detailed explanation of applicability of Step 1.4." included in Section B.6.1 consist only in transcription of the methodology. The</i></p>

VALIDATION REPORT VVS



		<p>Table 1), which is entirely used for power and heat generation.</p> <p>In doing so, the following allocation rules should be adhered to:</p> <ul style="list-style-type: none"> • The sum of biomass residues used in the baseline for power or heat generation in all heat generators shall be equal to the total amount of biomass residues which are used under the CDM project activity and for which the baseline scenario is B4; • The allocation of biomass residues should be undertaken in a conservative manner. This means that in case of uncertainty an allocation rule should be applied that tends to result in lower emission reductions. <p>Second response:</p> <p>The information was rephrased in order to be referred specifically to the particular conditions of the project activity.</p>	<p>explanation should be referred specifically to the particular conditions of this activity project, and the determination of the baseline availability of biomass residues must be very clear</p> <p>Validation Team Conclusion OPEN 24/06/2014</p> <p>CLOSED 27/06/2014</p>
<p>CAR 4</p> <p>The data on the spreadsheet Forecast electricity.xls is not traceable.</p>	<p>VVS</p> <p>Paragraph 96</p>	<p>The version of the spreadsheet" forecast electricity.xlsx" sent to DOE was corrupted.</p> <p>During the onsite validation visit the correct version of the spreadsheet named: "Prevision de la electricidad Panuco.xlsx" or in English: "Panicu forecast electricity.xlsx" has been presented and submitted to the DOE.</p>	<p>Validation Team Opinion</p> <p>The spreadsheet Panuco forecast electricity.xlsx was corrected and now is traceable.</p> <p>Validation Team Conclusion</p> <p>CLOSED 05/06/2014</p>

VALIDATION REPORT VVS



<p>CL 1</p> <p><i>On the diagram of scenario existing after to the start of the implementation of the Project Activity, the steam flow line to the process is not clear.</i></p>	<p>VVS</p> <p>Paragraph 64</p>	<p><i>The project participant agrees with the DOE, the first diagram of scenario existing after to the start of the implementation of the Project Activity has been not clear.</i></p> <p><i>A new corrected diagram is presented in the Sections A.3 and B.7.3 of the PDD version 03.</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The new diagram is clear enough</i></p> <p><i>Validation Team Conclusion</i></p> <p>CLOSED</p> <p>05/06/2014</p>
<p>CL 2</p> <p><i>Clarify the use of biomass from dedicated plantations</i></p>	<p>ACM 0006 v12.1.1</p> <p>Applicability condition 1</p>	<p><i>The bagasse (biomass residue) from sugar mill plant production will be the only fuel for the power and heat plant during the project activity and no other biomass residues from elsewhere will be used. The sugar cane plantation is not a dedicated plantation, because provides raw material (sugar cane) to the sugar mill process and this is the core business of the Panuco company as verified during the onsite validation visit.</i></p> <p><i>Therefore, no biomass types other than biomass residues and/or biomass from dedicated plantations are used in the project plant.</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The PP explains on the new version of the PDD that the biomass that will be used on the activity project is the residue of sugar mill process. There is not dedicated plantations for operate the activity project.</i></p> <p><i>Validation Team Conclusion</i></p> <p>CLOSED</p> <p>03/06/2014</p>

