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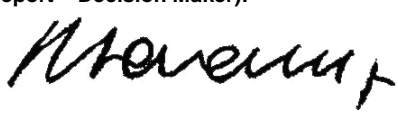
# VALIDATION REPORT


**Final**

“Alcoholos Del Istmo – Biomass energy plant”  
in  
Panama

Report N° 2011-DG-31-MD  
Revision N° 2.0

# VALIDATION REPORT

<b>Project Title:</b> "Alcoholes Del Istmo – Biomass energy plant"	<b>Country:</b> Panama	<b>Estimated CERs (tCO<sub>2</sub>e):</b> 22,637 (annual average)
<b>Client:</b>  RWE Supply & Trading Switzerland SA	<b>Client contact:</b> Mr. Rafel González	
<b>Report N°:</b> 2011-DG-31-MD	<b>Revision:</b> 2.0	<b>Date of this report:</b> 27/12/2012
<b>Approved by (Final Report – Decision Maker):</b>   Roberto Cavanna		<b>Date of approval:</b> 28/12/2012
<b>Methodology</b>		
<b>Number:</b> AMS-I.C	<b>Version:</b> Version 19 of 03/06/2011	<b>Title:</b> "Thermal energy production with or without electricity"
<b>Scale</b> Small		<b>SS(s):</b> 1
<p>RINA Services S.p.A. (RINA), commissioned by , has performed the validation of the project activity "Alcoholes Del Istmo – Biomass energy plant" in Panama, 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.</p> <p>In conclusion, it is RINA's opinion that the project activity "Alcoholes Del Istmo – Biomass energy plant" in Panama, as described in the PDD version 04 of 27/12/2012 , meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.C, "Thermal energy production with or without electricity", Version 19 of 03/06/2011.</p> <p>RINA thus requests the registration of the project as a CDM project activity.</p> <p>The validation report was updated to Revision 2.1 and the PDD was updated to version 4.0 to address the "Incomplete" received on 26/12/2012 from the Executive Board.</p>		

<b>Work carried out by:</b> Cintia Mara Miranda Dias, Vicente San Valero, Américo Varkulya Junior, Lilian Cristine Poll Herrmann.	<input checked="" type="checkbox"/> No distribution without permission from the Client or organizational unit responsible <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
<b>Work verified by (Authorised Officer Signing for the DOE)</b>   Laura Severino	<b>Keywords:</b> Climate Change, Kyoto Protocol, Clean Development Mechanism, Validation

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## Abbreviations

AISA	Alcoholes del Istmo S.A.
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	CDM Modalities and Procedures
CER(s)	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CL	Clarification Request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emissions
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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# VALIDATION REPORT

## 1 INTRODUCTION

has commissioned RINA to carry out the validation of the “Alcoholes Del Istmo – Biomass energy plant” project in Panama.

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

### 1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the CDM as set out in decision 3/CMP.1, its annex and relevant decisions of the COP/MOP, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC requirements and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

### 1.2 Scope

The validation scope is to review the PDD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

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

## 2 METHODOLOGY

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation report.

The following sections outline each step in more detail.

### 2.1 Document Review

The PDD **version 04** of 27/12/2012 , /1/, in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date of the project, the monitoring plan, the emission reduction calculations provided in the form of a spreadsheet, “AISA - Biomass\_energy\_plant\_Panama V3 0.xlsx” , version 3 (received on 27/05/2012) /23/, were assessed as part of the validation.

The following table lists the documentation that was reviewed during the validation.

/1/	<p>Ecosur: CDM-PDD for project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama, version 1.5 of 10/11/2010.</p> <p>Ecosur: CDM-PDD for project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama, version 2.0 of 05/04/2012</p> <p>Ecosur: CDM-PDD for project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama version 04 of 27/12/2012 ,</p> <p>Ecosur: CDM-PDD for project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama version 04 of 27/12/2012</p>
/2/	CDM Executive Board: Baseline and monitoring methodology AMS-I.C, “Thermal energy production

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	with or without electricity”, version 18 of 01/10/2010. CDM Executive Board: Baseline and monitoring methodology AMS-I.C “Thermal energy production with or without electricity”, version 19 of 03/06/2011
/3/	CDM Executive Board: Validation and Verification Manual, version 01.2 of 30/07/2010.
/4/	CDM Executive Board: “Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)”, version 7 of 02/08/2008.
/5/	CDM Executive Board: “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)”, version 5 of 14/09/2007.
/6/	CDM Executive Board: “Guidelines on the demonstration and assessment of prior consideration of the CDM” (EB 49 Annex 22), version 3 of 11/09/2009.
/7/	CDM Executive Board: “Glossary of CDM Terms”, version 5 of 19/08/2009.
/8/	Alcoholes del Istmo S.A.: picture of nameplate of turbo generator with 300 kW of installed capacity (file: DSC05314.jpeg).
/9/	Alcoholes del Istmo S.A.: “Purchase biomass Contract”, signed between Alcoholes del Istmo S.A. (buyer) and Campos de Pesé S.A (biomass supplier) dated 21/09/2007 (01/01/2008 to 30/04/2009).
/10/	Benecke Irmãos & Cia Ltda: “Boiler Purchase Order”, dated 31/03/2007 ( <i>starting date evidence</i> ).
/11/	Alcoholes del Istmo S.A. “Pictures of Biomass Boiler”: Civil works required to boiler installation, dated 01/09/2008 (file: 2008-01-09 Obra civil.jpeg); Arrival of the boiler at port, dated 03/02/2008 (file: 2008-02-03 Caldera en puerto (2).jpeg); Civil works of boilers room, date 05/03/2008 (file: 2008-03-05 Obra civil sala calderas (3).jpeg); Biomass boiler assembly, dated 14/03/2008 (file: 2008-03-14 Montaje caldera (13).jpeg); Biomass boiler assembly, dated 11/04/2008 (file: 2008-04-11 Montaje caldera (7).jpeg); Testing of boiler operation, from 19/04/2008 to 21/04/2008 (file: 2008-04-19 a 21 Pruebas arranque caldera (9).jpeg); Boiler’s start up, dated 30/04/2008 (file: 2008-04-30 Puesta en marcha caldera (9).jpeg); Boiler’s start up, dated 30/04/2008 (file: 2008-04-30 Puesta en marcha caldera (10).jpeg); Boiler’s start up, dated 30/04/2008 (file: 2008-04-30 Puesta en marcha caldera (13).jpeg); Extraction of ashes, dated 02/05/2008 (file: 2008-05-02 Extracción de cenizas.jpeg).
/12/	CDM Executive Board: “Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005 - ANNEX II Simplified modalities and procedures for small-scale clean development mechanism project activities”, dated 30/03/2006 (available in English at <a href="http://unfccc.int/resource/docs/2005/cmp1/eng/08a01.pdf#page=43">http://unfccc.int/resource/docs/2005/cmp1/eng/08a01.pdf#page=43</a>
/13/	CDM Executive Board: Location of DNAs - website: <a href="http://cdm.unfccc.int/DNA/index.html">http://cdm.unfccc.int/DNA/index.html</a> .
/14/	Status of Ratification of the Kyoto Protocol – website <a href="http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php">http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php</a> .
/15/	Panama DNA - Autoridad Nacional del Ambiente, Letter ARH-661-2010 ( <i>confirming that was informed, since November 2006, of AISA’s intention to develop the CDM project activity</i> ), dated 12/05/2010.
/16/	Global bank of Panamá “Letter describing the required the essential conditions/elements for the credit approval of the AISA project and confirming that all conditions were met, dated 27/04/2011 (file: “Global Bank Feb 2007.pdf” – <i>February 2007 was the month/year when AISA presented the project to Global bank</i> ).
/17/	Global bank of Panamá “Letter stating the investment on a turbo generator with 500 kW of installed capacity, considering the development of the project as CDM project activity”, dated 27/04/2011 (file: “Global Bank Sep 2009.pdf” – <i>September 2009 was the month/year of a meeting AISA-Global bank</i> ).
/18/	CDM Executive Board “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”. (available on <a href="http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf">http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf</a> ), EB 63 Annex 24, version 8 dated 29/09/2011.
/19/	E-mail from Rafael Gonzalez: “Memorandum of biomass CDM Project (from Spanish: Memorandum visto bueno proyecto MDL biomasa”, dated 18/09/2006.

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/20/	Global bank of Panamá: "Letter stating that the AISA project was approved, on October 2007, considering the development of the project as CDM project activity and CERs income", dated 27/04/2011 (file: "Global Bank Oct 2007").
/21/	El Salvador University: "Diagnosis of particulate matter generated by the Sugar Mills in El Salvador" (from Spanish - <i>Diagnóstico del Material Particulado generado por los Ingenios Azucareros de El Salvador</i> ), no date.
/22/	Panama Republic - Ministry of Trade and Industry "Notice of Operation" (from Spanish - <i>Aviso de Operación</i> # 56972-11-338211-2008-143118 – this document states al activities performed by Alcoholes del Istmo S.A..
/23/	ECOSUR: spreadsheet with CER calculations "AISA - Biomass_energy_ plant_Panama.xls"x, version 1 (received on 18/05/2011). Ecosur: spreadsheet with CER calculations "AISA - Biomass_energy_ plant_Panama V2.0.xlsx", version 2 (received on 06/04/2012) Ecosur: spreadsheet with CER calculations "AISA - Biomass_energy_ plant_Panama V3 0.xlsx" version 3 (received on 27/05/2012)
/24/	CDM Executive Board: "Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion", version 02, dated 02/08/2008.
/25/	Local stakeholder consultation: letters signed, attendance list, pictures of attendants and questionnaires, dated 03/06/2008.
/26/	CDM Executive Board: "General Guidelines to SSC CDM Methodologies" EB 61 Annex 21, version 17 dated 03/06/2011
/27/	Switzerland DNA : Switzerland's National Guidelines and Procedures for Approving Article 12 Projects (Clean Development Mechanism), Reference: G184-1054 (available in English at <a href="http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en">http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en</a> accessed by RINA on 20/06/2012)
/28/	Panamanian DNA ANAM (translating from Spanish National Environmental Authority): Letter demonstrating that this project activity does not require an EIA, dated 19/08/2011 (file "ANAM decision EIA_Vinazas Biomasa.pdf").
/29/	Panamanian DNA website: CDM rules (available in Spanish at website <a href="http://anam.gob.pa/images/stories/documentos_CC/GACETA_OFICIAL_N_26773-B_DEL_27_DE_ABRIL_DE_2011.pdf">http://anam.gob.pa/images/stories/documentos_CC/GACETA_OFICIAL_N_26773-B_DEL_27_DE_ABRIL_DE_2011.pdf</a> accessed by RINA on 20/06/2012)
/30/	IPCC: 2006 IPCC Guidelines for National Greenhouse Gas Inventories – volume 2 – Energy (available in English at <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf">http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf</a> accessed by RINA on 20/06/2012)
/31/	Benecke Irmão & Cia Ltda (manufacturer of biomass boiler): letter describing the lifetime of biomass boiler, dated 02/07/2011
/32/	Cleaver Brooks (manufacturer of exiting boilers): letter describing that the minimal remaining lifetime of boiler Standardkessel and boiler Linde
/33/	CDM Executive Board: "Tool to determine the remaining lifetime of equipment" version 1, dated 16/09/2009
/34/	CDM Executive Board: "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 1), dated 16/05/2008
/35/	CDM Executive Board: Tool to determine the baseline efficiency of thermal or electric energy generation systems" (Version 1), dated 17/07/2009
/36/	Alcoholes del Istmo S.A.: Datasheet of Standarkessel bolier oil, not dated no version
/37/	Alcoholes del Istmo S.A.: Datasheet of Lointek boiler, obtained from Offer # 03/039/04. dated 15/09/04.
/38/	Mysko Asesoramiento S.A: Technical study of new steam turbine of 500kW , dated 20/06/2006
/39/	Alcoholes del Istmo S.A.Board : E-mails mentioning the CDM before the project's implementation, dated 18/09/2006 and 19/09/2006
/40/	ANAM: Letter dated 12/05/2010 stating that Panamanian DNA has knowledge of project since November 2006
/41/	Alcoholes del Istmo S.A.: Contract between AISA & Ecosur for the development of CDM project,



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	dated 19/12/2007
/42/	Benecke Irmãos & Cia Ltda: Technical Delivery of biomass boiler, dated 07/05/2008
/43/	RINA Brasil Serviços Técnico Ltda.: Rina Validation proposal dated 19/02/2009
/44/	Alcoholes del Istmo S.A. ERPA between Alcoholes del Istmo S.A. and RWE Supply & Trading Switzerland S.A, dated 24/09/2010
/45/	Alcoholes del Istmo S.A.: E-mail referent to “Initial discussion with potential buyers” (file TR_Compradores.._GICA-AISA_01-02-2009pdf.pdf), dated from 24/01/2009 to 01/02/2009.
/46/	Mysko Asesoramiento S.A: letter describing the remaining lifetime of turbogenerator of 300kW, sent by Ms Herminia Lobero González (Director) to Mr. Ernesto Gómez Marciaga (Production Manager) of AISA, dated 12/07/2012
/47/	Mysko Asesoramiento S.A: : letter describing the lifetime of turbo generator of 500kW, sent by Ms Herminia Lobero González (Director) to AISA, dated 12/07/2012
/48/	Alcoholes del Istmo S.A.: Biomass Purchase Agreement, signed between Alcoholes del Istmo S.A. (buyer) and Campos de Pesé S.A (biomass supplier)dated 30/01/2012
/49/	Alcoholes del Istmo S.A.: Certification of the date biomass purchase agreement contract date, 12/07/2012
/50/	Benecke Irmãos & Cia Ltda.”Quality Control – Original Record” operational parameters of biomass boiler, dated 11/02/2008
/51/	Alcoholes del Istmo S.A.: technical data of 300 kW steam turbine, no dated
/52/	Alcoholes del Istmo S.A.: “Report of Analysis” issued 10/12/2011 – issued by Intertek
/53/	Swiss DNA: Letter of Approval from Swiss DNA of CDM Project Activity “Alcoholes Del Istmo – Biomass energy plant” , dated 20/07/2012
/54/	Panamanian DNA: Letter of approval of CDM Project Activity “Alcoholes Del Istmo – Biomass energy plant” , dated 03/10/2012
/55/	CCDM Executive Board: Clean Development Mechanism Project Design Document Form (CDM SSC-PDD), version 03, dated 22/12/2006
/56/	Alcoholes del Istmo S.A.: Picture from Google maps with distance of biomass transportation, no dated
/57/	Benecke Irmãos & Cia Ltda: ”Technique assistance and assembling Report”, occurred from 05/03/08 until 07/05/2008 (files :Informe Asistencia y Montage Benecke1.JPG; Informe Asistencia y Montage Benecke2.JPG; Informe Asistencia y Montage Benecke3.JPG)
/58/	Alcoholes del Istmo S.A.: Annual Production Reports Annual production Report 2005; Annual production Report 2006; Annual production Report 2007; Annual production Report 2008; Annual production Report 2009
/59/	Benecke Irmãos & Cia Ltda: technical data of Biomass boiler - Quality Control, dated 11/01/2008
/60/	UNFCCC: website with other CDM Project Activity developed by Project participants, available in English at <a href="http://cdm.unfccc.int/Projects/Validation/DB/UV7UTMJ50DJYFC5RI3I9DTJ46G5IHC/view.html">http://cdm.unfccc.int/Projects/Validation/DB/UV7UTMJ50DJYFC5RI3I9DTJ46G5IHC/view.html</a> accessed by Rina on 29/10/2012
/61/	Ecosur; Contact for development of CDM project Activity,
/62/	CDM Executive Board “Guidelines for objective demonstration and assessment of barriers”, version 1, dated 16/10/2009
/63/	CDM Executive Board: “Guidelines on the assessment of de-bundling for SSC project activities”, dated 28/05/2010
/64/	Switzerland DNA: “List of Letters of Approval and Authorization (LoAs) for CDM projects issued by the Swiss Designated National Authority (2012)” updated on 29/12/2012 available in English at <a href="http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en">http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en</a>
/65/	ANAM - Panamanian DNA: e-mail from Mr. Generoso Guerra (Legal Manager), dated 26/09/2012 describing the issuance of Letter of Approval .
/66/	Alcoholes del Istmo S.A. : e-mail from Mr. Rafael Gonzalez, date 27/12/2012 confirming that the turbo



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generator started its operation on 2007.

## 2.2 Follow-up actions

On 26-27/05/2011, RINA visited Alcoholes del Istmo S.A. located in Las Cabras, Pesé district, Province of Herrera, to resolve questions and issues identified during the document review and to perform interviews with relevant stakeholders in the host country.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	26-27/05/2011	Maria Belén Migone - CDM consultant	Ecosur	CERs calculation, project description, baseline issues, stakeholder consultation
/b/	26-27/05/2011	Timotheé Lazaroo - CDM consultant	Ecosur	CERs calculation, project description, baseline issues, stakeholder consultation
/c/	26-27/05/2011	Rafael Gonzalez - President	Alcoholes del Istmo S.A.	Additionality, baseline, project description, stakeholder consultation
/d/	26-27/05/2011	Ernesto Gomez - Operation and production manager	Alcoholes del Istmo S.A.	Environmental issues; baseline, project description

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## 2.3 Resolution of outstanding issues

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

To guarantee transparency a validation protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of validation and the results from validating the identified criteria. The validation protocol consists of four tables; the different columns in these tables are described in the figure below (see Figure 1). The completed validation protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The CDM requirements have not been met;
- There is a risk that the emission reductions cannot be monitored or calculate.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration. CARs, CLs and FARs identified are included in the validation protocol in Appendix A of this report.

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**Figure 1 Validation protocol tables**

Validation Protocol, Table 1 - Mandatory requirement		
Requirement	Reference	Conclusion
The requirements the project must meet.	Makes reference to the documents where the answer to the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) if a requirement is not met. A request for clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol, Table 2 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CL and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Validation Protocol, Table 3 - Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
The CAR and/or CLs raised in table 2 are repeated here.	Makes reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusion of the CARs and/or CLs.

Validation Protocol, Table 4 - Forward Action Requests		
Forward action request	Reference to Table 2	Response by project participants Validation Conclusion
The FAR raised in table 2 is repeated here.	Makes reference to the checklist question number in Table 2 where the FAR is explained.	Response by the project participants on how forward action request will be addressed prior to first verification.

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## 2.4 Internal quality control

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

## 2.5 Validation team and the technical reviewer(s)

The validation team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team Leader CDM	Mara Miranda Dias	Cintia	Brazil
CDM Validator	Poll Herrmann	Lilian Cristine	Brazil
Technical Expert CDM/CDM Validator	Varkulya	Américo	Brazil
Technical Reviewer	San Valero	Vicente	Italy
Technical Reviewer	Valoroso	Rita	Italy
Technical Reviewer	Mittal	Saurabh	India
Technical Reviewer in training	Alfieri	Felice	Italy

## 3 VALIDATION FINDINGS

The validation findings relate to the project design, as documented and described in the PDD version 04 of 10/11/2010, PDD version 2.0 of 05/04/2012 PDD version 04 of 27/12/2012 , and PDD version 04 of 27/12/2012 /1/are. stated in the following sections.

The validation requirements, means of validation, reporting requirements and the results from validating the identified criteria are documented in more detail in the Validation Protocol in Appendix A.

### 3.1 Approval and Participation

The project's host Party is Panama and the Annex I Party is Switzerland.

Panama and Switzerland fulfill the requirements to participate in the CDM. Both have ratified the Kyoto protocol and have established a DNA according to the participating requirements for CDM under the Kyoto Protocol. Panama ratified the Kyoto Protocol on 05/03/1999 /14/ and established as DNA "Autoridad Nacional del Ambiente" /13/ as per the UNFCCC website. Switzerland ratified the Kyoto Protocol on 09/07/2003 /14/ and established as DNA "Federal Office for the Environment FOEN, Climate Division", as per the UNFCCC website /13/ .

The project participant(s) are Alcoholes del Istmo S.A. from Panama and from Switzerland, and all participants are private entities. The project participants are correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD /1/.