VALIDATION REPORT VVS



<p>CL 3</p> <p><i>If the project does not result in an increase of the processing capacity of raw input or in other substantial changes in the process, ¿How is it obtained the bagasse necessary to energy production?. Please clarify.</i></p>	<p>ACM 0006 v12.1.1</p> <p><i>Applicability condition 3</i></p>	<p><i>The implementation of the project activity will not result in an increase of the processing capacity of raw input. The biomass residue is obtained as a by-product from sugar cane processing for sugar production which is the core business of the Panuco company. The core business activity of the sugar mill not depends of the bagasse utilization, because bagasse is a residue generated during sugar mill processes.</i></p> <p><i>Any increase in the processing capacity will be due to the increase in the demand for sugar production determined for the market and not for the implementation of the project activity.</i></p>	<p>Validation Team Opinion</p> <p><i>The explanation presented by the PP clarified that the increase of the production of sugar is by the market and it is not have like aim to increase the production of bagasse. The bagasse necessary to energy production always will be the residue of the sugar mill production.</i></p> <p>Validation Team Conclusion CLOSED 03/06/2014</p>
<p>CL 4</p> <p><i>The option to be used to calculate Quantity of biomass residues used in the baseline scenario must be explained.</i></p>	<p>ACM 0006 v12.1.1</p>	<p><i>The option to be used to calculate the quantity of biomass residues used in the baseline scenario has been explained with more detailed in the Step 1.4 of the Section B.6.1 of the PDD:</i></p> <p><i>...“</i></p> <p><i>The determination of this parameter shall be based on the monitored amounts of biomass residues used for power and/or heat generation in the project boundary for which scenario B4 (the biomass residues are used for power or heat generation at the project site in new and/or existing plants) has been identified as the most plausible baseline scenario in the CDM-PDD.</i></p> <p><i>To the present project activity only own bagasse from the Panuco sugar mill plant will be used.”</i></p> <p><i>Second response:</i></p> <p><i>A better explanation of the suitability of scenario B4 and exclusion of scenario B5, has been included in table 4 of the new version of PDD.</i></p>	<p>Validation Team Opinion</p> <p><i>The explanation included in Step 1.4, Section B.6.1 consist only in transcription of the methodology. The explanation should be referred specifically to the particular conditions of this activity project, and the determination of the baseline availability of biomass residues must be very clear</i></p> <p><i>The new presentation in Step 1.4: Determine the baseline availability of biomass residues (page 36 of PDD v3) is now referred to the specific Panuco project activity, so that the Correction Action is accepted.</i></p>

VALIDATION REPORT VVS



			<p><i>Validation Team Conclusion</i></p> <p>OPEN 24/06/2014</p> <p>CLOSED 27/06/2014</p>
<p>CL 5</p> <p><i>On the Step 4.1 there is confusion between boilers and cogeneration engines, please clarify.</i></p>	<p>VVS</p> <p>Paragraph 89</p>	<p><i>The paragraph has been revised and corrected as requested.</i></p> <p><i>Please see, the Step 4.1 of the PDD.</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The information was corrected on the new version of the PDD.</i></p> <p><i>Validation Team Conclusion</i></p> <p>CLOSED 03/06/2014</p>
<p>CL 6</p> <p><i>There are missing the information of measurement methods and procedures in any parameters of section B.6.2.</i></p>	<p>VVS</p> <p>Paragraph 132</p>	<p><i>The section B.6.2 of the PDD related to the information of measurement methods and procedures of parameters have been revised and developed with more detail.</i></p> <p><i>The parameters that have been revised are: Biomass categories and quantities used for the selection of the baseline scenario selection and assessment of additionality; $BR_{HIST,K1,x}$; $BR_{K1,h,x}$; $FF_{f,h,x}$; $HG_{h,x}$; $HG_{BR,CG/x,I}$; $HC_{BR,CG/x,I}$; $CAP_{HG,b1-b5}$; $LFC_{HG,h}$; $HPR_{BL,I}$; $LFC_{EG,CG,I}$; $NCV_{BR,k1,x}$; $NCV_{FF,fueloil,x}$.</i></p> <p><i>Second response:</i></p> <p><i>The information regarding the entity that undertook the measurement and the date of measurement results were added to the parameters in section B.6.2.</i></p>	<p><i>Validation Team Opinion</i></p> <p><i>The information does not comply with the Guidelines For Completing the Project Design Document Form EB66 Annex 8 (Version 01.0), related with: ... "Where values are based on measurement, indicate the responsible person/entity that undertook the measurement, the date of the measurement and the measurement results. More detailed information can be provided in Appendix 4: below"</i></p> <p><i>The information was completed.</i></p> <p><i>Validation Team Conclusion</i></p>

VALIDATION REPORT VVS



			CLOSED 24/06/2014
<p>CL 7</p> <p><i>Figure is not the same as showed in Table B.6.2 (461,903 – 362,920 – 390,808). Please clarify</i></p> <p><i>Figures for FF (L) are not the same as showed in Table B.6.2. (400,000 – 400,000 – 300,000). Please clarify.</i></p>	<p>VVS</p> <p>Paragraph 64</p>	<p><i>The Figures was copied by mistake and has been corrected accordingly.</i></p> <p><i>Please see the Section B.6.2 of the PDD</i></p>	<p>Validation Team Opinion</p> <p><i>Figures were corrected</i></p> <p>Validation Team Conclusion</p> <p>CLOSED 05/06/2014</p>
<p>CL 8</p> <p><i>There is inconsistency between baseline and project emission of fossil fuel and transportation.</i></p>	<p>ACM 0006 v12.1.1</p>	<p><i>The baseline scenario of the biomass residue, energy and heat used or produced in the project activity is the same scenario existing prior to the start of implementation of the project activity as demonstrated in section B.4. of the PDD.</i></p> <p><i>The scenario existing prior to the implementation of the project activity consisted of low-pressure heat generators using bagasse and bunker C fuel oil as their main fuels.</i></p> <p><i>The project activity involves the installation of a new cogeneration plant that does not use fossil fuel or offsite biomass residues, for this reasons the ex-ante calculations to project emissions is 0 tCO₂.</i></p> <p><i>However, the actual cogeneration plant (old plant) will be maintained as backup and for this reason the project emissions regarding to fossil fuel consumption has been considered to be monitored.</i></p> <p><i>Note that, no project emissions regarding transportation of offsite biomass residues are being considered, because all biomass residues that will be combust during the project activity will be generated in the Panuco sugar mill plant.</i></p> <p><i>In conclusion, the project participant agrees with DOE, because the inclusion of project emissions due to the transportation was considered by mistake and it has</i></p>	<p>Validation Team Opinion</p> <p><i>The explanation is deemed satisfactory</i></p> <p>Validation Team Conclusion</p> <p>CLOSED 05/06/2014</p>

VALIDATION REPORT VVS



		been excluded because the project activity does not use off-site biomass, as described previously. Please, see the corrections in the section B.6.1 "Explanation of methodological choices", section "Project Emissions" of the PDD.	
CL 9 Clarify the use of the table 1 on the Step 1a: Definition of alternative scenarios to the proposed CDM project activity.	ACM 0006 v12.1.1	The Table 1 has been included on the Step 1a: "Definition of alternative scenarios to the proposed CDM project activity" based on the Methodology ACM0006 version 12.1.1 which includes in this Step a table as example named: "Table 2: Example of a table for biomass residues categories", ACM0006, page 14. The PP understand that the inclusion of this table contributes positively to the definition the alternative scenarios for the use of biomass residues.	Validation Team Opinion Table 1 has been suitably corrected Validation Team Conclusion CLOSED 05/06/2014
CL 10 The source of data of electricity price is missing on the spreadsheet: Panuco cashflow.	VVS Paragraph 120	The average price of electric energy has been considered taking account the historic prices of 2010, 2011 and 2012 years. The source of data is the Mexican Energy Secretary (SENER) and the information is available in the following link: http://www.sener.gob.mx/portal/Default.aspx?id=1432 File: Estadistic prontuary of energetic sector.xlsx Sheet 47: Average price of electric energy Additionally, the spreadsheet "Estadistic prontuary of energetic sector.xlsx" downloaded of the SENER's site has been sent to the DOE. All information has been included in the spreadsheet Panuco cashflow.	Validation Team Opinion Electricity price used in the cash flow has been satisfactory justified Validation Team Conclusion CLOSED 05/06/2014
CL 11 Review the applicability of parameter: BRB5/B8,n,y on section B.7.1. Also review the information of QA/QC in the parameters of the same section.	VVS Paragraph 132	The parameter BRB5/B8,n,y (Quantity of biomass residues of category n used in the CDM project activity in year y , for which the baseline scenario is B5, B6, B7 or B8) was included on section B.7.1 by mistake. To the present project activity only biomass residues (bagasse) generated in the Panuco sugar mill plant will be used.	Validation Team Opinion The information on regard to Parameter BRB5/B8,n,y on section B.7.1. was correctly eliminated on the new version of the PDD.