The DNA of Panama issued a Letter of Approval on 03/10/2012, authorizing Alcoholes de Istmo S.A. as project participant and confirming that the project assists in achieving sustainable development /54/. The authenticity of this LoA was verified through an e-mail forward to Rina from project participants, sent by Mr. Generoso Guerra, dated 26/09/2012 describing the issuance of Letter of Approval /65/. The letter of approval from Switzerland was issued on 20/07/2012, authorizing RWE Supply & Trading Switzerland SA as project participant /53/. The authenticity of this LoA was verified through the "List of Letters of Approval and Authorization (LoAs) for CDM projects issued by the Swiss Designated National Authority (2012)", updated on 29/12/2012 and available at Switzerland DNA's website /64/. Regarding the assessment of Letters of Approval, RINA verified the following issues: the Parties signed the Kyoto Protocol; the participation is voluntary; the project activity contributes to the sustainable development of Panama, the host country of this project activity; both letters were received directly by the PP and refer to the precise project activity title mentioned in the PDD version 04 /1/; the authenticity of letters of Approval were assessed and the LoAs were

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issued by their respective DNAs. Thus, RINA concludes that the LoA are in accordance with requirements defined by Validation and Verification Manual, version 01.2 of 30/07/2010 /3/

The proposed project does not involve any public funding from an Annex I Party, and the validation did not reveal any information that indicated that the project could be seen as a diversion of official development assistance (ODA) funding towards the host country. This information was confirmed based on letters from Global Bank:

- “Letter describing the required the essential conditions/elements for the credit approval of the AISA project and confirming that all conditions were met, dated 27/04/2011” /16/;
- “Letter stating the investment on a turbo generator with 500 kW of installed capacity, considering the development of the project as CDM project activity”, dated 27/04/2011” /17/.

<b>Project participants</b>	Alcoholes del Istmo S.A.	RWE Supply & Trading Switzerland SA
<b>Parties involved</b>	Panama	Switzerland
<b>APPROVAL</b>		
<b>LoA received</b>	Yes /54/	Yes/53/
<b>Date of LoA</b>	03/10/2012	20/07/2012
<b>LoA received from</b>	Project participants	Project participants
<b>Validation of authenticity</b>	Verified trough an e-mail sent by Panamanian DNA forwarded by project participant to RINA /65/	Verified trough Switzerland DNA website /64/
<b>Validity of LoA</b>	Yes	Yes
<b>PARTICIPATION</b>		
<b>Party is party to Kyoto Protocol</b>	Yes	Yes
<b>Voluntary participation</b>	Yes	Yes
<b>Project contribution to SD</b>	Yes	N/A

## 3.2 Project design document

The PDD for the project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama, version 1.5 of 10/11/2010 , PDD 2.0 of 05/04/2012 PDD version 04 of 27/12/2012 , and PDD version 04 of 27/12/2012 , submitted by have been the basis for the validation process.

RINA confirms that the above PDD is based on the currently valid PDD template /55/ and is completed in accordance with the applicable guidance “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)”, version 5 of 14/09/2007 /5/.

The main differences between PDD version 04 of 27/12/2012 PDD version 04 of 27/12/2012 , PDD 2.0 of 05/04/2012 and published PDD version 1.5 of 10/11/2010 are described below:

- Panamanian Grid emission factor – in PDD published PDD project participants included the calculation of Panamanian grid emission factor, once the electricity supplied to grid by the project activity was considered on CER calculation, based on Paragraph 17 of applied baseline methodology AMS-I.C version 18 of 01/10/2010 which states that “Baseline emissions for supply of electricity to and/or displacement electricity from a grid shall be calculated as per the procedures detailed in AMS-I.D”. Nevertheless, the latest available version of baseline methodology AMS-I.D (version 17 of 03/06/2001) states on its paragraph 6 that “Combined heat and power (co-generation) systems are not eligible under this category” and the calculation of grid emission was removed from PDD version 04 of 27/12/2012

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- Amount of CERs –on PDD version 1 the value of emission factor of fossil fuel of 77.4 tCO<sub>2</sub>/TJ, presented on section B.6.2, was different from value of 77.3 tCO<sub>2</sub>/TJ presented on section B.6.3. and applied on CER calculation ("*AISA - Biomass\_energy\_plant\_Panama.xls*"x, version 1 (received on 18/05/2011). The section B.6.2 and B.6.3 of PDD version 2.0 were revised and the value of bunker emission factor of 78.8 tCO<sub>2</sub>/TJ is the same employed on updated spreadsheet with CER calculations "*AISA - Biomass\_energy\_plant\_Panama V2.0.xlsx*", version 2 (received on 06/04/2012). This value is line with IPCC data (2006 IPCC Guidelines for National Greenhouse Gas Inventories – volume 2 – Energy) /30/. Thus, the total emission reduction on PDD version 1.5 of 207,308 tCO<sub>2</sub>e were modified to 224,588 tCO<sub>2</sub>e on PDD version 2.0. On PDD **version 04** the total amount of CERs were estimated on 226,372 tCO<sub>2</sub>e. This change occurred due to a revision on spreadsheet with CER calculations "*AISA - Biomass\_energy\_plant\_Panama V3 0.xlsx*" , version 3 (received on 27/05/2012), related to amount of steam generation, which is now calculates based on distillery's demand and also due to a revision fossil fuel consumption applied on baseline calculations. Crediting period – on published PDD the starting date of crediting period was 01/01/2011 and on PDD version 04 it was modified to 01/09/2012.
- The common practice analysis was removed from PDD published. The PDD version 04 of 27/12/2012 only presents barriers of finance access.

## 3.3 Project Design

The project activity consists on the replacement of the current cogeneration plant installed at the project site, which consumes bunker oil as fuel, by a new biomass cogeneration plant,

The project activity will consume biomass from sugar cane bagasse and it is forecasted that project also uses a small amount of wood in the first three years of the project activity. The current bunker oil cogeneration plant is composed by boiler, with a steam capacity generation of 10 tons/hour, with a temperature of 220 °C and pressure of 10 bar. This boiler is connected to steam generator with installed capacity of 300 kW. A description of technical parameters of the cogeneration plant prior to the implementation of the project activity is described below.

- Bunker boiler manufactured by Standard Kessel, with a steam production capacity of 10 t/h and an
- Bunker boiler manufactured by Lointek, with a steam production capacity of 6,8 t/h
- Turbo generator Bemac II with 300 kW of installed capacity and serial number 178251231, as per nameplate provide by project participants /8/.

Regarding the equipment of project activity it was verified that the biomass boiler was already installed and operating and additional information. This boiler started its operation on May 2008, as verified by Technique assistance and assembling Report", which indicates that that the installation of boiler occurred from 05/03/08 until 07/05/2008 /57/

As per PDD version 04 of 27/12/2012 27/12/2012 , the project activity will be implemented in two steps. The first steps consist on the installation of the new biomass boiler and the second step consists on the installation of new turbo generator of 500 kW. It was verified during the site visit that the step one, referent to the installation of the biomass boiler was concluded. Project participants were acquiring the turbo generator, referent to the second step of project implementation As per purchase order, dated 31/03/2007, the boiler specifications are in line with the data described in PDD and it was possible to verify that project has been properly implemented /10/:

- Model – CCB – 500;
- Capacity of steam generation – 10 t/h;
- Operational pressure - 12 bar;

Based on biomass boiler operational data provided by manufacturer, it is possible to calculate its thermal installed capacity. The boiler's pressure is 12 bar and its inlet temperature of 210 °C provides an enthalpy of 2841 kJ/kg. As provided by boiler manufacturer data /59/ the inlet temperature of boiler is 80 °C, what results in a enthalpy of 334.6 kJ/kg. Considering the steam production of 10.000t/h and applying the following formula, the thermal installed (W<sub>th</sub>) capacity is calculated:

$$W_{th} = \text{steam flow} * (\text{outlet enthalpy } 2841 - \text{inlet enthalpy } 334.6) = 6.9 \text{ MW}$$



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On the spreadsheet with CER calculation “AISA - Biomass\_energy\_plant\_Panama V3 0.xlsx”, /23/ folder “Boiler capacity” project participants considered the inlet enthalpy of 2851 kJ/kg (10 bar and 210 oC) and the outlet enthalpy of 334.8. It is possible to verify, based on thermodynamic tables, that this values results in the same value of 6.9 MW, once the steam production is the same. Thus, the value of thermal installed capacity was properly calculated by project participants.

The new turbo generator with 500 kW of installed capacity has not been yet acquired by project participant/s. In case of new steam turbine the operational data were confirmed trough the document: Technical study of new steam turbine of 500kW , dated 20/06/2006, provided by Mysko Asesoramiento S.A /38/

The project is located in Las Cabras, Herrera District, Panama, in the following geographical coordinates that can be confirmed in the Google Earth:

- 7° 52' 20.20" N
- 80° 32' 15.74" W.

The starting date of the project activity is 31/03/2007, corresponding to date of the biomass purchase order. It has been verified by RINA that the starting date is supported by the purchase order “Boiler Purchase Order” /10/, as it is the earliest date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity as per the “Glossary of CDM Terms” /7/.

The expected operational lifetime of the project activity is 25 years, as letter dated 02/07/20011 sent by Benecke Irmão & Cia Ltda., the biomass boiler manufacturer, stating that the biomass boiler’s operational lifetime corresponds to 25 years, since the operational and maintenance recommendations be properly contemplated /31/.

Aiming to confirm the equipment currently employed by project activity are still operational and would not be replaced in the absence of the project activity RINA confirmed their operational lifetime.

The company Cleaver brooks, the manufacturer of Standarkessel boiler and Linde boiler, sent a letter describing that the remaining lifetime of both boilers achieves at last ten years, since the operational and maintenance recommendations be properly contemplated /32/.

The opinion of manufacturers on the lifetime of boilers and steam turbines are in line with “Tool to determine the remaining lifetime of equipment” /33/

A fixed crediting period of 10 years has been chosen for the project, starting, as described in PDD version 04 of 27/12/2012 from 01/09/2012, or the date of registration, whichever is later.

According to the PDD version 04 of 27/12/2012 the total GHG emission reductions from the “Alcoholes Del Istmo – Biomass energy plant” project are estimated to be 226, 372, tCO<sub>2</sub>e during the fixed 10 years crediting period, resulting in annual average emission reductions of 22,637 tCO<sub>2</sub>e / year.

Project participants provided a letter from Mykso Asesoramiento S.A, company responsible by the revision of the current turbo generator of 300 kW, demonstrating that the remaining lifetime of this equipment is 10 years /46/. The company Mykso Asesoramiento S.A also provided a letter regarding the new generator, demonstrating that its operational life time is 15 years /47/.

RINA confirms that the description of the proposed CDM project activity, as contained in the PDD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity. Both letters of approval /53/, /54/ describes that the project activity contributes to the sustainable development

## 3.4 Application of selected baseline and monitoring methodology

As per “Guidelines on the assessment of de-bundling for SSC project activities” /63/, it was verified that this project activity is not a de-bundled component of a large scale project activity. It was confirmed in the UNFCCC web site, that there is no CDM project activity or an application to register with the same project participants, in the same project category and technology/measure in the last two years within 1 km of the project boundary of the proposed small-scale project activity. There is another CDM project activity under validation developed by the same project participants “Alcoholes del Istmo S.A.- Methane recovery & power generation project” /60/. Nevertheless the applied technology on methane recovery is not the same of the technology applied by this project activity.

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The project activity correctly applies on PDD version 04 of 27/12/2012, the approved baseline and monitoring methodology AMS-I.C “Thermal energy production with or without electricity” version 19 of 03/06/2011 /2/. The latest versions of the following tools are also related to applied baseline methodology:

- “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” /24/
- “Tool to calculate baseline, project and/or leakage emissions from electricity consumption /34/
- “Tool to determine the baseline efficiency of thermal or electric energy generation systems /35/

In accordance with Paragraph 76 of Validation and Verification Manual, version 01.2 of 30/07/2010 /3/, all the applicability criteria condition listed in the approved methodology was assessed against criteria contained in the PDD, as follows:

Paragraph 1 - *“This methodology comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel”*. - it was verified during the site visit that the project activity consumes biomass as fuel, what was also verified on the boiler purchase order”, dated 31/03/2007 /10/. The thermal energy produced by biomass boiler is employed by industrial process of Alcoholes del Istmo company;

Paragraph 2 - *“Biomass-based cogeneration systems) are included in this category. For the purpose of this methodology “cogeneration” shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element processes (for example, heat from a boiler and electricity from a biogas engine) do not fit under the definition of cogeneration project.”* – it was verified that the project activity consists on a biomass cogeneration project, composed by a new biomass boiler and a steam turbine with 500 kW of installed capacity. The biomass consumption was verified during the site visit and project participants also provided a biomass supply contract to demonstrated the project activity will consume biomass Purchase biomass Contract”, signed between Alcoholes del Istmo S.A. (buyer) and Campos de Pesé S.A (biomass supplier) /9/

Paragraph 3 - *“Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) Electricity supply to a grid;(b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities (c) Combination of (a) and (b)”* – the project activity produces electric and thermal energy. As verified during the site visit, part of electric energy is able to be sold to the grid, as per study of the new steam turbo generator to be acquired by project participants /38/.

Paragraph 4 - *“The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal”* – as already calculated, based on biomass boiler operational data provided by manufacturer /59/ the thermal installed capacity of biomass boiler (W<sub>th</sub>) is calculated as follows:..  $W_{th} = \text{steam flow} \times (\text{outlet enthalpy } 2841 - \text{inlet enthalpy } 334.6) = 6.9 \text{ MW}$ .. Thus in line with applied baseline methodology.

Paragraph 5 - *“For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal”* – as verified during the site visit, the boiler applied to this project only consumes biomass, thus this condition is not applicable

Paragraph 6 – regarding the capacity limits to biomass cogeneration plants, the following conditions applies:  
*“(a) If the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e., for energy renewable project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant)”* – the thermal capacity of biomass boiler employed by this project activity is 6.9 MW, as calculation based on boiler’s operation parameters already described in this report and the capacity of electricity generation is 500 kW, as per Technical study of new steam turbine of 500kW, dated 20/06/2006 /38/, thus the limits are in line with applicability condition

*(b) If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal”* – the

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project activity also considers the electric energy. The project activity consists on the implementation of new biomass boiler and a new steam turbo generator

*(c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e., no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW – the project activity considers both, thermal and electric energy, as per Technical study of new steam turbine of , dated 20/06/2006, its installed capacity is 500 kW /38/*

Paragraph 7 – *“The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6, and should be physically distinct from the existing units.”* – The project activity is not an addition of current cogeneration plant. It was verified that a new biomass boiler was acquired and that, as per its technical parameters /59/, it supplies the energy demand of Alcoholes del Istmo, thus the older boiler is not required

Paragraph 8- *“Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category”*. – The project activity modifies the current cogeneration plant, thus this condition is applicable to the project activity;

Paragraph 9 - *New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the “General Guidelines to SSC CDM methodologies”* – the project complies with General Guidelines to SSC CDM methodologies” however it is not a Greenfield project, once there was another cogeneration unit using fossil fuel prior to the project activity.

Paragraph 10 – *“If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation”* – the project activity uses only biomass residues, derived from sugar cane crushing there is no production of biomass in consequence of the project activity, thus not applicable

Paragraph 11 - *“Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emissions reductions.”* – There is no processed biomass to this project activity, the biomass employed by this project activity consists on biomass residues from sugar cane.

Paragraph 12 – *“If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emissions reductions.”* - the electricity and steam produced by the new cogeneration plant will be used for onsite requirements, excess of electricity will be exported to the national grid, not to another facility or facilities within the project boundary, thus this condition is not applicable.

Paragraph 14 – discusses the eligibility of *Charcoal based biomass energy generation project activities* – this condition is not applicable, once the project activity applies do not consume charcoal, only biomass as verified during the site visit and confirmed through Purchase biomass Contract”, signed between Alcoholes del Istmo S.A. (buyer) and Campos de Pesé S.A (biomass supplier) /9/

The proposed project activity meets criteria expected in the baseline methodology. The applicability conditions of applied baseline methodology as well as the tool applicable to this project activity were properly discussed in PDD version 04 of 27/12/2012 and it ensures that:

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As “Alcoholes Del Istmo – Biomass energy plant” is qualified as small scale project activity, once the total capacity of electricity generation is 500 kW and the boiler thermal capacity is 6.9 MW<sub>th</sub>. Consequently, The project qualifies as small scale project because:

The limits of electricity output and of thermal output are also defined by paragraph 6 (a) of applied baseline methodology AMS-I.C “Thermal energy production with or without electricity”. Based on biomass boiler operational data provided by manufacturer /59/, it thermal installed capacity of 6.9 MW was calculated. Technical study of new steam turbine /38/ confirms its installed capacity of 500kW

Moreover the following additional evidences documents demonstrates that the project activity consists on a small scale project:

- The installed capacity of this project activity is in line with Simplified modalities and procedures for SSC CDM project activities, presented on Annex II of “Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol” (decision 17/CP.7, paragraph 6 (c) (i)). /12/. This Annex defines, on its item “I. Further clarifications on definitions of eligible activities”, that for renewable energy projects activities under type (i) category, the maximum output capacity is equivalent to or up to 15 megawatts 15 MW :
- The project activity is also in line with paragraph 4 (c) of “General Guidelines to SSC CDM Methodologies” /26/, which defines the output capacity of renewable energy equipment to biomass power plants as the maximal limit of 15 MW(e) that is equivalent to 45 MW thermal output of the equipment or the plant (e.g. boilers).

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

## 3.5 Project boundary and baseline identification

### 3.5.1 Project boundary

According to the approved baseline and monitoring methodology AMS-I.C “Thermal energy production with or without electricity”, version 19 of 03/06/2011 /2/, the project’s boundary encompasses:

- All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both;
- All power plants connected physically to the electricity system (grid connected) that the project plant is connected to;
- Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
- The processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette), unless all associated emissions are accounted for as leakage emissions;
- The transportation itineraries, if the biomass is transported over distances greater than 200 kilometers, unless all associated emissions are accounted for as leakage emissions – in case of this project activity the distance for the biomass transportation is less than 200 kilometers, as presented on pictures, indicating the distances of biomass transportation /56/.
- The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for power/heat production and applies this methodology on a standalone basis i.e. without using a Type III component of a SSC methodology.