VALIDATION REPORT VVS



		<p><i>In the new version of the PDD, v2, this parameter has been excluded accordingly.</i></p> <ul style="list-style-type: none"> <i>The information of QA/QC in the parameters of the section B.7.1 has been revised and more detailed when appropriated. The parameters that have been revised are: Biomass categories and quantities used in the CDM project activity; $BR_{PJ,n,y}$; $BR_{B4,n,y}$; $EL_{PJ,gross,y}$ and $EL_{PJ,imp,y}$. Please see the section B.7.1 of the PDD.</i> 	<p><i>Validation Team Conclusion</i></p> <p>CLOSED 03/06/2014</p>
--	--	--	--

ERIKA LUCIA URREGO ORTIZ

CDM Lead Auditor

Magister on Quality and integral management. Universidad Santo Tomas en Convenio con ICONTEC. April de 2013.

Specialist Environmental Management Systems. Universidad Externado de Colombia. Bogotá D.C. September 2002

Zootechnician, Universidad Agraria De Colombia, Bogotá D.C. August 1997.

OHSAS 18001 Diploma, ICONTEC, Bogotá D.C. July 2005.

Food Harmlessness Management System under ISO 22000 standard Course, ICONTEC, Bogotá D.C. March, 2003

Updating on CDM Course, Ministry of Environment, Housing and Territorial Development, Bogotá D.C 2006

Presentation of proposals for developing CDM in the farming and animal husbandry industry. CAF – Corporación Andina de Fomento, Bogotá 2006

Quality Management Systems under ISO 9001:2000 standard Course, ICONTEC, Medellin. May 2007.

PROFESSIONAL EXPERIENCE

- **ICONTEC (2006 – Actual)**

To prepare and perform the certification services assigned as per her Career Plan qualification, according to the stated on the procedures. To provide guidance to the certification costumers about the technical aspects of the assigned services provision. To participate in changing or designing Certification services, by changing or creating the respective procedures.

- **ASOCIACION COLOMBIANA DE PORCICULTORES-FNP (2003 – 2006)**

To coordinate the activities to be performed by the Environmental Window Program in the various country areas. To allocate and execute resources engaged under the Cleaner Production agreements signed together with several environmental authorities. To lead the CDM project, focused to reduce methane (CH₄) emissions issued by animal waste. To be aware of the Ecuadorian and Chilean methodologies already approved by the CDM's Executive Board for Hog Breeding Sector to elaborate a proposal for the hog breeding sector together with the Ministry of Environment, Housing and Territorial Development in order to join farms to CDM projects.

- **FICHTNER GmbH & Co. KG (2001 – 2002)**

To prepare, design and apply surveys focused to identify power consumption in the sector of slaughter, processed meat and food concentrate for animals

- Regional Environmental Authority (CAR Sumapaz) 1998 – 2001

To support the environmental management unities on technical concepts of processes, permissions, sanctions, control, monitoring and assessment in the proper and timely management of the Sumapaz area's natural resources.

EXPERIENCE IN CDM ACTIVITIES

Lead auditor on validation MDL:

1. Validation of Macano Small Hydro Power Plant, Panamá
2. Validation of Montenegro Landfill Gas Recovery and Flaring, Colombia
3. Validation of Monteria Landfill Gas Recovery and Flaring, Colombia
4. Validation of Pírgua Landfill Gas Recovery and Flaring, Colombia
5. Validation of Tunjita Diversion Hydroelectric Project, Colombia
6. Validation of El Toqui wind power project, Chile
7. Validation of Los Angeles Landfill Gas Flaring Project, Colombia
8. Validation of Ferreira Gomes Hydro Power Plant CDM Project, Brazil
9. Validation of BRASILM 1 - Avoidance of Methane Emissions through Composting of Manure Waste, Brazil
10. Validation of CGR Catanduva Landfill Gas Project, Brazil
11. Validation of Macaubas Landfill Gas Project, Brazil
12. Validation of Palmaceite Wastewater Treatment and Biogas Utilization Project, Colombia
13. Validation of Teresina Landfill Gas Project, Brazil
14. Validation of Maceio Landfill Gas Project, Brazil
15. Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
16. Validation Doña Teresa Small hydro power plant, Colombia
17. Validation Biogas recovery and heat generation from Palm Oil Mill Effluent (POME), Coopeagropal. Costa Rica.
18. Validation Panuco Bagasse Cogeneration Project. México.

Lead auditor on verification MDL:

1. Verification of Biogas energy plant from palm oil mill effluent, Guatemala 2
2. Verification of Doña Juana Landfill gas-to-energy project, Colombia
3. Verification of Tres Valles Cogeneration Project, Honduras
4. Verification of Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador, El Salvador
5. Verification of La Venta II, México
6. Verification of Jepirachi Wind Power Project, Colombia
7. Verification of Santa Ana Hydroelectric Project, Colombia
8. Verification of BRASCARBON Methane Recovery Project BCA-BRA-01, Brazil

9. Verification of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
10. Verification of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
11. Verification of Ciudad Juarez Landfill gas-to-energy Project, México.

Lead auditor on other schemes:

1. Validation VCS de Reforestación de áreas de pastura en la Sociedad Agrícola de Interés Social “José Carlos Mariátegui” – Proyecto Joven Forestal, Perú.
2. Validation Gold Standard Energy Efficiency at Ladrillera Alcarraza, Colombia.
3. Validation Gold Standard de Paramonga Bagasse Boiler Project, Perú.
4. Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
5. Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
6. Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil
7. Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil
8. Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil

Specialist

1. Validation of ECC methane capture and combustion from AWMS at dairy farms in Mexico – I, México
2. La Calera Biodigesters Project, Perú

Technical Review

1. Validation of Fuel Switching through change of furnaces at Imusa S.A., Colombia
2. Validation of Cervecería Hondureña Methane Capture Project, Honduras
3. Validation of Paysandú Clean Energy, Uruguay
4. Validation of Securitization and Carbon Sinks Project, Chile
5. Validation of METALDOM Fossil fuel switch from reheat furnace, República Dominicana
6. Validation of Reforestation of degraded/degrading land in the Caribbean Savannah of Colombia, Colombia
7. Validation of Co-composting of organic residues in ORO ROJO's Palm Oil Mill at Sabana de Torres, Colombia
8. Validation of EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle, Colombia
9. Validation of Energy efficiency at Malvinas Gas Plant, Perú
10. Validation of Marañon Hydroelectric Project, Perú
11. Validation of Santa Rita Hydroelectric Plant, Guatemala
12. Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
13. Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala

14. Validation of CTR Rosario Landfill Gas Project, Brazil
15. Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil
16. Validation of Taurichuco Hydropower Project, Perú
17. Validation of Feira de Santana Landfill Gas Project, Brazil
18. Validation of Doña Juana Landfill gas-to-energy Project, Colombia
19. Renovación Inversiones Hondurenas Cogeneration Project
20. Validación SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil
21. Validación SHPs Poço Fundo and Providência CDM Project (JUN1133), Brazil
22. Validación Santa Rita Hydroelectric Plant, Colombia
23. Validation Conservation and reforestation of degraded areas in Barbosa, Colombia
24. Verification Doña Juana Landfill gas-to-energy Project, Bogotá, Colombia.
25. Verificación Monomeros nitrous oxide abatement project. Barranquilla, Colombia.
26. Verification BRT Bogotá, Colombia: TransMilenio Phase II to IV
27. Verification BRT Macrobus Guadalajara, Mexico
28. Verification Inversiones Hondurenas Cogeneration Project, Honduras.
29. Verification Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project. Colombia.