The following emissions sources are included in the project boundary::

	GHGs involved	Description
Baseline emissions	CO <sub>2</sub>	Electricity is generated from a cogeneration plant based on bunker C;



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		Thermal energy is generated from a power plant based on bunker C; Part of electricity is consumed from the grid in the baseline scenario;
<i>Project emissions</i>	CO <sub>2</sub>	Emissions from auxiliary fuel combustion
<i>Leakage</i>	N/A	As per applied baseline methodology, the leakage is calculated based on "Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion". The main emissions potentially giving rise to leakage in the context this project activity involves: <ul style="list-style-type: none"> <li>➤ The energy equipment is neither transferred from another activity nor transferred to another activity. Therefore, leakage emissions are not considered;</li> <li>➤ The collecting and transporting of the biomass residues are made over a distance of less than 200 kilometers. Therefore, leakage emissions are not considered. This information was verified through pictures, indicating the distances of biomass transportation /56/.</li> <li>➤ Concerning the transporting of fossil fuel used during the first 2 years, similar emission levels would have also occurred in the baseline due to the transport of the same bunker C. Transport emissions are considered as negligible</li> </ul>

The section B.3 of PDD version 4 indicates the project boundary in line with applied baseline methodology AMS-I.C version 19 of 03/06/2011, including also the backup boiler. By checking the information and the project site, RINA can confirm that the project boundary and emission sources described in the PDD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

## 3.5.2 Baseline identification

As per applied baseline methodology AMS-I.C "Thermal energy production with or without electricity", version 19 of 03/06/2011, /2/ the baseline scenario for project activity that produces both heat and electricity must be in line with one of the following conditions, which were analyzed by RINA, as described below :

Paragraph 19 – "Project activities producing both heat and electricity shall use one of the following baseline scenarios:

- "Electricity is imported from a grid and thermal energy (steam/heat) is produced using fossil fuel"* –  
Condition not applicable once it was verified during the site visit that the baseline consists in a fossil fuel cogeneration plant, thus steam and electricity are produced from the same source. The datasheet of fossil fuel boilers were verified during the validation process /36/, /37/ as well as the nameplate of current turbo generator of 300 kW /8/ ;
- "Electricity is produced in an on-site captive power plant using fossil (with a possibility of export to the grid) and thermal energy (steam/heat) is produced using fossil fuel"* – C  
condition not applicable once it was verified during the site visit and confirmed through technical data boilers/36/, /37/ and current turbo generator /8/ that the baseline consists in a fossil fuel cogeneration plant, thus steam and electricity are produced from the same source;
- "A combination of (a) and (b)"* –  
Neither the condition (a) nor the condition (b) are applicable to this project activity;
- "Electricity and thermal energy (steam/heat) are produced in a cogeneration unit using fossil fuel (with a possibility of export of electricity to a grid/other facilities and/or thermal energy to other facilities)"* –

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The current situation in Alcoholes del Istmo S.A. is the cogeneration power plant using fossil fuel, thus this is an realistic and credible baseline scenario

- e) *“Electricity is imported from a grid and/or produced in an on-site captive power plant using fossil fuels (with a possibility of export to the grid); steam/heat is produced from biomass” – I*

In case of baseline of this project activity both steam and electricity are generated from fossil fuel, as per fossil fuel consumption verified on Annual Production Reports provided by Alcoholes del Istmo S.A. /58/ and also according to technical data sheet of boilers /36/, /37/and technical parameters of current turbo generator provided on its nameplate /8/ ;

- f) *“Electricity is produced in an on-site captive power plant using biomass (with a possibility of export to a grid) and/or imported from a grid; steam/heat is produced using fossil fuel” –*

As described on previous condition, in case of baseline of this project activity both steam and electricity are generated from fossil fuel, as per fossil fuel consumption verified on Annual Production Reports provided by Alcoholes del Istmo S.A. /58/ and also according to technical data sheet of boilers /36/, /37/and technical parameters of current turbo generator provided on its nameplate /8/ ;

- g) *“Electricity and thermal energy (steam/heat) are produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to a grid or to other facilities and without a possibility of export of thermal energy to other facilities). This scenario applies to a project activity that installs a new grid connected biomass cogeneration system that produces surplus electricity and this surplus electricity is exported to a grid. The baseline scenario is that the electricity would otherwise have been generated by the operation of grid connected power plants and by the addition of new generation sources to the grid” –*

This is not applicable once part of electric energy of Alcoholes del Istmo S.A. is generated by the cogeneration power plant.

- h) *“Electricity and/or thermal energy produced in a co-fired system” –*

The current cogeneration power plant is not a co-fired system it burns only fossil fuel, as per biomass purchase contracts provided by project participants /9/, /48/ and /49/;

- i) *“Electricity is imported from a grid and/or produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to the grid or to other facilities); steam/heat is produced in a biomass fired cogeneration unit and/or a biomass fired boiler (without a possibility of export of thermal energy to other facilities). This scenario applies to a project activity that installs a new biomass cogeneration system that displaces electricity which otherwise would have been imported from a grid”*  
This is not applicable once part of electric energy of Alcoholes del Istmo S.A. is generated by the cogeneration power plant ,as per Annual Production Reports provided by Alcoholes del Istmo S.A. /58/ and also according to technical data sheet of boilers /36/, /37/and technical parameters of current turbo generator provided on its nameplate /8/

- As per paragraph 87 of Validation and Verification Manual, version 01.2 of 30/07/2010 /3/ RINA verified that: The references and sources of the assumptions considered on the definition of baseline scenario of this project activity;
- The documentation provided by project participants and verified during the validation are in line with equipments technical parameters described on PDD version 04 of 27/12/2012;
- All the assumptions and its related evidences were verified during the validation and indicated on validation report;
- The approved baseline methodology was correctly applied in the identification of the most reasonable baseline scenario and the identified baseline scenario represents what would occur in the absence of the project activity.

Prior to the implementation of project activity the company Alcoholes del Istmo uses a cogeneration power plant that consumes bunker oil. The company production is presented on table below and the presented on this table were crosschecked based on annual production reports provided by the company /58/. It is important to note that, as per information provide by project participant, the current turbo generator was installed in the end of 2006 and thus the self generation started on 2007 /66/



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Year	2005	2006	2007	2008	2009
<b>Alcohol production in liters</b>					
<b>PHLEGMS</b>	7,663,425	6,442,030	7,783,341	5,853,460	4,237,348
<b>RECTIFIED</b>	6,601,161	5,943,178	6,507,664	5,022,131	3,467,941
<b>START-UP</b>	145	262,975	565,992	421,193	257,105
<b>SUB-PRODUCTS</b>	611,541	52,379	185,217	126,302	70,814
<b>Bunker consumption (gal)</b>	812,465	728,789	762,770	319,031	188,594
<b>Residual fuel consumption (gal)</b>	29,611	98,354	84,406	117,315	77,953
<b>Electricity consumed from the grid (kWh)</b>	1,825,950	1,082,550	1,302,000	1,340,850	1,045,800
<b>Steam production (ton)</b>	37,358	38,182	39,222	27,255	19,557
<b>Electricity produced (kWh)</b>	0	0	139,672	129,399	158,432

Thus as per applied baseline methodology AMS-I.C version 19 of 03/06/2011 the only realistic scenario corresponds to alternative D - Electricity and thermal energy (steam/heat) are produced in a cogeneration unit using fossil fuel (with a possibility of export of electricity to a grid/other facilities and/or thermal energy to other facilities). Therefore, the identified baseline scenario presented in the PDD is correctly applied and further discussed in section 3.6.2 of the report. RINA confirms that the scenarios are properly identified.

## 3.6 Additionality

The additionality of the project activity is demonstrated by applying the “Attachment A of Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities”, Version 08, dated 29 September 2011” /18/. The access-to-finance barrier analysis has been applied.

RINA’s opinion regarding the additionality of the proposed project is further explained in the following steps.

### 3.6.1 Prior consideration of the clean development mechanism

The project’s starting date was defined as 31/03/2007 which is represented by the biomass boiler purchase order /10/.

Project participants provided the following evidences regarding the CDM prior consideration:

#### CDM Prior Consideration

Prior Consideration Activity	Date
E-mail from Mr. Rafael Gonzalez, dated, describing that a new biomass boiler and new turbo generator will be acquired and that revenues from CER are necessary to support this investment /19/	18/09/2006
Letter describing that Panama’s DNA knows the project activity since to be developed by Alcoholes del Istmo S.A. since November 2006 /15/	12/05/2010,
First CDM consideration by AISA’s board /39/	Sep 2006
Prior CDM notification with the DNA /40/	Nov 2006

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The real actions to demonstrate that CDM was considered in the project activity, as well as its related evidences, are presented on the following table, what also demonstrates the steps of the project's implementation.

Actions	Date
Bank loan pre- approval for the boiler considering the CDM /16/	Feb 2007
Boiler purchase order /10/	31 Mar 2007
Contact with a PDD consultant /61/	Sep 2007
CDM Consultancy Agreement /41/	Dec 2007
Loan Bank approval phase 1 on condition of CDM (biomass boiler) /20/	Oct 2007
Boiler starting operation /42/	May 2008
DOE's agreement for CDM validation /43/	Feb 2009
Initial discussion with potential buyers /46/	Feb 2009
Loan Bank pre- approval for turbo on condition of CDM /17/	Sep 2009
ERPA signature /44/	Sept 2010

In conclusion, in accordance with the requirements of the "Guidelines on the demonstration and assessment of prior consideration of the CDM", version 3 of 11/09/2009 /6/. and VVM, RINA can confirm that the CDM was seriously considered in the decision to implement the project activity and that real and continuing actions to attain CDM status of the project activity were taken

## 3.6.2 Identification of alternatives

The alternative to this project activity was assessed based on applied baseline methodology AMS-I.C "Thermal energy production with or without electricity" version 19 of 03/06/2011 and it was conclude that most plausible baseline scenario consists on its alternative (d):

"Electricity and thermal energy (steam/heat) are produced in a cogeneration unit using fossil fuel (with a possibility of export of electricity to a grid/other facilities and/or thermal energy to other facilities) – the current situation in Alcoholes del Istmo S.A. is the cogeneration power plant using fossil fuel, thus this is an realistic and credible baseline scenario.

## 3.6.3 Investment analysis

Not applicable

## 3.6.4 Barrier analysis

On PDD version 04 of 27/12/2012 after RINA's assessment it was verified that the project activity faces just the barrier, related to the access to finance. Project participants demonstrated from letters of Global Bank the CDM was always a condition to the financing of "Alcoholes Del Istmo – Biomass energy plant"

Project participants provided the following letters from Global Bank of Panama:

- Letter from the Global Bank of Panama, dated 27/04/2011, which describes that the development of a CDM project activity, located at Alcoholes del Istmo S.A. distillery, is one of the conditions to the bank release the loan required to the project implementation /16/ This letter also mentions that this project was presented to Global Bank on February 2007;
- Letter from Global Bank, related to the investment on a turbo generator with 500 kW of installed capacity, dated 27/04/2011, also mentioning the biomass boilers as a CDM project activity was presented by project participant /17/. This letter also mentions that the meeting related to acquisition of turbo-generator occurred in September 2009.

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- Letter from Global Bank of Panama, dated 27/04/2011, stating that the project of steam and electricity generation from biomass was already approved October 2007, considering the development of the project as CDM project activity /20/.

Project participants demonstrated that the development of a CDM project activity was a condition required by the Global Bank of Panama for releasing of the loan. Such condition was required for the boiler acquisition and was also considered in the investment of steam turbine.

RINA can confirm that the barrier analysis was done in accordance with the "Guidelines for objective demonstration and assessment of barriers, Guideline 6 /62/ where it is possible to confirm that the financing of the project activity of the project will be assured only due to the benefit of the CDM.

## 3.6.5 Common practice analysis

Not applicable.

## 3.6.6 Conclusion

RINA can confirm that all data, rationales, assumptions, justifications, and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information, RINA considers that the reasoning for the proposed project additionality demonstration is credible and reasonable, i.e. the proposed project activity has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the proposed CDM project activity.

## 3.7 Monitoring Plan

The approved baseline and monitoring methodology AMS-I.C, "Thermal energy production with or without electricity", version 19 of 03/06/2011 /2/ has been correctly applied.

The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant to the project activity have been found in the plan.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex-

Please refer to the Validation Protocol in Appendix A of this report.

### 3.7.1 Parameters determined ex-ante

The following parameters are available at validation (not monitored) RINA verified that such parameters are in line with project activity and with applied baseline methodology:

- $Q_{\text{steam, boiler 1}}$  - Quantity of steam generated by bunker C based boiler 1; value of 10 tons of steam per hour
- $P_{\text{steam, boiler 1}}$  - Pressure generated by boiler 1; value of pressure 10 bar (operational pressure)
- $T_{\text{boiler 1}}$  - Steam temperature generated by boiler 1, 210 °C
- $\eta_{\text{baseline coge}}$  - Efficiency of the standalone boiler using fossil fuel that would have been used in the absence of the project activity; 75.6 %
- $NCV_{\text{bunker}}$  - Net calorific value of bunker C; 31,514 kcal/gal
- $NCV_{\text{residual oil}}$  - Net calorific value of residual oil 136,338 BTU/gal
- $EF_{\text{CO}_2}$  - CO<sub>2</sub> emission factor per unit of energy of the bunker that would have been used in the baseline plant and in the project emissions calculation 78.8 tCO<sub>2</sub>/TJ

### 3.7.2 Parameters monitored ex-post

The following parameters are monitored ex-post, as per applied baseline methodology:

- $Q_{\text{steam,p,y}}$  - Quantity of steam supplied by the project activity during the year y;, expressed in Nm<sup>3</sup>/hour

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Monitoring frequency: Continuous monitoring, integrated hourly and at least monthly recording.

Monitoring procedure: flow meter

Calibration frequency: according to manufacturer specification

- **P<sub>steam, cogen</sub>** - Pressure of steam extracted from turbine, expressed in bar

Monitoring frequency: continuously, integrated hourly and recorded at least on a monthly basis.

Monitoring procedure: pressure gauge

Calibration frequency: according to manufacturer's specifications

- **T<sub>steam, cogen</sub>** - Temperature of steam extracted from turbine, expressed in °C

Monitoring frequency: continuously, integrated hourly and recorded at least on a monthly basis

Monitoring procedure: temperature transmitter.

Calibration frequency: according to manufacturer's specifications

- **T<sub>feedwater</sub>** - **Temperature of the feedwater**

Monitoring frequency: continuously, integrated hourly and recorded at least on a monthly basis

Monitoring procedure: temperature transmitter.

Calibration frequency: according to manufacturer's specifications

- **EG<sub>thermal,y</sub>** - Net quantity of thermal energy supplied by the project activity during the year y, expressed in TJ;;

Monitoring frequency: Continuous monitoring, aggregated annually.

Monitoring procedure:

- The feed water temperature will be used to determine the feed water enthalpy using standard steam table.
- The steam pressure and the steam temperature will be used to determine the steam enthalpy using standard steam table.
- The amount of feed water will be multiplied by the feed water enthalpy to calculate the amount of energy containing in the feed water.
- The amount of steam produced will be multiplied by the steam enthalpy to calculate the amount of steam energy produced.

Net quantity of steam supplied by the project activity = the amount of steam energy produced minus the amount of energy containing in the feedwater.

Calibration frequency: N/A

- **EG<sub>pPJ,electrical,y</sub>** - Electricity supplied by the project activity in year y, expressed in MWh

Monitoring frequency: Continuous monitoring, integrated hourly and at least monthly recording

Monitoring procedure: measured using calibrated meters installed at the turbo generator.

Calibration frequency: according to manufacturer's specifications.

- **B<sub>leafs and stems</sub>** - Annual leafs and stems consumption, expressed in tonnes/year

Monitoring frequency: in batches, consolidated annually

Monitoring procedure: weight bridge estimate using annual mass/ energy balance

Calibration frequency: according to manufacturer specifications

- **B<sub>bagasse</sub>** - Annual bagasse consumption, expressed in tonnes/year

Monitoring frequency: in batches, consolidated annually

Monitoring procedure: weight bridge estimate using annual mass/ energy balance

Calibration frequency: according to manufacturer specifications

- **B<sub>wood waste</sub>** - Annual wood waste consumption, expressed in tonnes/year

# VALIDATION REPORT

Monitoring frequency: in batches, consolidated annually

Monitoring procedure: weight bridge estimate using annual mass/ energy balance

Calibration frequency: according to manufacturer specifications

- **M<sub>leaves and stems</sub>** Moisture content of leafs and stems, expressed in %

Monitoring frequency: monitored at least on a monthly basis.

Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory.

Calibration frequency: according to manufacturer specification.

- **M<sub>bagasse</sub>** - Moisture content of bagasse, expressed in %

Monitoring frequency: monitored at least on a monthly basis.

Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory.

Calibration frequency: according to manufacturer specification.

- **M<sub>wood waste</sub>** - Moisture content of wood waste, expressed in %

Monitoring frequency: monitored at least on a monthly basis.

Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory.

Calibration frequency: according to manufacturer specification.

- **FF<sub>i,y</sub>** - Fossil fuel oil flow rate *i* combusted in the boiler during the year *y*, expressed in gal/year

Monitoring frequency: continuously, recorded on an daily basis

Monitoring procedure: value will be measured using a ruler gauge which will be part of the daily tank.

Calibration frequency for the ruler gauge: annually

- **NCV<sub>biomass</sub>** - Net calorific value per type of biomass

Monitoring frequency: monitored at least on a monthly basis once for the crediting period.

Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory.

Calibration frequency: N/A, performed in an independent

## 3.7.3 Management system and quality assurance

Quantity of steam supplied by the project activity during the year *y* will be continuous monitored, integrated hourly and at least monthly recording on existing management system control at Alcoholes del Istmo S.A. the pressure and temperature produces by boiler is will be also controlled in boilers indicators and these will be applied on calculation of steam enthalpy, which provides the thermal energy produced.

The amount of each type of biomass employed by the project activity will be monitored in batches and consolidated annually.

The cross-check of purchased biomass will be made through invoices and biomass stock. Additionally, the consistency of measurements will be checked based on the energy balance that takes into account the energy generation, fossil fuels and biomass used and the efficiency of energy generation. The inputs required for the calculation of energy balance are clearly indicated in section B.7.1 of PDD version 3 to all types of biomass to be employed by this project activity. The calibrations procedures will follow manufactures requirements and must be provided in the first verification. Alcoholes del Istmo S.A. is the responsible for implementation and execution of monitoring plan, as defined in section B.7.2 of PDD version 04 .

## 3.8 Estimation of GHG emissions

As per paragraph 44 of applied baseline metrology, "The quantities and types of biomass and the biomass to fossil fuel ratio (in the case of co-fired systems) to be used during the crediting period should be explained and documented transparently in the CDM-PDD. For the selection of the baseline scenario, an ex-ante estimation of these quantities should be provided." Project participants provided on spreadsheet with CER calculations "AISA - Biomass\_energy\_ plant\_Panama V3 0.xlsx "/23/, the estimated biomass consumption, based on operational parameters of Alcoholes del Istmo company, as presented on table below:

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Number of years	0	1	2	3	4	5	6	7	8	9	10
Quantity of biomass (Tonnes)	8,500	16,225	25,349	29,474	32,600	35,600	35,600	35,600	35,600	35,600	35,600
leaves and stems (Tonnes/y)	3,500	5,600	9,100	12,600	12,600	12,600	12,600	12,600	12,600	12,600	12,600
Wood (Tonnes)	5,000	5,000	5,000	-	-	-	-	-	-	-	-
Bagasse (Tonnes)	-	5,625	11,249	16,874	20,000	23,000	23,000	23,000	23,000	23,000	23,000

All the formulas and factors used in the project's emissions calculations are in accordance to the approved baseline and monitoring methodology AMS-I.C version 19 of 03/06/2011.

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration, and the mentioned data sources have been verified by RINA

## Baseline Emissions

The baseline calculations are in line with AMS-I.C "Thermal energy production with or without electricity", version 19 of 03/06/2011 of /2/

$$BE_{cogen,CO_2,y} = [(EG_{PJ,thermal,y} + EG_{PJ,electrical,y} * 3.6) / \eta_{BL,cogen}] * EF_{FF,CO_2}$$

Where:

$BE_{cogen,CO_2,y}$  Baseline emissions from electricity and thermal energy displaced by the project activity during the year  $y$  (tCO<sub>2</sub>)

$EG_{PJ,electrical,y}$  The amount of electricity supplied by the project activity during the year  $y$ , GWh

3.6 Conversion factor (TJ/GWh)

$EG_{PJ,thermal,y}$  The net quantity of thermal energy supplied by the project activity during the year  $y$  (TJ)

$EF_{FF,CO_2}$  The CO<sub>2</sub> emission factor of the fossil fuel, in case of this project activity corresponds to bunker oil, that would have been used in the baseline cogeneration plant obtained from reliable local or national data if available, alternatively, IPCC default emission factors can be used-(tCO<sub>2</sub>/TJ)

$\eta_{BL,cogen}$  The total annual average efficiency of the cogeneration plant using fossil fuel

## Baseline emission reductions

On PDD version 1 the value of emission factor of fossil fuel of 77.4 tCO<sub>2</sub>/TJ, presented on section B.6.2, was different from value of 77.3 tCO<sub>2</sub>/TJ presented on section B.6.3. and applied on CER calculation ("AISA - Biomass\_energy\_plant\_Panama.xls"x, version 1 (received on 18/05/2011). The section B.6.2 and B.6.3 of PDD version 2.0 were revised and the value of bunker emission factor of 78.8 tCO<sub>2</sub>/TJ is the same employed on updated spreadsheet with CER calculations "AISA - Biomass\_energy\_plant\_Panama V2.0.xlsx", version 2 (received on 06/04/2012). This value is line with IPCC data (2006 IPCC Guidelines for National Greenhouse Gas Inventories – volume 2 – Energy) /30/. Thus, the total emission reduction on PDD version 1 of 385,209 tCO<sub>2</sub>e was modified to 224,588 tCO<sub>2</sub>e on PDD version 2.0. On PDD version 04 the total amount of CERs were estimated on 226,372 tCO<sub>2</sub>e. This change occurred due to a revision on spreadsheet with CER calculations "AISA - Biomass\_energy\_plant\_Panama V3 0.xlsx", version 3 (received on 27/05/2012), related to amount of steam generation, which is now calculates based on distillery's demand and also due to a revision fossil fuel consumption applied on baseline calculations.

The steam consumption of Alcoholes del Istmo are based on Annual Reports from years 2005, 2006, 2007, 2008 and 2009 /58/ which presents the energy consumptions, the alcohol production, the fossil fuel consumptions. Such historical data were also applied on calculation of basely efficiency, which also considers



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the operational parameters of baseline boilers to obtain the enthalpies values applied on its calculations (pressure and temperature)

## Project Emissions

As per applied baseline methodology, the project emissions include:

- CO<sub>2</sub> emissions from electricity consumption by the project activity using the latest version of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.

As the project activity consists on thermal and electric energy generation from biomass and considering that the generated electricity will supply the distillery demand and the surplus will be exported to the grid, this project emission source is not applicable.

- *CO<sub>2</sub> emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”.*

As per section B.6.3 of PDD version 04 of 27/12/2012, and per spreadsheet calculation “AISA - Biomass\_energy\_plant\_Panama V3 0.xlsx” /23/ it is expected te consumption of bunker oil during the first year of the project activity, thus this source of project emissions is applicable. It calculated as per “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” /24/, as follows:

$PE_{FC,j,y} = \sum F_{i,j,y} \times COEF_{i,y}$  where:

- $PE_{FC,j,y}$  - Are the CO<sub>2</sub> emissions from fossil fuel combustion in process j during the year y (tCO<sub>2</sub>/yr);
- $F_{i,j,y}$  - Is the quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr);
- $COEF_{i,y}$  - Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit).

The calculation of  $COEF_{i,y}$  is in line with option B of Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” /24/,. The option A could also be applied, nevertheless it is based on chemical composition of fossil fuel, the option B is based on net calorific value and on emission factor of fossil, what are available for project participants. Thus, the leakage was calculated according to following equation:

$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i,y}$ , where:

$COEF_{i,y}$  - Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit);

$NCV_{i,y}$  - Is the weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit).

$EF_{CO_2,i,y}$  - Is the weighted average CO<sub>2</sub> emission factor of fuel type i in year y (tCO<sub>2</sub>/GJ) – based on values provided by IPCC;

i - Are the fuel types combusted in process j during the year y.

Thus, considering the estimated amount of bunker consumption for 2012, which is based on historical data /58/ and the net calorific value of 0.000152870 TJ/Gal. the project emissions results in 1,041 tCO<sub>2</sub>

## Leakage

As per applied baseline methodology, the leakage occurs in the following conditions:

1 - If the energy generating equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered – this is not applicable to the project activity, once it applies new equipments:

- A new biomass boiler was acquired, as per Boiler Purchase Order”, dated 31/03/2007 /10/;
- New turbo generator, as per Letter stating the investment on a turbo generator with 500 kW of installed capacity,” dated 27/04/2011 /17/.

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2 – Leakage associated to biomass transportation – as per applied baseline methodology “If biomass residues are transported over a distance of more than 200 kilometers due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected”.

As per pictures provided by project participants, indicating the distances of biomass transportation /56/ it was demonstrated that distance from biomass supplier is less than 200 km.

Also the contract of biomass from sugar cane, dated 30/01/2012 /48/ describes on its Clause 1 that the biomass supplier (Campos de Pesé) will provide the biomass required amount of biomass to the operation of the project activity. Thus leakage is not applicable to this project activity.

## 3.9 Environmental Impacts

Project participants provided a document, dated 19/08/2011 issued by Panamanian DNA (ANAM – translating from Spanish National Environmental Authority), demonstrating that this project activity does not require an EIA /28/.

## 3.10 Local stakeholders consultation

The local stakeholder consultation was conducted on 03/06/2008. It was verified that the date of the meeting is provided in the invitation letter/s /25/. The stakeholder’s consultation process was conducted in an open and transparent manner. It was carried out an open meeting attended by 16 persons, from local associations, NGOs, environmental agency, and local communities. The attendance list is provided in the PDD. RINA has verified the original list during the site visit. Moreover PP has provided pictures of the meeting and copies of the formularies filled out by the stakeholders.

RINA verified the evaluation formularies answered by the local stakeholder, during the meeting. No negative comments were addressed to the project activity. There are no specific stakeholders’ consultation process regulations/laws in Panama. The local stakeholder consultation was conducted in a transparent manner.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 1.5 of 10/11/2010 was made publicly available on the CDM UNFCCC website (<http://cdm.unfccc.int/Projects/Validation/DB/WB5IVZ6OREQHZX1ZNSM7O6239W79G/view.html>) and Parties, stakeholders and NGOs were invited to provide comments during a 30 days period from 11/02/2011 to 12/03/2011. No public comments were received during this period.

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## 5 VALIDATION OPINION

RINA Services S.p.A. (RINA) has performed the validation of the project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama, with regard to the relevant requirements for CDM activities.

The review of the project design document and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of the stated criteria.

The host Party is Panama and the Annex I Party is Switzerland. Both Parties fulfill the participation criteria and have approved the project and authorized the project participant/s Alcoholes del Istmo S.A., RWE Supply & Trading Switzerland SA. The DNA from Panama confirmed that the project assists in achieving sustainable development

The project correctly applies the approved baseline and monitoring methodologies AMS-I.C, “Thermal energy production with or without electricity”, version 19 of 03/06/2011.

The project activity consists on the replacement of the current cogeneration plant installed at project site, which consumes bunker oil as fuel, by a new biomass cogeneration plant. The current cogeneration plant is composed by two boilers that use bunker oil as fuel and a turbo generator with 300 kW of installed capacity.

The total GHG emission reductions from the “Alcoholes Del Istmo – Biomass energy plant” are estimated to be 226, 372, tCO<sub>2</sub>e during the first renewable 10 years crediting period, resulting in an annual average emission reductions of 22,637 tCO<sub>2</sub>e / year. The emission reduction forecast has been checked and it is deemed likely the stated amount is achieved given that the underlying assumption does not change.

The monitoring plan sufficiently specifies the monitoring requirements for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA's opinion that the project participants are able to implement the monitoring plan.

In conclusion, it is RINA's opinion that the project activity “Alcoholes Del Istmo – Biomass energy plant” in Panama as described in the PDD version 04 of 27/12/2012 /1/ meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodologies AMS-I.C, “Thermal energy production with or without electricity”, version 19 of 03/06/2011/2/.

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

# **APPENDIX A**

## **VALIDATION PROTOCOL**

**TABLE 1 MANDATORY REQUIREMENTS**

Requirement	Reference	Conclusion
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non Annex I Parties contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2	<del>CAR-2</del> OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art.12.5a CDM Modalities and Procedures §40a	<del>CAR-2</del> OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art.12.2 CDM Modalities and Procedure §40	<del>CAR-2</del> OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance (ODA) and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7 CDM Modalities and Procedures Appendix B §2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities and Procedures §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedure §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedure §31b	OK
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedure §43	OK
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art.12.5b	OK
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK

Requirement	Reference	Conclusion
13. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a de-bundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
15. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK
16. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
17. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30/45 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
18. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel.	CDM Modalities and Procedures §37e	OK
19. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §47	OK
20. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords, and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK



**TABLE 2 REQUIREMENTS CHECKLIST**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
<b>A. General Description of Project Activity</b>						
<b>A.1. Title of the project activity</b>						
A.1.1.	Title of the project activity, version number and date of the PDD (section A.1).	/1/ /3/	DR	The title of project activity is “Alcoholes Del Istmo – Biomass energy plant” , as per the published PDD version 1.5 of 10/11/2010.	<b>OK</b>	<b>OK</b>
A.1.2.	Does the project comply with the applicable requirements for completing the PDDs?	/1/ /5/		The project is in line with “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)”, version 5 of 15/09/2007.	<b>OK</b>	<b>OK</b>
<b>A.2. Description of the proposed project activity</b>						
A.2.1.	Does the PDD contain an accurate description of the project activity and provide the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation? How was the design of the project assessed?	/1/,/3/, /8/,/9/, /10/	DR/I	<p>The project activity consists on the replacement of the current cogeneration plant installed at project site, which consumes bunker oil as fuel, by a new biomass cogeneration plant.</p> <p>The project is a small scale and applies the baseline methodology AMS-I.C “Thermal energy production with or without electricity” Sectoral Scope 1 “Energy industries (renewable - / non-renewable sources)”.</p> <p>The current cogeneration plant is composed by two boilers that use bunker oil as fuel and a turbo generator with 300 kW of installed capacity.</p> <p>During the site visit it was verified the following equipments of current cogeneration plant:</p> <ul style="list-style-type: none"> <li>• Bunker boiler manufactured by Standard Kessel, with a steam production capacity</li> </ul>		<b>OK</b>

<sup>1</sup> MoV: DR document review, I interview, CC cross checking

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>of 10 t/h and an efficiency of 82%;</p> <ul style="list-style-type: none"> <li>• Bunker boiler manufactured by Lointek, with a steam production capacity of 6.8 t/h;</li> <li>• Turbo generator Bemac II with 300 kW of installed capacity and serial number 178251231, as per nameplate provided by project participants /8/.</li> </ul> <p>Regarding the equipments of project activity it was verified that the biomass boiler was already installed and operating. As per purchase order, dated 31/03/2007 /10/, the boiler specifications are:</p> <ul style="list-style-type: none"> <li>• Model – CCB – 500;</li> <li>• Capacity of steam generation – 10 t/h;</li> <li>• Operational pressure 12 bar.</li> </ul> <p>As the nameplate of all boilers verified during the site visit were not accessible and could not be verified, project participants are requested to provide evidences to confirm the boiler's operational parameters. PPs have also to provide evidences regarding the acquisition of new turbo generator (500 KW) as well as its operational parameters.</p> <p>Project participants are requested to clarify and to detail with possible scenarios the section A.2 of the published PDD, where it is described that the replacement of biomass boiler by a new one with higher efficiency is possible in the future. PP is requested to describe the increasing of the capacity of electricity generation as well.</p> <p>During the site visit, project participants provided the Purchase Contract of Biomass,</p>	<p><b>CL1</b></p> <p><b>CAR1</b></p> <p><b>CL2</b></p>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				dated 21/09/2007, covering the period from 01/01/2008 to 30/04/2009 /9/. Project participants are requested to provide most recent and valid contracts of biomass supply.		
A.2.2.	Does the project activity involve alteration of existing installations? If yes, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/,/3/, /11/	DR/I	<p>As verified during the site visit at Alcoholes del Istmo S.A., a cogeneration plant, composed by two bunker oil boilers (one of which is backup boiler) and one turbo generator with 300 kW of installed capacity are currently being used. As per the PDD, the project activity consists on the implementation of new cogeneration power plant, which will use a new 12 bar biomass boiler and new 500 KW turbo generators. During the site visit it was verified that the new biomass boiler was already installed and, as informed by project participants the new boiler operates with old bunker oil in the beginning of this project activity. Thus, this is not a Greenfield project.</p> <p>During the site visit, project participants provided pictures of biomass boiler, dated from 09/01/2008 to 30/04/2008 (starting date of the operation of biomass boiler). Project participants are requested to provide evidences to confirm the date when the biomass boiler started its operation..</p>	<del>CL-3</del>	<b>OK</b>
A.2.3.	Does the project qualify as a small-scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/,/2/ /3/,/12/	DR/I	<p>As per published PDD, the total capacity of electricity generation is 500 kW and the boiler thermal capacity is 6.9 MW<sub>th</sub>. Consequently, The project qualifies as small scale project because.</p> <ul style="list-style-type: none"> <li>The installed capacity of this project activity is in line with Simplified modalities and procedures for SSC CDM</li> </ul>	<b>OK</b>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>project activities, presented on Annex II of “Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol” (decision 17/CP.7, paragraph 6 (c) (i)). /12/. This Annex defines, on its item “I. Further clarifications on definitions of eligible activities”, that for renewable energy projects activities under type (i) category, the maximum output capacity is equivalent to or up to 15 megawatts 15 MW :</p> <ul style="list-style-type: none"> <li>• The project activity is also in line with paragraph 4 (c) of “General Guidelines to SSC CDM Methodologies” /26/, which defines the output capacity of renewable energy equipment to biomass power plants as the maximal limit of 15 MW(e) that is equivalent to 45 MW thermal output of the equipment or the plant (e.g. boilers).</li> <li>• The limits of electricity output and of thermal output are also defined by paragraph 6 (a) of applied baseline methodology AMS-I.C “Thermal energy production with or without electricity”.</li> </ul>		
A.2.4.	Is the small-scale project activity a de-bundled component of a larger project activity?	/1/,/3/	DR/I	The project is not a de-bundled component of a large project activity. Confirmed in the UNFCCC web site, that there is no CDM project activity or an application to register with the same project participants, in the same project category and technology/measure in the last two years within 1 km of the project boundary of the proposed small-scale project activity.	<b>OK</b>	<b>OK</b>
<b>A.3. Project participants</b>						
A.3.1.	Have the Parties and project participants involved in	/1/,/3/,	DR	The project participants are the two following		<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	the project been listed in tabular form in Section A.3 and are they consistent with the information detailed in Annex 1 of the PDD?	/5/		private entities: <ul style="list-style-type: none"> <li>Alcoholes del Istmo S.A.;</li> <li>.</li> </ul> <p>Project participants are requested to clarify/revise the Postfix//ZIP information of project participant Alcoholes del Istmo S.A., mentioned in Annex 1 of published PDD.</p>	<del>CL-4</del>	
A.3.2.	Do all participating Parties fulfill the participation requirements as follows: (a) Party has ratified the Kyoto Protocol; (b) Party has a Designated National Authority; (c) The assigned amount has been determined.	/1/, /3/ /13/ /14/	DR	Panama (host country) has ratified the protocol on 05/03/1999 /14/. The Panama designated national authority for the CDM is the “Autoridad Nacional del Ambiente” /13/.	<b>OK</b>	<b>OK</b>
				Switzerland has ratified the protocol on 09/07/2003 /14/and the designated national authority for the CDM is the “Federal Office for the Environment FOEN, Climate Division” /13/.		
A.3.3.	Have the letters of approval been issued?	/1/, /3/ /15/	DR/I	Project participants provided a letter from Panama DNA, Autoridad Nacional del Ambiente, dated 12/05/2010 /15/, describing that the DNA knows about project activity since November 2006.		<b>OK</b>
				PP is requested to provide the LoAs from the DNA of Panama and Switzerland, including the confirmation that the Project assists the host country in achieving sustainable development.	<del>CAR-2</del>	
A.3.4.	Do the letter/s of approval (LoA/s) confirm the following requirements? (a) The Party has ratified the Kyoto Protocol; (b) The participation is voluntary; (c) In the case of the host Party, the project contributes to the sustainable development of the country;	/1/, /3/ /15/	DR/I	See section 8A.3.3	<del>CAR-2</del>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	<p>(d) It refers to the precise project activity title in the PDD;</p> <p>(e) Has been issued by the respective Party's designated national authority (DNA).</p> <p>Indicate whether the LoA/s were received from the project participants or directly from the DNA.</p> <p>In case of doubt regarding the authenticity of the LoA/s, describe how it was assessed the authenticity of the LoA/s.</p>					
A.3.5.	Have all private/public project participants been authorized by a Party to the Kyoto Protocol?	/1/, /3/ /15/	DR/I	See section A.3.3	<del>CAR 2</del>	OK
<b>A.4. Technical description of the project</b>						
A.4.1.	Is the project location clearly defined?	/1/, /3/	DR/I	<p>The project is located in Las Cabras, Chitré District, Panama, in the following geographical coordinates, that can be confirmed in the Google Earth: 7° 52' 20.20" N and 80° 32' 15.74" W.</p> <p>PP is requested to revise PDD section A.4.1.3 to include the precise name of the district where project activity is located, as verified/informed during the site visit.</p>	<del>CAR 3</del>	OK
A.4.2.	<p>Does the project design engineering reflect current good practices?</p> <p>Would the technology result in a significantly better performance than any commonly used technologies in the host Country? Is any transfer of technology from any Annex I Party involved?</p>	/1/, /3/ /9/	DR/I	<p>The project activity consists on the installation of new 12 bar biomass with a steam production capacity of 10 t/h and by a steam turbine &amp; generator (500 kW installed capacity). It was verified during the site visit that only the biomass boiler was already installed at the project site.</p> <p>The biomass boiler, as per purchase order /10/ was manufactured by Benecke Irmãos &amp; Cia. Ltda., a Brazilian company located at Santa Catarina State. The data of boiler's manufacturer is in line with its website <a href="http://www.benecke.com.br">www.benecke.com.br</a>.</p>	<del>CL 1</del>	OK



Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>As the nameplate of all boilers verified during the site visit were not accessible and could not be verified, project participants are requested to provide evidences to confirm the boiler's operational parameters. PPs have also to provide evidences regarding the acquisition of new turbo generator (500 KW) as well as its operational parameters.</p> <p>Project participants are requested to provide the operational parameters and its respective evidences of the following equipments:</p> <p>1 - For all boilers (1 biomass and 2 bunker boilers):</p> <ul style="list-style-type: none"> <li>- Pressure;</li> <li>- Temperature of steam produced;</li> <li>- Temperature of feed water;</li> <li>- Type and fuel consumption;</li> <li>- NCV of each fuel consumed by each boiler;</li> <li>- Boiler Efficiency;</li> <li>- Steam production.</li> </ul> <p>2 – For two steam turbines (1 with 300 kW, 1with 500 KW):</p> <ul style="list-style-type: none"> <li>- Inlet and outlet pressure;</li> <li>- Steam flow;</li> <li>- Efficiency.</li> </ul>	<del>CL-5</del>	
A.4.3.	If public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/,/3/ /16/ /17/	DR/I	<p>The project activity does not receive any public funding from Annex 1 Party.</p> <p>Confirmed in the letter from the Global Bank of Panama, dated 27/04/2011, which describes that the development of a CDM project activity, located at Alcoholes del Istmo S.A. distillery, is one of the conditions to the bank release the loan required to the project implementation /16/. This letter also</p>	<b>OK</b>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>mentions that this project was presented to Global Bank on February 2007.</p> <p>Another letter from Global Bank, related to the investment on a turbo generator with 500 kW of installed capacity, dated 27/04/2011, also mentioning the biomass boilers as a CDM project activity was presented by project participant /17/. This letter also mentions that the meeting related to acquisition of turbo-generator occurred in September 2009 and considers the CER's as condition to release the loan.</p>		
<b>B. Application of a baseline and monitoring methodology</b>						
<b>B.1. Methodology applied</b>						
B.1.1.	Does the project activity apply an approved methodology and the correct version?	/1/, /2//2/ /3/		<p>The project activity applies the baseline methodology AMS-I.C “Thermal energy production with or without electricity” version 18 of 01/10/2010 /2/ that was valid until 16/06/2011.</p> <p>Considering the grace period (17/02/2012) for the submission of project activities for registration, when using the version 18 of applied baseline methodology, it is recommended to revise the PDD and its annexes according to AMS-I.C version 19. Also update the versions of all tools applicable to this project activity, as per its latest available versions.</p>	<del>CL-6</del>	<b>OK</b>
<b>B.2. Applicability criteria of the methodology/tools</b>						
B.2.1.	How was it validated that the project activity complies with the applicability criteria?	/1/, /2/ /3/		<p>The project activity is in line with the following paragraphs described by applied baseline methodology /2/:</p> <p><i>Paragraph 1 – “This category comprises renewable energy technologies that supply users1 with thermal energy that displaces</i></p>		<b>OK</b>