Eng. Fernando Gómez Gómez

Energy and financial expert

Electrical Engineer. Universidad Nacional of Colombia (1967)

Master of Power Systems - Instituto Tecnológico de Monterrey (Mexico) (1970)

EAFIT Financial Specialist (Colombia) (1984)

ECONOMETRÍA S.S. - Technical Advisory

Technical Advisory to Unidad de Planeación Minero Energética to incorporate international electrical interconnections into the Colombian electrical planning carried by UPME, October 2002 - March 2003 (including use of SUPEROLADE, MPODE, NEPLAN and REAL models).

ECOENERGIA S.S. ESP - Founding Member and Manager

Management of private projects of generation, distribution and commercialization of power.

Unidad de Planeación Minero Energética - UPME-: Elaboration of Catalog of Generation Projects for National Energy Plan, October 1996 - October 1997.

AUDITORES ENERGÉTICOS - AENE LTDA

Advisory to the company in the application of the new regulatory scheme of Colombian electrical sector to private and public entrepreneurial management through the following studies:

Development of competent rate models, October 1994 - March 1995

CORELCA: Determination of marginal costs and development of innovative rate structures for power generation companies and big industrial customers, October 1994 - March 1995.

CORELCA: Development and application of rate models to prepare proposal on power sale in the wholesale market, July 1995 - September 1995.

EMPRESA DE ENERGIA DE BOGOTÁ - EEB

Chief of the Department of generation planning, interconnection and sub-transmission, 1978 - 1979

Chief of Electric Planning Division, 1979 - 1986.

Assistant for Technical Sub-management, 1986 - 1987

Chief of Special Projects Division, 1987

Chief of expansion and Development Division, 1987 - 1994

Management Advisor, 1994

INTERCONEXIÓN ELÉCTRICA S.A - ISA

Engineer Specialist in electric planning research and development of models for planning and operation of electric systems. 1976 - 1978

National Coordinator of Colombian electric system planning in the project "Study of Electric Power Sector (Estudio del Sector de Energía Eléctrica), ESEE" winner of the National Award of Engineering.

EXPERIENCE IN CDM ACTIVITIES (Main references)

Technical Reviewer and participation as Energy and Financial expert (onsite visit) in more than 60 project activities, from 2006 to 2012, inter alias:

- Verification of three verification periods of Santa Ana Hydroelectric plant project
- Verification of first verification period of Agua Fresca Multipurpose and Environmental Services Project
- Verification of two verification of La Vuelta and la Herradura Hydroelectric Project
- Verification of Rio Amazon Woods residues power plant
- Verification of Cristalino small hydroelectric power plant project
- Verification of Faxinal small hydro project in Faxinal dos Guedes
- Validation of El Bote small hydroelectric plant project
- Verification of "La Joya hydroelectric project"
- Validation Thuan Nhien Phong - Viet Nam
- Validation Phuong Mai 3 - Viet Nam
- Verification La Venta II Project
- Verification Biogas Energy plant from palm oil mill effluent
- Validation Ferreira Gomes Hydro power plant CDM project activity
- Verification Toachi – Pilaton Hydroelectric Project
- Validation of "Fuel Switching through change of furnaces at Imusa S.A."
- Verification of "Los Algarrobos hydroelectric project"
- Validation CTR ROSARIO Landfill Gas Project
- Validation CTR Feira de Santana Landfill Gas Project

Team Technical Review

FRANCY MILENA RAMÍREZ TORRES

MAIN PROFESSIONAL EDUCATION

Electrical Engineer. Universidad Los Andes, 2002

Postgrade: Assessment on Social Projects. Universidad Los Andes, 2005

University of Oxford. Course: Applying Knowledge Management, Principle and Practices (December 1 de 2009).

University of Oxford. Course: Successful Change Management for Engineers, Scientists and Staff in Hi-tech Companies (December 2 de 2009).

University of Oxford. Course: Essentials of Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 3 de 2009).

University of Oxford. Course: Advanced Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 4 de 2009).