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p><i>fossil fuel use”</i></p> <p>As verified during the site visit the project activity consists on the replacement of the current fossil fuel cogeneration plant by a biomass cogeneration plant</p> <p>Paragraph 2 – <i>“Biomass-based cogeneration systems consisting of steam generator(s) and steam turbine(s) are included in this category”</i></p> <p>It was verified during the site visit that the project activity consists in a biomass cogeneration plant.</p> <p>Paragraph 3 – <i>“Emission reductions from a biomass cogeneration system can accrue from one of the following activities:</i>  <i>(a) Electricity supply to a grid;</i>  <i>(b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities;</i>  <i>(c) Combination of (a) and (b)”</i></p> <p>The emissions reductions are claimed by project participants are based on item (c)</p> <p>Paragraph 5 – <i>“The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal”</i></p> <p>In case of this project activity, the section B.2 of published PDD describes that the bunker oil will be co-fired in biomass boiler during the first two years of this project activity.</p> <p>Paragraph 6 – <i>“The following capacity limits</i></p>		

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p><i>apply for biomass cogeneration units:</i></p> <p><i>(a) If the project activity includes emission reductions from the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable project activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant)"</i></p> <p>As per published PDD, the boiler thermal capacity is 6.9 MW and the electricity installed capacity is 500 kW.</p> <p>Project participants are requested to provide the operational parameters and its respective evidences of the following equipments:</p> <p>1 - For all boilers (1 biomass and 2 bunker boilers):</p> <ul style="list-style-type: none"> <li>- Pressure;</li> <li>- Temperature of steam produced;</li> <li>- Temperature of feed water;</li> <li>- Type and fuel consumption;</li> <li>- NCV of each fuel consumed by each boiler;</li> <li>- Boiler Efficiency;</li> <li>- Steam production.</li> </ul> <p>2 – For two steam turbines (1 with 300 kW, 1with 500 KW):</p> <ul style="list-style-type: none"> <li>- Inlet and outlet pressure;</li> <li>- Steam flow;</li> <li>- Efficiency.</li> </ul>	<del>CL5</del>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				Project participants are requested to revise the applicability conditions Ref 8* and Ref 11* presented on section B.2 of PDD version, which are applicable to the project activity. Moreover, also include in this section of PDD a detailed explanation about the applicability conditions Ref 9* and Ref 10*	<b>CAR 24</b>	
B.2.2.	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/, /2/ /3/	DR/I	The project activity is in line with applicability criteria of applied baseline methodology, nevertheless the operational parameters of equipments applied by the project activity must be confirmed ( <b>CL 5</b> ).	<b>CL 5</b>	<b>OK</b>
<b>B.3. Project boundary</b>						
B.3.1.	Is the project boundary clearly defined and in accordance with the applied methodology?	/1/, /2/ /3/	DR/I	The project Boundary described in published PDD is in line with applied baseline methodology. It includes the physical, geographical site of the project and the industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment that is affected by the project activity.	<b>OK</b>	<b>OK</b>
B.3.2.	What are the project's system boundaries (components and facilities used to mitigate GHGs)?	/1/, /2/ /3/	DR/I	<p>In case of this project activity, the boundary encompasses:</p> <ul style="list-style-type: none"> <li>• Biomass storage,</li> <li>• Biomass cogeneration plant,</li> <li>• Steam and electricity consumed by distillery consumption,</li> <li>• Electricity exported to the grid.</li> </ul> <p>Considering that the project activity will export electricity to the grid, project participants are requested to revise the</p>	<b>CAR 22</b>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				section B.6.3 of PDD version 1, including the power plants that the project activity is connected to.		
B.3.3.	Which sources are identified for the project? Does the identified project boundary cover all possible sources linked to the project activity?	/1/, /2/ /3/	DR/I	As per published PDD, the GHG sources identified to this project activity are the following: CO <sub>2</sub> – Electricity is generated from a cogeneration plant based on bunker C. CO <sub>2</sub> – Thermal energy is generated based on bunker C; CO <sub>2</sub> - Part of electricity is consumed from the grid in the baseline scenario. The boundary identified to project activity is in line with applied baseline methodology.	OK	OK
B.3.4.	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute by more than 1% to the estimated emission reductions of the project?	/1/, /2/ /3/	DR/I	It was not identified other emissions not foreseen by the methodology.	OK	OK
<b>B.4. Baseline scenario identification</b>						
B.4.1.	Which baseline scenarios have been identified? Is the list of the baseline scenarios complete?	/1/, /2/ /3/	DR/I	As described on section B.4 of Published PDD, the baseline scenarios considered the following alternatives, as per paragraph 15 of applied baseline methodology:  <i>Alternative A: Electricity is imported from the grid and steam/heat is produced using fossil fuel – this is not an eligible baseline scenario</i>  The item “Identification of the most plausible and realistic scenario” in section B.4 of published PDD describes that “...electricity supply from the grid is more costly as compared to electricity generation through fossil fuel cogeneration plant...” Project	<del>CAR4</del>	OK



Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>participants are requested to revise the section B.4 of published PDD and further assess the propriety of this statement as a possible alternative scenario. Evidences related to costs of energy imported from the grid and energy produced from fossil fuel cogeneration plant shall also be provided.</p> <p><i>Regarding the Alternative B: Electricity is produced in an onsite captive and steam/heat is produced using fossil fuel – this is not an eligible baseline scenario.</i></p> <p>As per published PDD, this would not be an alternative scenario, once the cost of electricity generation from captive power plants through diesel generation is higher than the costs of electricity produced from cogeneration units. Project participants are requested to provide evidences referent to such generation costs.</p> <p><i>Alternative C: A combination of (a) and (b) - this is not a plausible baseline scenario, once alternatives (A) and (B) are not applicable to the project activity</i></p> <p><i>Alternative D: Electricity and steam/heat are produced in a cogeneration unit, using fossil fuel (with a possibility of export of electricity to the grid/other facilities and/or thermal energy to other facilities) – as verified during the site visit, in the current baseline consists in a cogeneration power plant, based on fossil fuel, which generates part of electricity consumed by distillery. This scenario is a plausible Baseline scenario</i></p>	<del>CL7</del>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p><i>Alternative E: Electricity is imported from the grid and/or produced in an on-site captive power plant using fossil fuels (with a possibility of export to the grid) steam/heat is produced from biomass – as per published PDD, the biomass boilers faces investment barriers.</i></p> <p><i>Alternative F: Electricity is produced in an on-site captive power plant using biomass (with a possibility of export to the grid) and/or imported from the grid; steam/heat is produced using fossil fuel – as verified during the site visit the energy generation from biomass implies in a cogeneration plant, thus is not possible to consider thermal and electric energy separately. This is not a plausible scenario.</i></p> <p><i>Alternative G: Electricity and thermal energy (steam/heat) are produced in a biomass fired cogeneration unit (without a possibility of export of electricity either to the grid or to other facilities and without a possibility of export of thermal energy to other facilities) - as per published PDD, the biomass boilers faces investment barriers.</i></p> <p><i>Alternative H: Electricity and/or thermal energy produced in a co-fired system - as per published PDD, the biomass boilers faces investment barriers.</i></p>		
B.4.2.	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/, /2/ /3/	DR/I	See section B.4.1	<del>CAR4</del> <del>CL7</del>	OK
B.4.3.	What is the baseline scenario? Is the determination of the baseline scenario in	/1/, /2/ /3/	DR/I	See section B.4.1	<del>CAR4</del> <del>CL7</del>	OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	accordance with the guidance in the methodology?					
B.4.4.	Has the baseline scenario been determined using conservative assumptions? Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/, /2/ /3/	DR/I	See section B.4.1	<del>CAR-4</del> <del>CL-7</del>	OK
<b>B.5. Additionality determination</b>						
B.5.1.	What tool does the project use to assess additionality? Is this in line with the methodology?	/1/, /3/ /18/	DR/I	Project participants applied the “Attachment A of Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities”, Version 08, dated 29 September 2011” /18/ to assess the additionality.	OK	OK
B.5.2.	What is the project additionality mainly based on?	/1/, /3/ /18/	DR	Project participants described the following barriers: <ul style="list-style-type: none"> <li>• Access to finance barrier;</li> <li>• Prevailing practice barrier</li> </ul>	OK	OK
<b>B.5.3. Prior consideration of CDM</b>						
B.5.3.1.	What is the starting date of the proposed project activity?	/1/, /3/ /10/	DR/I	The project’s starting date was defined as 31/03/2007 in the published PDD. This date is in line with biomass boiler purchase order /10/.	OK	OK
B.5.3.2.	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/, /3/ /6/ /15/ /16/ /19/	DR/I	Project participants provided the following evidences regarding the CDM prior consideration: <ul style="list-style-type: none"> <li>• E-mail from Mr. Rafael Gonzalez, dated 18/09/2006, describing that a new biomass boiler and new turbo generator will be acquired and that revenues from CER are necessary to support this investment /19/ .</li> <li>• Letter dated 12/05/2010, describing that Panama’s DNA knows the project activity since to be developed by Alcoholes del Istmo S.A. since November 2006 /15/</li> <li>• Letter from the Global Bank of Panama, dated 27/04/2011, which describes that</li> </ul>		OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>the development of a CDM project activity, located at Alcoholes del Istmo S.A. distillery, is one of the conditions to the bank release the loan required to the project implementation /16/This letter also mentions that this project was presented to Global Bank on February 2007</p> <ul style="list-style-type: none"> <li>Letter from Global Bank, related to the investment on a turbo generator with 500 kW of installed capacity, dated 27/04/2011, also mentioning the biomass boilers as a CDM project activity was presented by project participant /17/. This letter also mentions that the meeting related to acquisition of turbo-generator occurred in September 2009.</li> </ul> <p>Project participants are requested to provide the minutes of meeting or other evidence to cross check the description of the e-mail dated 18/09/2006, as per “Guidelines on the demonstration and assessment of prior consideration of the CDM” /6/.</p>	<b>CAR-5</b>	
B.5.3.3.	What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/, /2/ /3/	DR/I	<p>Project participants are requested to provide all the evidences described on table 8 “Timeline of events and actions which have been taken to achieve CDM registration” of section B.5 of published PDD.</p> <p>During the site visit, project participants provided pictures of biomass boiler, dated from 09/01/2008 to 30/04/2008 (starting date of the operation of biomass boiler). Project participants are requested to provide evidences to confirm the date when the biomass boiler started its operation.</p>	<b>CAR-6</b>	<b>OK</b>
B.5.3.4.	Does the timeline of the project confirm that	/1/, /2/	DR/I	See section B.5.3.3	<b>CAR-6</b>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	continuous actions in parallel with the implementation were taken to secure CDM status?	/3/				
<b>B.5.4. Investment analysis</b>						
B.5.4.1.	What is the analysis method used to determine whether the proposed project activity is not (a) the most economically or financially attractive; or (b) economically or financially feasible, without the revenue from the sale of certified emission reductions?	/1/	DR	Not applicable , the project activity is applying the barrier analysis	<b>OK</b>	<b>OK</b>
B.5.4.2.	What financial indicator is used?	/1/	DR	Not applicable , the project activity is applying the barrier analysis	<b>OK</b>	<b>OK</b>
B.5.4.3.	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the Host Country?	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>
B.5.4.4.	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is the working capital returned in the last year of the operation?	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>
B.5.4.5.	Cross-check of main parameters used in the financial analysis: electricity generation, electricity tariff, investment costs, operating and maintenance costs, taxes, other costs. The main parameters can be changed for the different project categories.	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>
B.5.4.6.	Sensitivity analysis: have the key parameters contributing more than 20% of the revenue/costs during operating or implementation been identified?	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>
B.5.4.7.	Sensitivity analysis: the range of variations is reasonable in the project activity? The main parameters can be changed for the different project categories.	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>
B.5.4.8.	Have the key parameters been varied to reach the benchmark and the likelihood of this happening been	/1/	DR	Not applicable , the project activity is applying the barrier analysis.	<b>OK</b>	<b>OK</b>

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	justified?					
<b>B.5.5.</b>	<b>Barrier analysis</b>					
B.5.5.1.	Are the barriers identified complimentary to a potential investment analysis?	/1/, /3/ /16/ /17/ /20/ /21/ /22/	DR/I	<p>Project participants described the following barriers:</p> <ul style="list-style-type: none"> <li>• Access to finance barrier;</li> <li>• Prevailing practice barrier.</li> </ul> <p>Regarding the Access to finance barrier, project participants provided the following letters from Global Bank of Panama:</p> <ul style="list-style-type: none"> <li>• Letter from the Global Bank of Panama, dated 27/04/2011, which describes that the development of a CDM project activity, located at Alcoholes del Istmo S.A. distillery, is one of the conditions to the bank release the loan required to the project implementation /16/ This letter also mentions that this project was presented to Global Bank on February 2007;</li> <li>• Letter from Global Bank, related to the investment on a turbo generator with 500 kW of installed capacity, dated 27/04/2011, also mentioning the biomass boilers as a CDM project activity was presented by project participant /17/. This letter also mentions that the meeting related to acquisition of turbo-generator occurred in September 2009.</li> <li>• Letter from Global Bank of Panama, dated 27/04/2011, stating that the project of steam and electricity generation from biomass was already approved October 2007, considering the development of the project as CDM project activity /20/.</li> </ul>		<b>OK</b>



Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>Regarding the Prevailing Practice barrier, project participants provided on Section B.5 of published PDD (footnote 13) the website <a href="http://www.bvsde.paho.org/bvsacd/IRET2005/SandraPeraza.pdf">http://www.bvsde.paho.org/bvsacd/IRET2005/SandraPeraza.pdf</a> , which access the Study “Diagnosis of particulate matter generated by the Sugar Mills in El Salvador”.</p> <p>The page four of study “Diagnosis of particulate matter generated by the Sugar Mills in El Salvador” /21/ describes a large use of sugar cane bagasse as fuel. Project participants are requested to clarify how this study is applicable to this project activity..</p> <p>Project participants are requested to provide evidences related to the prevailing practices described on section B.5 of published PDD.</p> <p>Based on document “Notice of Operation” issued by Panama Republic - Ministry of Trade and Industry /22/, the agricultural activities are not performed by Alcoholes del Istmo. Project participants are requested to clarify how the project activity modified the sugar cane harvesting. Also clarify the relation between project activity and agricultural activity.</p>	<p><del>CL-8</del></p> <p><del>CAR-7</del></p> <p><del>CL-9</del></p>	
B.5.5.2. How were the investment barriers assessed to be real? How does CDM alleviate the investment barriers?	/1/, /3/ /16/ /17/ /20/	DR/I	<p>The investment barriers are demonstrated by project participant's trough the three letters from Global Bank, all of them dated 27/04/2011. Based on these letters is possible to define the following events:</p> <ul style="list-style-type: none"> <li>• The project activity was presented to Global bank on February 2007 /16/;</li> <li>• The project was approved on October</li> </ul>		OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>2007 /20/;</p> <ul style="list-style-type: none"> <li>The meeting related to the acquisition of turbo generator with 500 kW of installed capacity occurred in September 2009 /17/.</li> </ul> <p>Considering that letter from Global Bank clearly describes the installed capacity of new turbo generator, project participants are requested to provide the study where the technical parameters of turbo generator were defined.</p>	<del>CAR-8</del>	
B.5.5.3.	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/, /2/ /3/	DR/I	The baseline scenario, which considers the operation of current cogeneration power plant, based on fossil fuel, is feasible under the same circumstances.	OK	OK
B.5.5.4.	How were the technological barriers assessed to be real? How does CDM alleviate the technological barriers?	/1/	DR/I	As per published PDD, the project activity does not face technological barrier	OK	OK
B.5.5.5.	Is the project activity prevented by the technological barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/, /2/ /3/	DR/I	As per published PDD, the project activity does not face technological barrier	OK	OK
B.5.5.6.	How were the barriers due to prevailing practice assessed to be real? How does CDM alleviate the barriers due to prevailing practice?	/1/ /3/ /16/ /17/ /20/ /21/ /22/	DR/I	See section B.5.5.1	<del>CAR-7</del> <del>CL-8</del>	OK
B.5.5.7.	Is the project activity prevented by the barriers due to prevailing practice and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR/I	The baseline scenario, which considers the operation of current cogeneration power plant, based on fossil fuel, is feasible under the same circumstances.	OK	OK
B.5.5.8.	How were the other barriers assessed to be real? How does CDM alleviate the other barriers?	/1/	DR	<p>As per published PDD, project activity faces only two barriers:</p> <ul style="list-style-type: none"> <li>Access to finance barrier;</li> </ul>	OK	OK

[illegible]

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>emissions for supply of electricity to and/or displacement electricity from a grid shall be calculated as per the procedures detailed in AMS-I.D". The latest available version of baseline methodology AMS-I.D states on its paragraph 6 that "Combined heat and power (co-generation) systems are not eligible under this category". Project participants are requested to revise the baseline emissions calculations, excluding the amount of emissions reductions calculated from baseline methodology AMS-I.D.</p> <p>The paragraph 23 of applied baseline methodology is in line with baseline scenario defined to this project activity. The equation presented on section B.6.1 of published PDD was correctly applied to project activity</p> $BE_{cogen\ CO\ y} = [(EG_{PJ\ thermal\ y} + EG_{PJ\ electrical\ y} * 3.6) / \eta_{BL\ cogen}] * EF_{FF\ CO\ 2}, \text{ where:}$ <p><math>BE_{cogen\ CO\ y}</math> - Baseline emissions from electricity and thermal energy displaced by the project activity during the year y (tCO<sub>2</sub>).</p> <p><math>EG_{PJ\ electrical\ y}</math> - The amount of electricity supplied by the project activity during the year y; (GWh).</p> <p>Project participants are requested to explain the factor of 80%, applied in the calculation of the energy generated by project activity on Worksheet "main parameters" (row 28) of spreadsheet with emissions reduction calculations "AISA - Biomass_energy_plant_Panama.xlsx".</p>	<del>CL-10</del>	

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>The amount of energy employed on emission reduction calculation, indicate on worksheet “Emissions reduction calc” (cells K32:K41) corresponds to the energy consumed on site, which is not in line with baseline methodology. Project participants are requested to revise the emission reduction calculation.</p> <p><math>EG_{PJ\ thermal\ y}</math> - The net quantity of thermal energy supplied by the project activity during the year y (TJ).</p> <p>Project participants are requested to provide the operational parameters and its respective evidences of the following equipments:</p> <p>1 - For all boilers (1 biomass and 2 bunker boilers):</p> <ul style="list-style-type: none"> <li>- Pressure;</li> <li>- Temperature of steam produced;</li> <li>- Temperature of feed water;</li> <li>- Type and fuel consumption;</li> <li>- NCV of each fuel consumed by each boiler;</li> <li>- Boiler Efficiency;</li> <li>- Steam production.</li> </ul> <p>2 – For two steam turbines (1 with 300 kW, 1with 500 KW):</p> <ul style="list-style-type: none"> <li>- Inlet and outlet pressure;</li> <li>- Steam flow;</li> <li>- Efficiency.</li> </ul> <p><math>\eta_{BL\ cogen}</math> - The total annual average efficiency of the cogeneration plant using fossil fuel. In case of this project activity, the average</p>	<p><del>CAR-10</del></p> <p><del>CL-5</del></p>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>efficiency was calculated considering the last three years of historical data, as per baseline methodology.</p> <p>Project participants are requested to provide evidences of the consumption of bunker oil indicated in worksheet “Baseline Efficiency” of emission reduction spreadsheet / “AISA - Biomass_energy_ plant_Panama.xlsx”, applied on efficiency calculation. PPs are also requested to clarify if the bunker boilers will be kept as back up boilers and, if so, how the emissions associated to its operation will be monitored/measured.</p> <p><math>EF_{FFCO\ 2}</math> - The CO<sub>2</sub> emission factor of the fossil fuel that would have been used in the baseline cogeneration plant – project participants applied the emission factor defined by IPCC.</p> <p>The value of emission factor of fossil fuel of 77.4 tCO<sub>2</sub>/TJ, presented on section B.6.2 of PDD version 1, differs from value of 77.3 tCO<sub>2</sub>/TJ presented o section B.6.3. and applied on CER calculation. Project participants are requested to address this inconsistency.</p>	<p><del>CL-11</del></p> <p><del>CAR-23</del></p>	
B.6.1.2.	Have conservative assumptions been used when calculating the baseline emissions and are the uncertainty estimates properly addressed?	/1/, /2/ /3/ /23/	DR	See section B.6.1.1	<p><del>CAR-9</del></p> <p><del>CAR-10</del></p> <p><del>CL-5</del></p> <p><del>CL-10</del></p> <p><del>CL-11</del></p>	OK
<b>B.6.2.</b>	<b>Project emissions</b>					



Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
B.6.2.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/, /2/ /3/ /24/		<p>As per applied baseline methodology, the project emissions include:</p> <ul style="list-style-type: none"> <li><i>CO<sub>2</sub> emissions from electricity consumption by the project activity using the latest version of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.</i></li> </ul> <p>As the project activity consists on thermal and electric energy generation from biomass and considering that the generated electricity will supply the distillery demand and the surplus will be exported to the grid, this project emission source is not applicable.</p> <ul style="list-style-type: none"> <li><i>CO<sub>2</sub> emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”.</i></li> </ul> <p>As mentioned in published PDD, during the first two years there will be bunker consumption by the project activity, thus this source of project emissions is applicable. It calculated as per “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” /24/, as follows:</p> <p>PE<sub>FC,j,y</sub> = <math>\sum F_{i,j,y} \times COEF_{i,y}</math> where:  PE<sub>FC,j,y</sub> - Are the CO<sub>2</sub> emissions from fossil fuel combustion in process j during the year y (tCO<sub>2</sub>/yr);  F<sub>i,j,y</sub> - Is the quantity of fuel type i combusted in process j during the year y (mass or</p>		OK

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>volume unit/yr);</p> <p>Project participants are requested to explain the calculation of Bunker C consumption with biomass (gal), presented on worksheet “Main parameters” (cells E17 and F17) of spreadsheet “AISA - Biomass_energy_plant_Panama.xlsx”, used in the calculation of project emissions.</p> <p>COEF<sub>i,y</sub> - Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit).</p> <p>The calculation of COEF<sub>i,y</sub> is in line with option B of applied emissions is applicable. It calculated as per “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”, as follows:  COEF<sub>i,y</sub> - Is the CO<sub>2</sub> emission coefficient of fuel type i in year y (tCO<sub>2</sub>/mass or volume unit);  NCV<sub>i,y</sub> - Is the weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit).</p> <p>The website provided by project participants related to NCV<sub>bunker</sub> value is not available. Project participants are requested to provide evidences of the applied NCV value.</p> <p>EF<sub>CO2,i,y</sub> - Is the weighted average CO<sub>2</sub> emission factor of fuel type i in year y (tCO<sub>2</sub>/GJ) – based on values provided by IPCC;  i - Are the fuel types combusted in process j during the year y.</p>	<p><b>CL-12</b></p> <p><b>CL-13</b></p>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				The value of emission factor of fossil fuel of 77.4 tCO <sub>2</sub> /TJ, presented on section B.6.2 of PDD version 1, differs from value of 77.3 tCO <sub>2</sub> /TJ presented o section B.6.3. and applied on CER calculation. Project participants are requested to address this inconsistency.	<del>CAR-23</del>	
B.6.2.2.	Have conservative assumptions been used when calculating the project emissions and are the uncertainty estimates properly addressed?	/1/, /2/ /3/ /24/	DR	See section B.6.2.1	<del>CL-12</del> <del>CL-13</del>	OK
<b>B.6.3. Leakage</b>						
B.6.3.1.	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/, /2/ /3/ /10/ /17/	DR	<p>As per applied baseline methodology, the leakage occurs in the following conditions:</p> <p>1 - If the energy generating equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered – this is not applicable to the project activity, once it applies new equipments:</p> <ul style="list-style-type: none"> <li>• A new biomass boiler was acquired, as per Boiler Purchase Order”, dated 31/03/2007 /10/;</li> <li>• New turbo generator, as per Letter stating the investment on a turbo generator with 500 kW of installed capacity,” dated 27/04/2011 /17/.</li> </ul> <p>2 – Leakage associated to biomass transportation – as per applied baseline methodology “If biomass residues are transported over a distance of more than 200 kilometers due to the implementation of the project activity then this leakage source attributed to transportation shall be</p>		OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				considered, otherwise it can be neglected”.  Project participants are requested to provide evidences demonstrating the distance between the biomass residues and the project site.	<b>CL-14</b>	
B.6.3.2.	Have conservative assumptions been used when calculating the leakage and are the uncertainty estimates properly addressed?	/1/, /2/ /3/ /10/ /17/	DR	See section B.6.3.2	<b>CL-14</b>	<b>OK</b>
<b>B.6.4.</b>	<b>Emission reductions</b>					
B.6.4.1.	Has the methodology been correctly applied to calculate the emission reductions and can this be replicated by the data provided in the PDD and supporting files to be submitted for registration?	/1/, /2/ /3/	DR	The equation of emission reduction calculation is line with baseline methodology AMS-I.C, as following; ERy = BEy – PEy – LEy , where: ERy Emission reductions in year y (tCO <sub>2</sub> e); BEy Baseline emissions in year y (tCO <sub>2</sub> e); PEy Project emissions in year y (tCO <sub>2</sub> ); ;LEy Leakage emissions in year y (tCO <sub>2</sub> ).	<b>OK</b>	<b>OK</b>
<b>B.6.5.</b>	<b>Data and parameters that are available at validation and that are not monitored</b>					
B.6.5.1.	How were the parameters available at validation verified?	/1/, /2/		Project participants presented the following parameters available at validation: <ul style="list-style-type: none"> <li>• Q<sub>steam, boiler 1</sub> - Quantity of steam generated by bunker C based boiler 1;</li> <li>• P<sub>steam, boiler 1</sub> - Pressure generated by boiler 1;</li> <li>• T<sub>boiler 1</sub> - Steam temperature generated by boiler 1.</li> </ul> As the nameplate of all boilers verified during the site visit were not accessible and could not be verified, project participants are requested to provide evidences to confirm the boiler's operational parameters. PPs have also to provide evidences regarding the acquisition of new turbo generator (500 KW)	<b>CL-1</b>	<b>OK</b>

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>as well as its operational parameters.</p> <ul style="list-style-type: none"> <li>• <math>\eta_{\text{baseline coge}}</math> - Efficiency of the stand alone boiler using fossil fuel that would have been used in the absence of the project activity;</li> </ul> <p>Project participants are requested to provide evidences of the consumption of bunker oil indicated in worksheet “Baseline Efficiency” of emission reduction spreadsheet / “AISA - Biomass_energy_ plant_Panama.xlsx”, applied on efficiency calculation. PPs are also requested to clarify if the bunker boilers will be kept as back up boilers and, if so, how the emissions associated to its operation will be monitored/measured.</p> <ul style="list-style-type: none"> <li>• <math>\text{NCV}_{\text{Bunker}}</math> - Net calorific value of bunker C;</li> </ul> <p>The website provided by project participants related to <math>\text{NCV}_{\text{bunker}}</math> value is not available. Project participants are requested to provide evidences of the applied NCV value.</p> <ul style="list-style-type: none"> <li>• <math>\text{EF}_{\text{CO}_2}</math> - <math>\text{CO}_2</math> emission factor per unit of energy of the bunker that would have been used in the baseline plant and in the project emissions calculation – according to IPCC data;</li> </ul> <p>The value of emission factor of fossil fuel of <math>77.4 \text{ tCO}_2/\text{TJ}</math>, presented on section B.6.2 of PDD version 1, differs from value of <math>77.3 \text{ tCO}_2/\text{TJ}</math> presented o section B.6.3. and applied on CER calculation. Project participants are requested to address this</p>	<p><del>CL-11</del></p> <p><del>CL-13</del></p> <p><del>CAR-23</del></p>	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				<p>inconsistency.</p> <ul style="list-style-type: none"> <li>• <math>EF_{GRID}</math> - Electricity emission factor for displaced electricity generation;</li> </ul> <p>Regarding the <math>EF_{GRID}</math> (Electricity emission factor for displaced electricity generation) once the cogeneration plant is not eligible under methodology AMS-I.D, project participants are requested to remove this parameter of the PDD.</p>	<del>CAR-11</del>	
<b>B.7. Monitoring plan</b>						
<b>B.7.1. Data and parameters monitored</b>						
B.7.1.1.	Does the monitoring plan described in the PDD comply with the requirements of the methodology?	/1/, /2/ /3/	DR	The monitoring plan is in line with applied baseline methodology AMS-I.C “Thermal energy production with or without electricity”, version 18 of 01/10/2010.	<b>OK</b>	<b>OK</b>
B.7.1.2.	Does the monitoring plan contain all necessary parameters and are they clearly described?	/1/, /2/ /3/ /24/		<p>The following parameters will be monitored:</p> <p><math>Q_{steam,p,y}</math> - Quantity of steam supplied by the project activity during the year y;</p> <ul style="list-style-type: none"> <li>• Monitoring frequency: Continuous monitoring, integrated hourly and at least monthly recording</li> <li>• Monitoring procedure: flow meter</li> <li>• Calibration frequency: defined by manufacturer specification</li> </ul> <p><math>P_{steam,cogen}</math> - Pressure of steam extracted from turbine:</p> <ul style="list-style-type: none"> <li>• Monitoring frequency: continuously, recorded at least on a monthly basis</li> <li>• Monitoring procedure: pressure gauge</li> <li>• Calibration frequency: annually</li> </ul>		<b>OK</b>

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>Project participants are requested to clarify the monitoring procedure applied to parameter <math>P_{\text{steam, cogen}}</math> (Pressure of steam extracted from turbine).</p> <p><math>T_{\text{steam, cogen}}</math> - Temperature of steam extracted from turbine</p> <ul style="list-style-type: none"> <li>Monitoring frequency: continuously, recorded at least on a monthly basis</li> <li>Monitoring procedure: pressure gauge</li> <li>Calibration frequency: annually</li> </ul> <p>Project participants are requested to clarify the monitoring procedure applied to parameter <math>T_{\text{steam, cogen}}</math>, (Temperature of steam extracted from turbine).</p> <p><math>EG_{\text{thermal,y}}</math> - Net quantity of thermal energy supplied by the project activity during the year</p> <ul style="list-style-type: none"> <li>Monitoring frequency: This calculation will be made at least once a year.</li> <li>Monitoring procedure: according to the following steps: <ol style="list-style-type: none"> <li><i>The feed water temperature will be used to determine the feed water enthalpy using standard steam table;</i></li> <li><i>The steam pressure and the steam temperature will be used to determine the steam enthalpy using standard steam table;</i></li> <li><i>The amount of feed water will be multiplied by the feed water enthalpy to calculate the amount of energy containing in the feed water.</i></li> <li><i>The amount of steam produced will be multiplied by the steam enthalpy to</i></li> </ol> </li> </ul>	<p><del>CL-15</del></p> <p><del>CL-16</del></p>	



Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p><i>calculate</i></p> <p>5. <i>The amount of steam energy produced.</i></p> <p>6. <i>Net quantity of steam supplied by the project activity = the amount of steam energy produced minus the amount of energy containing in the feed water</i></p> <ul style="list-style-type: none"> <li>Calibration frequency:</li> </ul> <p>As per applied baseline methodology, the monitoring/ recording frequency of parameter <math>EG_{thermal,y}</math> is continuous and aggregated annually, project participants are requested to revise this parameter on section B.7.1 of published PDD.</p> <p>The parameters <math>EG_{pj,auxiliary\ consumption,y}</math> (Power consumption of cogeneration system) and <math>EG_{pj,gross\ generation,y}</math> (Gross energy generated by the biomass cogeneration plant) are not required by the applied baseline methodology. Project participants are requested to remove them from section B.7.1 of published PDD.</p> <p><math>EG_{pj,netgeneration,y}</math> - Net electricity generated by the biomass cogeneration plant</p> <ul style="list-style-type: none"> <li>Monitoring frequency: Continuously, aggregated at least annually;</li> <li>Monitoring procedure: The power consumption of the cogeneration system will be subtracted to the gross power generation to calculate the Net Power Generation;</li> <li>Calibration frequency: N/A.</li> </ul> <p>The monitoring recording /frequency and</p>	<p><b>CAR-12</b></p> <p><b>CAR-13</b></p>	

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<p>measurements methods and procedures applied to parameter <math>EG_{pj,net\ generation,y}</math> (Net electricity generated by the biomass cogeneration plant) are not in line with AMS-I.C, project participants are requested to revise the PDD.</p> <p><math>EG_{pj,grid}</math> (Quantity of net electricity supplied to the grid.)</p> <ul style="list-style-type: none"> <li>Monitoring frequency: Continuous monitoring, integrated hourly and at least monthly recording</li> <li>Monitoring procedure: power meter</li> <li>Calibration frequency: according to manufacturer specification</li> </ul> <p><math>B_{wood\ waste}</math> - Annual wood waste consumption:</p> <ul style="list-style-type: none"> <li>Monitoring frequency: consolidated annually</li> <li>Monitoring procedure: estimate using annual mass/ energy balance</li> <li>Calibration frequency: N/A</li> </ul> <p><math>B_{bagasse}</math> - Annual bagasse consumption</p> <ul style="list-style-type: none"> <li>Monitoring frequency: consolidated annually</li> <li>Monitoring procedure: estimate using annual mass/ energy balance</li> <li>Calibration frequency: N/A</li> </ul> <p><math>B_{leafs\ and\ stems}</math> - Annual leafs and stems consumption</p> <ul style="list-style-type: none"> <li>Monitoring frequency: consolidated annually</li> <li>Monitoring procedure: estimate using annual mass/ energy balance</li> </ul>	<b>CAR 14</b>	

Checklist Question	Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
			<ul style="list-style-type: none"> <li>Calibration frequency: N/A</li> </ul> <p>Project participants are requested to explain in section B.7.2 the procedures to calculate the energy balance, considering that three different types of biomass are burnt in one boiler.</p> <p><math>M_{\text{leafs and stems}}</math> - Moisture content of leafs and stems</p> <ul style="list-style-type: none"> <li>Monitoring frequency: monitored at least on a monthly basis</li> <li>Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory</li> <li>Calibration frequency: according to manufacturer specification</li> </ul> <p><math>M_{\text{bagasse}}</math> - Moisture content of bagasse.</p> <ul style="list-style-type: none"> <li>Monitoring frequency: monitored at least on a monthly basis</li> <li>Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory</li> <li>Calibration frequency: according to manufacturer specification</li> </ul> <p><math>M_{\text{wood waste}}</math> - Moisture content of wood waste</p> <ul style="list-style-type: none"> <li>Monitoring frequency: monitored at least on a monthly basis</li> <li>Monitoring procedure: At least 3 samples taken for measurement and tested at the laboratory</li> <li>Calibration frequency: according to manufacturer specification</li> </ul>	<b>CAR-15</b>	

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Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	appropriate?					
B.7.1.4.	Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1/	DR	see section B.7.1.2	<del>CAR 12</del> <del>CAR 14</del> <del>CL 15</del> <del>REF</del> <del>Ref30125204</del>	OK
B.7.1.5.	Is the recording frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1/	DR	see section B.7.1.2	<del>CAR 12</del> <del>CAR 14</del> <del>CAR 16</del>	OK
<b>B.7.2.</b>	<b>Monitoring of sustainable development indicators/ environmental impacts</b>					
B.7.2.1.	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	The simplified monitoring methodology AMS-IC and the Panama DNA do not require the monitoring of social and environmental indicators.	OK	OK
B.7.2.2.	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	See B.7.2.1	OK	OK
B.7.2.3.	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	See B.7.2.1	OK	OK
<b>B.7.3.</b>	<b>Management, quality assurance and quality control</b>					
B.7.3.1.	How it has been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/, /2/ /3/	DR/I	Project participants are requested to include in the section B.7.2 of the PDD a better description of the procedures for registration, monitoring, measurement, the monitoring frequency of all monitored parameters and reporting of CERs, also indicating the responsible for each activity.	<del>CAR 18</del>	OK
B.7.3.2.	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/, /2/ /3/	DR/I	See section B.7.3.1	<del>CAR 18</del>	OK
B.7.3.3.	Are the data management and quality assurance and quality control procedures sufficient to ensure that	/1/, /2/ /3/	DR/I	See section B.7.3.1	<del>CAR 18</del>	OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	the emission reductions achieved by/resulting from the project can be reported <i>ex post</i> and verified?					
B.7.3.4.	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later?	/1/, /2/ /3/	DR/I	Regarding the data archiving, the monitoring plan does not comply with the “Guidelines for completing the simplified project design document (CDM-SSC-PDD)” (data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later).	<del>CAR-19</del>	OK
<b>C. Duration of the project activity and crediting period</b>						
<b>C.1. Start date of project activity</b>						
C.1.1.	What is the expected project's starting date of the project activity and how it has been determined? When was the first construction activity?	/1/, /2/ /3/ /10/	DR	The project starting date is 31/03/2007 that corresponds to the date of the biomass boiler purchase order /10/.	OK	OK
C.1.2.	What is the expected operational lifetime of the project activity? Is it deemed reasonable?	/1/	DR	The expected operational lifetime of the project was defined in the published PDD as 25 years (0 months).  Project participants are requested to provide evidences regarding the expected operational lifetime of project activity. Moreover, provide also evidences regarding the remaining life of equipments the will be replaced by the project activity.	<del>CAR-20</del>	OK
<b>C.2. Start date of crediting period</b>						
C.2.1.	What is the expected crediting period starting date of the proposed project activity?	/1/ /2/ /3/	DR	According to the published PDD, the expected crediting period starting date of the proposed project activity is 01/01/2011.  Project participants are requested to revise the Section C.2.2.1 of published PDD in accordance to CDM-SSC-PDD Guidelines section C.2.	<del>CAR-21</del>	OK
C.2.2.	What is the length of the crediting period?	/1/ /2/	DR	According to the published PDD, a fixed	<del>CAR-21</del>	OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	Is it clearly defined and deemed reasonable?	/3/		crediting period of 10 years has been chosen, starting from 01/01/2011, or the date of registration, whichever is later.		
<b>D. Environmental Impact</b>						
D.1.1.	Has an analysis of the environment impacts of the project activity been undertaken? Is it clearly and sufficiently described in the PDD?	/1/ /2/ /3/	DR/I	Project participants are requested to provide evidences that the implementation of project activity is in line with local environmental agencies requirements.	<del>CL-17</del>	OK
D.1.2.	Will the project create any adverse environmental effects? Are transboundary environmental impacts considered in the analysis?	/1/ /2/ /3/	DR/I	See section D.1.1.	<del>CL-17</del>	OK
D.1.3.	Is the analysis of the environmental impacts required by the legislation of the host Country? If yes, has the EIA has been approved by local Government? Does the approval contain any conditions that need monitoring?	/1/ /2/ /3/	DR/I	See section D.1.1.	<del>CL-17</del>	OK
D.1.4.	Is it the project in line with the current environmental legislation in the host Country?	/1/ /2/	DR/I	See section D.1.1.	<del>CL-17</del>	OK
<b>E. Local stakeholder consultation</b>						
E.1.1.	Were the local stakeholders invited by the PP prior to the publication of the PDD in the UNFCCC website?	/1/ /2/ /25/	DR/I	Yes, the meeting for local stakeholder consultation was conducted on 09/02/2011. It was verified that the date of the meeting is provided in the invitation letter/s /25/. The stakeholder's consultation process was conducted in an open and transparent manner. It was carried out an open meeting attended by 16 persons, from local associations, NGOs, environmental agency, and local communities. The attendance list is provided in the PDD. RINA has verified the original list during the site visit. Moreover PP has provided pictures of the meeting and copies of the formularies filled out by the stakeholders.	OK	OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
E.1.2.	Have relevant stakeholders been adequately consulted / invited for comments (addresses provided / available)?	/1/ /2/ /25/	DR/I	RINA has verified that PP has the letters signed or stamped confirming that the stakeholders received the letter.	OK	OK
E.1.3.	Is the summary of the comments received from the stakeholders provided in the PDD (provided / available), complete?	/1/ /2/ /25/	DR/I	RINA verified the evaluation formularies answered by the local stakeholder, during the meeting. No negative comments were addressed to the project activity.	OK	OK
E.1.4.	Has due account been taken by the project participants of any stakeholder comments received?	/1/ /2/ /25/		See section E.1.3 above.	OK	OK
E.1.5.	If a stakeholder consultation process is required by regulations/laws in the host Country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR/I	There are no specific stakeholders' consultation process regulation/laws in Panama.	OK	OK