Climate Change, Trade and Standardization - in a development perspective". Estocolmo, Suecia (23 y 25 de November de 2009)

ISO global workshop on Greenhouse Gas Schemes Addressing Climate Change – How ISO Standards Help, Estocolmo, Suecia. (20 y 21 de November de 2009)

Conference on Climate Change – Deforestation and Standardization. Bali, Indonesia (May 31 and June 1 de 2010)

Universidad Nacional – ICONTEC, Internal Auditor ISO 50001, December 2013

PROFESSIONAL EXPERIENCE

- ICONTEC, (2010-Actually)

Plan, coordinate, implement and ensure the compliance of audit program for projects that reduce the emission of greenhouse gases in different schemes (CDM, VCS, Gold Standard), listed in the sectors of renewable energy generation and manufacturing (energy efficiency). Provide training to internal and external staff of the company. Develop technical standards concerning the issues of the area, specifically quantifying carbon footprint. Develop special projects assigned on energy efficiency. Since 2014, she is qualified as ISO 9001 auditor and product auditor with voluntary standards as well as regulatory requirements.

- ICONTEC. (2005 – 2010)

Professional of Standardization

Planning, coordinate, implement and ensure compliance with the program of national standardization in technical committees, among which are electrical installations, electrical power quality, electrical transformers, substations and equipment for medium and high voltage, lighting, appliances and electrical accessories, protection against lightning strikes and electrical equipment. Develop of technical standards. Develop and manage special projects assigned. Participate in programs on regional and international standardization.

- CODENSA (2002 – 2005)

Inspections and electrical works coordinator

Supervise field work and download the results in the central information system, evaluate the inspections performed, reconciled with contractors, addressing the results of inspections to different areas of the company, charging inspections and electrical work to clients, coordination and support group field sales engineers, technical training for technical staff, administrative support to department business processes and loss control, maintenance of the database for internal management inspections. Project Leader for Technical Processes Optimization in Cundinamarca Regional.

EXPERIENCE IN CDM ACTIVITIES:

Lead Auditor

- Validation of Guanaquitas 9.74 MW hydroelectric project, Colombia
- Validation of Fuel Switching through change of furnaces at Imusa S.A., Colombia
- Validation of Installation of a high-pressure/high-efficiency bagasse boiler to cogenerate heat and power, Argentina
- Validation of Cueva Maria Hydroelectric Expansion Project, Guatemala
- Validation of Paysandú Clean Energy, Uruguay
- Validation of La Vegona Hydroelectric project, Honduras
- Validation of Chamelecón 280 Hydroelectric project, Honduras
- Validation of Pardos SHPs and LOGICarbon CDM Project, Brazil
- Validation of Pequi and Sucupira SHPs and LOGICarbon CDM Project, Brazil
- Validation of Cambará and Embaúba SHPs and LOGICarbon CDM Project, Brazil
- Validation of Bonyic hydroelectric project, Panamá
- Validation of METALDOM Fossil fuel switch from reheat furnace, República Dominicana
- Validation of Toachi – Pilaton Hydroelectric Project, Ecuador
- Validation of EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle, Colombia
- Validation of Energy efficiency at Malvinas Gas Plant, Perú
- Validation of Marañon Hydroelectric Project, Perú
- Validation of Santa Rita Hydroelectric Plant, Guatemala
- Validation of Ventana, Suba and Usaquén Hydroelectric CDM Bundled, Colombia
- Verification of Los Algarrobos hydroelectric project, Panamá

- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
- Validation of Taurichuco Hydropower Project, Perú
- Validation of Aguafresca Multipurpose and Environmental Service Project, Colombia
- Verification of Agua Fresca Multipurpose and Environmental Service Project, Colombia
- Verification of La Joya Hidroelectric project, Costa Rica
- Verification of Amaime Minor Hydroelectric Power Plant, Colombia

Specialist

- Validation of Rio Bonito and Baitaca SHPs and LOGICarbon CDM Project, Brazil
- Validation VCS of Pequi and Sucupira SHPs and LOGICarbon CDM Project, Brazil
- Verification of three crediting periods of La Vuelta and la Herradura hydroelectric project, Colombia

CDM Technical Reviewer

- Validation of Improving energy efficiency in a new Gas Plant in Gibraltar - Colombia
- Validation of Tres Valles Cogeneration Project, Honduras
- Validation of Tunjita Diversion Hydroelectric Project, Colombia
- Validation of Ferreira Gomes Hydro Power Plant CDM Project, Brazil
- Verification of two crediting periods of La Venta II, México
- Verification of two crediting periods of La Joya Hidroelectric Project, Costa Rica
- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
- Verification of Tres Valles Cogeneration Project, Honduras
- Verification of Agua Fresca Multipurpose and Environmental Services, Colombia
- Verification of La Venta II, México
- Verification of two crediting periods of Fertinal Nitrous Oxide Abatement Project, México
- Verification of Co-composting of EFB and POME project, Guatemala
- Verification of Biogas Project, Olmeca III, Tecun Uman, Guatemala
- Verification of Jepirachi Wind Power Project, Colombia
- Verification of Biogas energy plant from palm oil mill effluent, Guatemala
- Verification of Santa Ana Hydroelectric Project, Colombia
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
- Verification of Biogas Project, Olmeca III, Tecun Uman, Guatemala

Specialist Technical Reviewer

- Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil

CRISTIAN DARIO GRISALES BERNAL
Lead Auditor and CDM SPECIALIST sector 1.2

EDUCATION:

Master Executive in Renewable Energies
EOI-Madrid, Spain
April 2015

Certified ISO 14001
ICONTEC
May 2012

Certified ISO 9001
ICONTEC
August 2012

Electrical Engineer
National University of Colombia
Bogotá - Colombia
July 2009

PROFESSIONAL BACKGROUND
Professional of Climate Change
ICONTEC
May 2012 – Today

Professional on developing validation and verification on CDM projects as lead auditor and as technical expert in the energy sector.

Electrical Maintenance Engineer
EMGESA S.A ESP. Colombia
November 2009 – May 2012

Electrical maintenance engineer in the Bogotá River Hydroelectric plants. Executing preventive, predictive and corrective maintenance of the generators, auxiliary services, power transformers and electrical substation. Developed the investment projects' inventory in accordance with the annual operating budget. Implementation of RCM maintenance programs. Monthly service availability in the plant, and full-time availability in failure care. Electrical testing of generators, transformers, motors and substation equipment.

Engineering Intern
INGENIERIA ESPECIALIZADA

Commercial visits to different industries, sales, design and assembly of shielding systems, grounding grids, power quality studies, calculation of electrical installations, RETIE inspections, diagnostic grounding systems, implementation, supervision and maintenance of the developed projects.

EXPERIENCE IN CDM ACTIVITIES:

Auditor and Specialist:

- Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil
- Validation of Taurichuco Hydropower Project, Perú
- Validation of Teresina Landfill Gas Project, Brazil
- Validation of Maceio Landfill Gas Project, Brazil
- Validation of Doña Teresa Hydroelectric Power Plant, Colombia
- Validation of SHPs Poço Fundo and Providência CDM Project (JUN1133), Brazil
- Validation of SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil
- Verification of Amaime Minor Hydroelectric Power Plant, Colombia
- Verification of Ciudad Juarez Landfill Gas to Energy Project, Mexico
- Verification of Santa Ana Hydroelectric Plant, Colombia
- Verification of Biogas Project, Olmeca III, Tecún Uman, Guatemala
- Verification of Berlin Geothermal Project, Phase Two, San Salvador

Technical Reviewer:

- Validation of Thuan Nhien Phong Wind Farm, Viet Nam
- Validation of Phuong Mai 3 Wind Power Project, Viet Nam
- Validation of Chamelecón 280 Hydroelectric project, Honduras
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant, Colombia
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant, Colombia
- Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil, Brazil
- Renewal of Agua fresca Multipurpose and Environmental Service Project, Colombia
- Validation of Feira de Santana Landfill Gas Project, Brazil
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
- Verification of Santa Ana Hydroelectric Plant, Colombia
- Verification of Methane recovery and effective use of power generation project Norte III-B Landfill, Argentina