**TABLE 3 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS**

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<b>CAR-1</b> Project participants are requested to clarify and to detail with possible scenarios the section A.2 of the published PDD, where it is described that the replacement of biomass boiler by a new one with higher efficiency is possible in the future. PP is requested to describe the increasing of the capacity of electricity generation as well.	A.2.1	There is no intention to replace the biomass boiler with a new one with higher efficiency. Therefore, this consideration has been deleted in PDD Version 2.0.	The section A.2 of PDD Version 2 was revised. It was clarified that the use of a higher efficiency boiler and turbines is not a possibility considered by this project activity in the future.  This CAR is closed
<b>CAR-2</b> PP is requested to provide the LoAs from the DNA of Panama and Switzerland, including the confirmation that the Project assists the host country in achieving sustainable development.	A.3.3 A.3.4 A.3.5	The LoA will be issued by the Swiss DNA as soon as the Draft Final Validation Report will be submitted to them. The LoA issuance from the Panamanian DNA is in process.	It was verified on Swiss DNA website ( <a href="http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en">http://www.bafu.admin.ch/emissionshandel/05556/05558/index.html?lang=en</a> ) the document “Switzerland's National Guidelines and Procedures for Approving Article 12 Projects (Clean Development Mechanism)”, which states on its item 3.1 that a draft final validation report is requested to the issuance of LoA. Project participants also provided a document, dated 19/08/2011 issued by Panamanian DNA (ANAM – translating from Spanish National Environmental Authority) (file “ANAM decision EIA_Vinazas Biomasa.pdf”) demonstrating that this project activity does not require an EIA. This is a step of LoA obtaining process from ANAM, as verified on Panamanian rules available in Spanish at website <a href="http://anam.gob.pa/images/stories/documentos_CC/GACETA_OFICIAL_N_26773-B_DEL_27_DE_ABRIL_DE_2011.pdf">http://anam.gob.pa/images/stories/documentos_CC/GACETA_OFICIAL_N_26773-B_DEL_27_DE_ABRIL_DE_2011.pdf</a>  This CAR is closed.
<b>CAR-3</b>	A.4.1	Please refer to the PDD Version 2.0 where	The PDD version 2 was properly revised,

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
PP is requested to revise PDD section A.4.1.3 to include the precise name of the district where project activity is located, as verified/informed during the site visit.		the precise name of the district where the project activity is located has been modified accordingly.	the precise name of the district where project activity is locate was modified from Chitré (mentioned on published PDD) to Las Cabras (corrected location)  This CAR is closed
<b>CAR 4</b> The item “ <i>Identification of the most plausible and realistic scenario</i> ” in section B.4 of published PDD describes that “ <i>...electricity supply from the grid is more costly as compared to electricity generation through fossil fuel cogeneration plant...</i> ” Project participants are requested to revise the section B.4 of published PDD and further assess the propriety of this statement as a possible alternative scenario. Evidences related to costs of energy imported from the grid and energy produced from fossil fuel cogeneration plant shall also be provided.	B.4.1 B.4.2 B.4.3 B.4.4	Please refer to the PDD Version 2.0 where section B.4 has been assessed/revised and the mentioned statement has been erased.	The paragraph ““ <i>...electricity supply from the grid is more costly as compared to electricity generation through fossil fuel cogeneration plant...</i> ” was referent to the discussion of baseline scenario provided in alternative A of applied baseline scenario AMS-I.C. (current version 19). This alternative baseline scenario considers that “ <i>Electricity is imported from a grid and thermal energy (steam/heat) is produced using fossil fuel</i> ” and, as verified during the site visit, the baseline consists on a fossil fuel cogeneration plant, thus the heat and electricity are produced from one unit. This explanation was properly addressed by project participants on section B.4 of PDD version 2.0, dated 05/04/2012  This CAR is closed
<b>CAR 5</b> Project participants are requested to provide the minutes of meeting or other evidence to cross check the description of the e-mail dated 18/09/2006, as per “Guidelines on the demonstration and assessment of prior consideration of the CDM” /6/.	B.5.3.2	Please refer to the folder named CAR 5 to find the answer to the e-mail dated 18/09/2006 as an evidence to cross check it.	Project participants provided an e-mail sent by Mr. Rafael González, dated 18/09/2006 describing the situation of biomass project. It is describes the following: <ul style="list-style-type: none"> <li>• The CDM project will be developed,</li> <li>• The PP obtained from Panamanian DNA the information that the project</li> </ul>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			<p>activity is eligible as CDM project</p> <ul style="list-style-type: none"> <li>That the PP will begin to search for equipments suppliers.</li> </ul> <p>This CAR is closed</p>
<p><b>CAR-6</b></p> <p>Project participants are requested to provide all the evidences described on table 8 “Timeline of events and actions which have been taken to achieve CDM registration” of section B.5 of published PDD.</p>	<p>B.5.3.3 B.5.3.4</p>	<p>Please refer to folder CAR 6 to find all the evidences described on table 8 “Timeline of events and actions which have been taken to achieve CDM registration” of section B.5.</p> <p><u>Answer 2:</u> Please refer to the folder CAR6 to find e-mails exchange with potential buyers. Also, please refer to the PDD Version 3.0 where table 8 has been revised and the discussion with potential buyers is now listed only on Jan / Feb 2009. Please do not take into account the file Correo.pdf as it presents the same content as “2006 Sep-E-mails AISA Board.pdf”, which was re-named to match the description presented in table 8.</p>	<p>The documents “Initial discussion with potential buyers” Feb 2009 and November 2009 are missing. Moreover the file “2006 Sep-E-mails AISA Board.pdf” presents the same content of file “Correo.pdf”</p> <p>CAR is still open</p> <p>Conclusion regarding client’s response # 2</p> <p>Evidence related “Initial discussion with potential buyers” dated February 2009 was provided on file (TR_ Compradores.._GICA-AISA_01-02-2009pdf.pdf). This file presents e-mails changed between Mr Rafael Gonzalez (Alcoholes Borad in copy) , Mr Gugliemo Cioni (CER’s byer) and Mr. Timothée Lazaroo (project developer) demonstrating the negotiations of CER’s sales. These e-mails are dated from 24/01/2009 to 01/02/2009.</p> <p>Evidence related “Initial discussion with potential buyers” dated September 2009 was removed from PDD version 3 of 25/07/2012.</p> <p>This CAR is closed</p>
<p><b>CAR-7</b></p>	<p>B.5.5.1</p>	<p>Please refer to the PDD Version 2.0 where the common practice barrier has been</p>	<p>The text of “common practice barrier” was removed , nevertheless, the conclusion of</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
Project participants are requested to provide evidences related to the prevailing practices described on section B.5 of published PDD.		deleted.  <u>Answer 2:</u> Please refer to the PDD Version 3.0 where the conclusion of section B.5 was revised and the common practice barrier is no longer listed.	section B.5 of PDD version 2.0 still mentions that the project activity faces two barriers: “... <i>There are both financial and common practice barriers that prevent the implementation of the proposed project activity...</i> ”  The CAR is still open  Conclusion regarding client’s response # 2  The section B.5 of PDD version 03 was properly revised.  This CAR is closed.
<b>CAR-8</b> Considering that letter from Global Bank clearly describes the installed capacity of new turbo generator, project participants are requested to provide the study where the technical parameters of turbo generator were defined.	B.5.5.2	Please refer to the folder CAR 8 to find the study where the technical parameters of the turbo generator were defined according to the technical characteristics of the biomass boiler.	Project participants provided an calculation from Mysko Asesoriamiento S.A. (file “Mysko asesoriamento.pdf”) that recommends the installation of a steam turbine with 500 kW of installed capacity, based on operational parameters of new biomass boilers  This CAR is closed
<b>CAR-9</b> Paragraph 17 of applied baseline methodology AMS-I.C states that “ <i>Baseline emissions for supply of electricity to and/or displacement electricity from a grid shall be calculated as per</i> ”	B.6.1.1	Please refer to the PDD Version 2.0 where the emissions reductions calculated from the baseline methodology AMS-I.D have been excluded.	The PDD version 2.0 was properly revised. The calculation related to baseline methodology AMS – I.D was removed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<i>the procedures detailed in AMS-I.D</i> ”. The latest available version of baseline methodology AMS-I.D states on its paragraph 6 that “ <i>Combined heat and power (co-generation) systems are not eligible under this category</i> ”. Project participants are requested to revise the baseline emissions calculations, excluding the amount of emissions reductions calculated from baseline methodology AMS-I.D.			This CAR is closed
<b>CAR 10</b> The amount of energy employed on emission reduction calculation, indicate on worksheet “Emissions reduction calc” (cells K32:K41) corresponds to the energy consumed on site, which is not in line with baseline methodology. Project participants are requested to revise the emission reduction calculation.	B.6.1.1	<p>Please refer to the excel spreadsheet “AISA-Biomass_energy_plant_Panama V2.0” where the amount of energy employed on the emission reduction calculation is now in line with the baseline methodology. Moreover, please refer to the PDD Version 2.0 where the emission reduction calculation has been revised accordingly.</p> <p>Answer 2: Please refer to the spreadsheet “AISA-Biomass_energy_plant_Panama V3.0.xlsx” where the steam generated with biomass has been revised. The biomass steam had been calculated upon the expectation of available biomass. However, the PP confirms that in no case the biomass boiler will produce more steam than the one required to cover the distillery steam demand, which is also in line with the amount applied on sizing the steam turbine. Therefore, for ex ante calculation, the steam production is calculated based on the distillery steam demand and the net quantity of thermal energy supplied by the project activity will be monitored and used for ERs calculations ex post.</p>	<p>Regarding the spreadsheet “AISA-Biomass_energy_plant_Panama V2.0.xlsx”, the amount of steam presented on worksheet “Main parameters” (line 25 - Steam generated with biomass (Tonnes)) results in a value of hourly steam production higher than 22000lb/hour (9,97 t/hour), which is the amount applied on sizing of steam turbine study, on document “Mysko asesoraminedo.pdf”. (E.g the value on cell H25 of 102.399, divided by (24 hours/day*314 days) results in 15.38 t/h of steam. Also clarify the impact of the mentioned higher amount of steam on turbine capacity.</p> <p>Also explain and provide evidences of the values of NCV of three different types of biomass applied on steam calculation ; On worksheet “emissions reductions calc” of spreadsheet “AISA-Biomass_energy_plant_Panama V2.0.xlsx”, the values of EG P,J thermal was calculated based on steam demand of alcohols distillery. As per applied basely methodology, which describes that EG P,J thermal corresponds to the net quantity if thermal energy supplied by the project activity and considering that</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			<p>according to figure 4 of PDD version 2.0 all steam goes to process after its expansion on steam turbine, project participants are requested to include all steam generated by the biomass boiler in CER calculations</p> <p>This Car is still open</p> <p>Conclusion regarding client's response # 2</p> <p>The amount of steam generation was revised and it is based on alcohol production, resulting in a amount around 10 t/h of generation. The biomass consumption is based on sugar cane production.</p> <p>This CAR is closed.</p>
<b>CAR 11</b> Regarding the $EF_{GRID}$ (Electricity emission factor for displaced electricity generation) once the cogeneration plant is not eligible under methodology AMS-I.D, project participants are requested to remove this parameter of the PDD.	B.6.5.1	Please refer to the PDD Version 2.0 where the $EF_{GRID}$ parameter has been removed.	<p>The PDD version 2.0 was revised and the baseline methodology AMS –I.D was removed</p> <p>This CAR is closed</p>
<b>CAR 12</b> As per applied baseline methodology, the monitoring/ recording frequency of parameter $EG_{thermal,y}$ is continuous and aggregated annually, project participants are requested to revise this parameter on section B.7.1 of published PDD.	B.7.1.2 B.7.1.4 B.7.1.5 B.7.3.1	Please refer to the PDD Version 2.0 where the monitoring/recording frequency of the parameter $EG_{thermal,y}$ has been revised and is now in line with the applied baseline methodology.	<p>The monitoring/recording frequency of parameter was properly in line with applied baseline methodology.</p> <p>This CAR is closed</p>
<b>CAR 13</b> The parameters $EG_{pj,auxiliary\ consumption,y}$ (Power	B.7.1.2	Please refer to the PDD Version 2.0 where $EG_{pj,auxiliary\ consumption,y}$ (Power consumption of	The section B.7.1 was properly revised on PDD version 2.0, dated 05/04/2012.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
consumption of cogeneration system) and $EG_{pj, gross\ generation, y}$ (Gross energy generated by the biomass cogeneration plant) are not required by the applied baseline methodology. Project participants are requested to remove them from section B.7.1 of published PDD.		cogeneration system) and $EG_{pj, gross\ generation, y}$ (Gross energy generated by the biomass cogeneration plant) have been removed from section B.7.1.	This CAR is closed
<b>CAR 14</b> The monitoring recording /frequency and measurements methods and procedures applied to parameter $EG_{pj, net\ generation, y}$ (Net electricity generated by the biomass cogeneration plant) are not in line with AMS-I.C, project participants are requested to revise the PDD.	B.7.1.2 B.7.1.4 B.7.1.5	Please refer to the PDD Version 0 where the monitoring recording /frequency and measurements methods and procedures applied to parameter $EG_{pj, net\ generation, y}$ (Net electricity generated by the biomass cogeneration plant) have been revised.	The parameter $EG_{pj, net\ generation, y}$ (Net electricity generated by the biomass cogeneration plant) was properly revised on PDD version 2.0 and its recording, monitoring frequency and procedures are in line with applied baseline methodology.  This CAR is closed
<b>CAR 15</b> Project participants are requested to explain in section B.7.2 the procedures to calculate the energy balance, considering that three different types of biomass are burnt in one boiler.	B.7.1.2	Please refer to the PDD Version 2.0. The procedure to calculate the energy balance, considering the three different types of biomass used has been included in Annex 4. The following sentence has been added as a footnote to the table in Annex 4: <i>“The consistency of measurements will be checked based on the energy balance that takes into account the energy generation, fossil fuels and biomass used and the efficiency of energy generation.”</i>  Answer 2: Please refer to the PDD Version 3.0 where the monitoring procedure for the quantity of the three types of biomass used has been revised. As stated in the methodology, each type of biomass will be monitored separately. The quantity of biomass will be measured in batches and the consistency of these measurements will be cross-checked with biomass purchase	Considering that the three different types of biomass (with three different values of NCV) will be burnt in the same boiler, project participants are request to provide a more detailed explanation regarding the procedures to applied on calculation of energy balance.  This Car is still open  Conclusion regarding client’s response # 2  The inputs required for the calculation of energy balance are clearly indicated in section B.7.1 of PDD version 3 to all types of biomass to be employed by this project activity.  This CAR is closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		invoices and stock. Additionally, it will also be checked based on the energy balance that takes into account the energy generation, fossil fuels and biomass used and the efficiency of energy generation.	
<b>CAR-16</b> The parameter $FF_{i,y}$ (Fossil fuel oil flow rate $i$ combusted in the boiler during the year $y$ ) as defined by the applied baseline methodology must be monitored as per “Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion” /24/. Project participants are requested to revise the section B.7.1 of published PDD.	B.7.1.2 B.7.1.5	Please refer to the PDD Version 2.0 where the monitoring procedure for the parameter $FF_{i,y}$ (Fossil fuel oil flow rate $i$ combusted in the boiler during the year $y$ ) has been revised.	The parameter $FF_{i,y}$ (Fossil fuel oil flow rate $i$ combusted in the boiler during the year $y$ ) was properly revised on section B.7.1 of PDD version 2.0, dated 05/04/2012.  This CAR is closed
<b>CAR-17</b> As per applied baseline methodology, the calibration shall be based on “General Guidelines to SSC CDM methodologies”, which defines that “ <i>Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years</i> ”. Project participants are requested to revise the PDD (B.7.1) accordingly.	B.7.1.2 B.7.1.3	Please refer to the PDD Version 2.0 where section B.7.1 has been revised accordingly.	The “General Guidelines to SSC CDM methodologies” version 18 9EB 66 Annex 23) describes on its paragraph 14 that “For monitoring the emission reductions from project activities, project participants must refer to applicable provisions for monitoring plan for all project types and small-scale project activities.” The section B.7.1 of PDD version 2.0 was properly revised in accordance with “Guidelines for assessing compliance with the calibration requirements, version 01.0, EB 52, Annex 60, dated 12/02/2010.  This CAR is closed
<b>CAR-18</b> Project participants are requested to include in the section B.7.2 of the PDD a better description of the procedures for registration, monitoring, measurement, the monitoring frequency of all monitored parameters and reporting of CERs, also indicating the responsible for each activity.	B.7.3.1	The description of the procedures for registration, monitoring, measurement, the monitoring frequency of all monitored parameters is included in Annex 4. The following sentence has been added to the PDD Version 2.0 Section B.7.2: “ <i>For more detailed information of the procedures for</i>	The section B.71 and the Annex 4 presented in PDD version 2.0 provided a better description of the procedures of the monitored parameters.  This CAR is closed.



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
		<i>registration, monitoring, measurement, the monitoring frequency of all monitored parameters, please refer to Annex 4”.</i>	
<b>CAR-19</b> Regarding the data archiving, the monitoring plan does not comply with the “Guidelines for completing the simplified project design document (CDM-SSC-PDD)” ( <i>data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later</i> ).	B.7.3.2	Please refer to the PDD Version 2.0 where the data archiving in the monitoring plan is now in compliance with the “Guidelines for completing the simplified project design document (CDM-SSC-PDD)”.	The section B.7.1 of PDD version 2.0 was properly revised. All parameters presents a data archiving procedures in line with paragraph 56 of “Clean Development Mechanism Project Standard “, version 01.0, dated 25/11/2011. (EB 65 Annex 5), which is mentioned on section B.7 “Guidelines for completing the project design document form for small-scale CDM project activities” version 01.0 , dated 02/03/2012 (EB66 annex 9)  This CAR is closed
<b>CAR-20</b> Project participants are requested to provide evidences regarding the expected operational lifetime of project activity. Moreover, provide also evidences regarding the remaining life of equipments the will be replaced by the project activity.	B.7.3.4	Please refer to the folder CAR 20 to find a letter from the biomass boiler supplier stating the operational lifetime and a letter from the company in charge of the maintenance of the boilers to be replaced by the project activity stating the remaining lifetime.  <u>Answer 2:</u> Please refer to the folder CAR20 to find the evidences regarding the lifetime of the steam turbines. Even though the 500 kW turbine has not been bought yet, MysKo, the company in charge of performing the sizing of steam turbine study, provided a certification for its expected lifetime.	Project participants provided a letter sent by biomass boiler manufacturer (Benecke Irmão & Cia Ltda.) stating that the biomass boiler’s operational corresponds to 25 years (file “vida util caldera benecke.pdf). it was also provided a letter from Cleaver Brooks (manufacturer of the boiler replaced by the project activity) stating that this boiler presents a lifetime for, at least, more ten years.  The evidences regarding the lifetime of steam turbines are still missing.  This CAR is still open.  Conclusion regarding client’s response # 2  Project participants provided a letter from Mykso Asesoriamiento S.A, company

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			<p>responsible by the revision of the current turbo generator of 300 kW, with serial number 178251231, demonstrating that the remaining lifetime of this equipments is 10 years</p> <p>The company Mykso Asesoriamiento S.A also provided a letter regarding the new generator, demonstrating that its operational life time is 15 years.</p> <p>Both letters are dated 12/07/2012.</p> <p>This CAR is closed</p>
<p><b>CAR 21</b></p> <p>Project participants are requested to revise the Section C.2.2.1 of published PDD in accordance to CDM-SSC-PDD Guidelines section C.2.</p>	<p>C.2.1 C.2.2</p>	<p>Please refer to the PDD Version 2.0 where Section C.2.2.1 has been revised and is now in accordance to the CDM-SSC-PDD Guidelines section C.2.</p>	<p>The section C2.2.1 was properly revised in PDD version 2.0, dated 05/04/2010.</p> <p>This CAR is closed</p>
<p><b>CAR 22</b></p> <p>Considering that the project activity will export electricity to the grid, project participants are requested to revise the section B.6.3 of PDD version 1, including the power plants that the project activity is connected to.</p>	<p>B.3.2</p>	<p>Please refer to the PDD Version 2.0 where the national grid is now included in the project boundary.</p> <p>Answer 2: Please refer to the PDD version 3.0 where the existing boilers that will be used in case of emergency have been added to the project boundary.</p>	<p>As per section A.4.2 of PDD version 2.0 "As a result of the project activity, existing boilers will be taken out of operation and only used in case of emergency..". these boilers are not included in project boundary , as required by applied baseline methodology.</p> <p>This CAR is still open</p> <p>Conclusion regarding client's response # 2</p> <p>The section B.3 of PDD version 3 was properly revised and the backup boiler was included.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			This CAR closed
<b>CAR-23</b> The value of emission factor of fossil fuel of 77.4 tCO <sub>2</sub> /TJ, presented on section B.6.2 of PDD version 1, differs from value of 77.3 tCO <sub>2</sub> /TJ presented o section B.6.3. and applied on CER calculation. Project participants are requested to address this inconsistency.	B.6.1.1 B.6.2.1 B.6.5.1	Please refer to the PDD Version 2.0 and to the excel spreadsheet “AISA-Biomass_energy_plant_Panama V2.0” where the inconsistency of the value of the emission factor of bunker C has been corrected. IPCC default value at the upper limit of the uncertainty at a 95% confidence interval has been chosen as per "Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion" and the AMS-I.C.	The section B.6.2 and B.6.3 of PDD version 2.0 were revise and the value of bunker emission factor of 78.8 tCO <sub>2</sub> /TJ is the same employed on spreadsheet CER calculations AISA-Biomass_energy_plant_Panama V2.0.xlsx” and it is line with IPCC data (2006 IPCC Guidelines for National Greenhouse Gas Inventories – volume 2 – Energy)  This CAR is closed
<b>CAR-24</b> Project participants are requested to revise the applicability conditions Ref 8* and Ref 11* presented on section B.2 of PDD version, which are applicable to the project activity. Moreover, also include in this section of PDD a detailed explanation about the applicability conditions Ref 9* and Ref 10*	B.2.1	Please refer to the PDD Version 2.0 where the methodology applicability conditions have been revised including a detailed explanation about which conditions are applicable or not to the project activity.  <u>Answer 2:</u> Please refer to the PDD Version 3.0 where applicability conditions of Ref8*, Ref10*, Ref11* and Ref12* have been revised accordingly	Project participants are requested to revise /clarify the following applicability conditions described in section B.2 of PDD version 2.0: <ul style="list-style-type: none"> <li>• The justification of applicability condition of Ref8* is not clear;</li> <li>• The project activity consumes three different types of biomass: leafs and stems, wood and bagasse. Project participants are requested to revise the applicability conditions Ref 10* and Ref 11* that describes that project does not use soild biomass;</li> <li>• The applicability condition Ref12* describes that “If electricity and/or steam/heat produced by the project activity is delivered to a third party ..” as the project activity sells electric energy to the grid, project participants are requested to revise the discussion of this applicability condition on PDD version 2.0</li> </ul>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			<p>This Car is still open</p> <p>Conclusion regarding client's response # 2</p> <p>The Ref8* was revised and clarified that this condition is applicable to the project activity;</p> <p>The conditions Ref 10* and Ref 11* were revised and it is explained that project activity uses biomass residues, thus they are not applicable to this project activity.</p> <p>The condition Ref 12* explains the project activity will export energy only to the grid and not to an utility, as defined on baseline methodology.</p> <p>This CAR is closed</p>
<p><b>CL1</b></p> <p>As the nameplate of all boilers verified during the site visit were not accessible and could not be verified, project participants are requested to provide evidences to confirm the boiler's operational parameters. PPs have also to provide evidences regarding the acquisition of new turbo generator (500 KW) as well as its operational parameters.</p>	<p>A.2.1</p> <p>A.4.2</p> <p>B.6.5.1</p>	<p>Please refer to the folder CL 1 to find a document containing the biomass boiler's technical characteristics. The new turbo has not been acquired yet, therefore, its operational parameters are not available.</p>	<p>The operational parameters of biomass boiler (project activity's boiler) were provided (file: Datos tecnicos caldera biomasa (Benecke).JPG);</p> <p>The operational parameters of back up boiler (6.5 tv/h) were provided in file Caracteristicas caldera LK.pdf);</p> <p>The operational parameters of bunker oil to be replaced by the project activity were provided in file "Caracteristicas de caldera standardkessel.pdf)</p> <p>The operational parameters of steam turbine 500 kW were provided in file Mysko Asesoramiento.pdf.</p> <p>This CL is closed</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<b>CL-2</b> During the site visit, project participants provided the Purchase Contract of Biomass, dated 21/09/2007, covering the period from 01/01/2008 to 30/04/2009 /9/. Project participants are requested to provide most recent and valid contracts of biomass supply.	A.2.1	Please refer to the folder named CL 2 to find the most recent and valid contract of biomass supply.  Answer 2: Please refer to the folder named CL2 to find a document clarifying the signature date for the biomass supply contract. Moreover, also please find in the mentioned folder the recent contract supply, as stated in this document, Campos de Pese will provide AISA with bagasse and leaf and stems from sugar cane. Campos de Pese is AISA's main biomass supplier. AISA will also buy wood residues from locals upon availability. Whatever the biomass type, invoices stating the biomass type, weight and provider will be collected and made available to the DOE during verification.	The provided purchase contract of biomass (file: “Contrato compra venta biomasa AISA – CPv3.JPG”) is related only to biomass from sugar cane plantation. Contract of other types of biomass employed by the project activity are still missing.  Moreover project participants are requested to clarify the date of this contract.  This CL is still open  Conclusion regarding client's response # 2 Project participants provided a contract of biomass from sugar cane , dated 30/01/2012 (file ADENDA - Contrato compra venta biomasa AISA - CP (2).pdf), that extends the term of the contract previous contract, dated 21/05/2009 to the period 01/05/2012 to 30/04/2015.  The dated of previous contract was confirmed, based on a certificate of correction of the signature data. The previous contract is dated 21/05/2009  This CL is closed
<b>CL-3</b> During the site visit, project participants provided pictures of biomass boiler, dated from 09/01/2008 to 30/04/2008 (starting date of the operation of biomass boiler). Project participants are	A.2.2 B.5.3.3	Please refer to the folder CL 3 to find evidences regarding the starting date of operation of the biomass boiler. The letter from the supplier is dated on 07 May 2008, therefore, this has been revised in the PDD	As per document “Technical Delivery of the Boiler” (file: “Entrega técnica de Caldera Benecke.pdf) the boiler was delivered to project participants on operational conditions on 07/05/2008. It

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
requested to provide evidences to confirm the date when the biomass boiler started its operation.		Version 2.0.	was also demonstrate by “Technique assistance and assembling Report” that that the installation of boiler occurred from 05/03/08 until 07/05/2008 (files :Informe Asistencia y Montage Benecke1.JPG; Informe Asistencia y Montage Benecke2.JPG; Informe Asistencia y Montage Benecke3.JPG) The table 8 with the timeline of project activity on section B.5 of PDD version 2.0 was also revised.  This CL is closed
<b>CL-4</b> Project participants are requested to clarify/revise the Postfix//ZIP information of project participant Alcoholes del Istmo S.A., mentioned in Annex 1 of published PDD.	A.3.1	Please refer to the PDD Version 2.0 where the Postfix//ZIP information of project participant Alcoholes del Istmo S.A., mentioned in Annex 1 has been clarified.	the PDD version 2.0 was revised and the Postfix was included in Annex1  This CL is closed
<b>CL-5</b> Project participants are requested to provide the operational parameters and its respective evidences of the following equipments: 1 - For all boilers (1 biomass and 2 bunker boilers): - Pressure; - Temperature of steam produced; - Temperature of feed water; - Type and fuel consumption; - NCV of each fuel consumed by each boiler; - Boiler Efficiency; - Steam production. 2 – For two steam turbines (1 with 300 kW, 1with 500 KW): - Inlet and outlet pressure; - Steam flow; - Efficiency.	A.4.2 B.2.1 B.2.2 B.6.1.1	Please refer to the folder CL1 to find the biomass boiler's technical characteristics. Moreover, please refer to the folder CL 5 to find evidence of the operational parameters of the bunker boilers and the steam turbine of 300kW. As stated before, since the 500 kW steam turbine has not been bought yet, its technical characteristics are not available.	The operational parameters of biomass boiler (project activity's boiler) were provided (file: Datos tecnicos caldera biomasa (Benecke).JPG); The operational parameters of back up bolier (6.5 tv/h) were provided in file Caracteristicas caldera LK.pdf); The operational parameters of bunker oil to be replaced by the project activity were provided in file “Caracteristicas de caldera standardkessel.pdf) The operational parameters of 500 kW were provided in file Mysko Asesoriamiento.pdf. The operational parameters of 300 kW steam turbine were provided on file Caracteristicas Turbinas 300 kW.pdf  This CL is closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
<b>CL-6</b> Considering the grace period (17/02/2012) for the submission of project activities for registration, when using the version 18 of applied baseline methodology, it is recommended to revise the PDD and its annexes according to AMS-I.C version 19. Also update the versions of all tools applicable to this project activity, as per its latest available versions.	B.1.1	Please refer to the PDD Version 2.0 where AMS-I.C. has been updated to the latest version. Moreover, all the versions of the tools applicable to this project activity have been also updated.	The PDD version 2.0 was properly revised. The baseline methodology and the applicable tool s to this project activity were updates pas per its latest versions.  This CL is closed
<b>CL-7</b> Regarding the <i>Alternative B: Electricity is produced in an onsite captive and steam/heat is produced using fossil fuel</i> – this is not an eligible baseline scenario. As per published PDD, this would not be an alternative scenario, once the cost of electricity generation from captive power plants through diesel generation is higher than the costs of electricity produced from cogeneration units. Project participants are requested to provide evidences referent to such generation costs.	B.4.1 B.4.2 B.4.3 B.4.4	Please refer to the PDD Version 2.0 where section B.4 has been revised. Alternative B is not an eligible baseline scenario since electricity production in an onsite captive power plant is an inefficient option compared to a cogeneration power plant. Evidence on this statement can be found on the following document: <a href="http://www.energymanagertraining.com/announcements/issue25/winners_papers_Issue25/11_SureshKolamala.pdf">http://www.energymanagertraining.com/announcements/issue25/winners_papers_Issue25/11_SureshKolamala.pdf</a> , which can also be found in folder CL 7.	It is described on section B.4 of PDD version 2.0 and verified during the site visit, the current situation at the project site consists on a cogeneration unit, and thus the generation of thermal and electric energy on different equipments is not applicable to the project activity.  This CL is closed
<b>CL-8</b> The page four of study “Diagnosis of particulate matter generated by the Sugar Mills in El Salvador” /21/ describes a large use of sugar cane bagasse as fuel. Project participants are requested to clarify how this study is applicable to this project activity.	B.5.5.1	Please refer to the CAR 7 and the PDD Version 2.0 where the common practice barrier has been deleted.  Answer 2: Please refer to the PDD Version 3.0 where section B.5 has been revised and the common practice analysis has been removed from the conclusion.	The common practice analysis was removed from table presented on section B.5 of PDD version 2.0 , nevertheless it is still mentioned on the conclusion of same table  This CL is still open  Conclusion regarding client’s response # 2  The PDD version 3 was revised and the common practice analysis was removed from the conclusion described on table of section B.5

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
			This CL is closed
<b>CL-9</b> Based on document “Notice of Operation” issued by Panama Republic - Ministry of Trade and Industry /22/, the agricultural activities are not performed by Alcoholes del Istmo. Project participants are requested to clarify how the project activity modified the sugar cane harvesting. Also clarify the relation between project activity and agricultural activity.	B.5.5.1	As stated in the biomass supply contract, the agricultural activities are performed by Campos de Pesé. As its main sugar cane buyer, AISA required a change in its harvesting practice, which was an agreed condition for the purchase of the biomass by AISA.	It was verified on Biomass purchase contract that the biomass supplier is Campos de Pesé.  This CL is closed
<b>CL-10</b> Project participants are requested to explain the factor of 80%, applied in the calculation of the energy generated by project activity on Worksheet “main parameters” (row 28) of spreadsheet with emissions reduction calculations “AISA - Biomass_energy_plant_Panama.xlsx”.	B.6.1.1	Since the 500 kW steam turbine has not been bought yet, its technical characteristics are not available Therefore, a default factor of 80% has been applied to account for its availability and the functioning hours.  Answer 2: please refer to the spreadsheet “AISA- Biomass_energy_plant_Panama V3.0, where the calculation of the energy generated has been revised and the factor of 80% has been removed. Indeed, the turbine will only function when the boiler is operating. All maintenance will be done when the distillery does not operate. ERs have also been revised accordingly in PDD Version 3.0.	Project participants are requested to clarify the source of availability and function hours of 500 kW steam turbine.  This CL is still open  Conclusion regarding client’s response # 2  The spreadsheet was revised and the energy generated by 500 kW turbine is based on sugar mill’s operational days on spreadsheet “AISA - Biomass_energy_plant_Panama V3 0.xlsx”  This CL is closed.
<b>CL-11</b> Project participants are requested to provide evidences of the consumption of bunker oil indicated in worksheet “Baseline Efficiency” of emission reduction spreadsheet / “AISA - Biomass_energy_plant_Panama.xlsx”, applied on efficiency calculation. PPs are also requested to clarify if the bunker boilers will be kept as back	B.6.1.1 B.6.5.1	Please refer to the folder CL 11 to find evidences of the consumption of bunker oil indicated in the worksheet “Baseline Efficiency” of emission reduction spreadsheet / “AISA - Biomass_energy_plant_Panama.xlsx”. Only one bunker boiler will be kept as back up for extreme emergencies, thus it will be	It was verified on data provided by project participants that AISA consumes two different types of fossil: bunker oil 87% and residual fuel 13%, project participants are requested to provide the NCV of residual oil.  This CL I still open



Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
up boilers and, if so, how the emissions associated to its operation will be monitored/measured.		<p>rarely used. If so, the emissions associated to its operation will be calculated as described in section B.6.1- Project emissions.</p> <p><u>Answer 2:</u> Please refer to folder CL11 to find a document containing the NCV of the residual oil.</p>	<p>Conclusion regarding client’s response # 2</p> <p>The NCV of residual oil was provide on file analisis de aceite Intertek dic 2011.pdf.</p> <p>This CL is closed</p>
<p><b>CL-12</b></p> <p>Project participants are requested to explain the calculation of Bunker C consumption with biomass (gal), presented on worksheet “Main parameters” (cells E17 and F17) of spreadsheet “AISA - Biomass_energy_ plant_Panama.xlsx”, used in the calculation of project emissions.</p>	<p>B.6.2.1</p> <p>B.6.2.2</p>	<p>Bunker C consumption has been calculated based on a specific steam production of 48kg/gal, which is based on the boiler’s thermal efficiency, bunker’s NCV and density and the water evaporation latent heat.</p> <p><u>Answer 2:</u> Please refer to the spreadsheet “AISA-Biomass_energy_plant_Panama V3.0.xlsx” where the residual fuel and bunker C consumption are now listed separately. The baseline efficiency calculation and ERs have been modified accordingly. Also, please refer to the PDD Version 3.0 where ERs calculation has been modified based accordingly.</p>	<p>Considering the data production presented on files: anual2005.pdf, anual2006.pdf, annual 2007.pdf, annual 2008pdf and annual 2009.pdf presents the consumption of bunker and residual fuel and the spreadsheet “AISA-Biomass_energy_plant_Panama V2.0.xlsx” presents the sum of both fossil fuel only as bunker, project participants are still request to clarify the calculation of bunker consumption.</p> <p>This CL is still open</p> <p>Conclusion regarding client’s response # 2</p> <p>The spreadsheet with ER calculations“AISA - Biomass_energy_ plant_Panama V3 0.xlsx and the section B.6.3 were properly revised.</p> <p>This CL is closed.</p>
<p><b>CL-13</b></p> <p>The website provided by project participants related to NCV<sub>bunker</sub> value is not available. Project participants are requested to provide evidences of</p>	<p>B.6.2.1</p> <p>B.6.2.2</p> <p>B.6.5.1</p>	<p>Please refer to the following link to find the mentioned evidence for the applied NCV value:  <a href="http://www.asep.gob.pa/electric/Anexos/AN">http://www.asep.gob.pa/electric/Anexos/AN</a></p>	<p>The value of Bunker NCV is in line with document “Expansion Plan of the National Interconnected system 2007-2021”, dated 15/09/2007 issued by Panamanian Electric Energy Transition (page 98, table</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
the applied NCV value.		<a href="#">EXO_1256.pdf</a> A copy of the document may also be found in folder CL 13.	1.2)  This CL is closed
<b>CL-14</b> Project participants are requested to provide evidences demonstrating the distance between the biomass residues and the project site.	B.6.3.1 B.6.3.2	Please refer to the folder CL 14 where you will find document which proves that the distance between the biomass residues and the project site is less than 200 km.  <u>Answer2:</u> Please refer to the folder CL14 to find a document showing the farthest point of biomass supply, which corresponds to 6.75 km. The main biomass supplier is Campos de Pese (bagasse and leafs and stems from sugar cane, which is referred to pacas in the supply contract). Additionally, AISA may also buy some wood residues from local suppliers, but this depends on availability. In no case, the distance between the biomass residues and the project site will exceed 20 km, as local wood suppliers are located within the area shown in the evidence provided. Whatever the biomass type, invoices, with the weight, the provider and the type of biomass will be made available to the DOE during verification.	It is not clear the distance between biomass supplier and project site. Moreover project participants are requested to clarify the quantity of biomass suppliers as well as the respective type of biomass supplied by each of them.  This CL is still open  Conclusion regarding client's response # 2  Project participants provide an image demonstrating the distance from biomass supplier is less than 200 km. Also the contract of biomass from sugar cane, dated 30/01/2012 describes on its Clause 1 that the biomass supplier (Campos de Pesé) will provide the biomass required amount of biomass to the operation of the project activity.  This CL is closed
<b>CL-15</b> Project participants are requested to clarify the monitoring procedure applied to parameter $P_{\text{steam, cogen}}$ (Pressure of steam extracted from turbine).	B.7.1.2 B.7.1.4	Please refer to the PDD Version 2.0 where the monitoring procedure applied to the parameter $P_{\text{steam, cogen}}$ (Pressure of steam extracted from turbine) has been clarified.	The monitoring procedure applied to parameter $P_{\text{steam, cogen}}$ (Pressure of steam extracted from turbine) were properly revised on PDD version 2.0.  This CL is closed
<b>CL-16</b> Project participants are requested to clarify the monitoring procedure applied to parameter $T_{\text{steam, cogen}}$ (Temperature of	B.7.1.2 B.7.1.4	Please refer to the PDD Version 2.0 where the monitoring procedure applied to parameter $T_{\text{steam, cogen}}$ (Temperature of	The monitoring procedure applied to parameter $T_{\text{steam, cogen}}$ (Temperature of steam extracted from turbine) was

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
cogen, (Temperature of steam extracted from turbine).		steam extracted from turbine) has been clarified.	clarified on PDD version 2.0.  This CL is closed
<b>CL-17</b> Project participants are requested to provide evidences that the implementation of project activity is in line with local environmental agencies requirements.	D.1.1 D.1.2 D.1.3 D.1.4	Please refer to the folder CL17 to find a letter from the ANAM (the local environmental agency) stating that the project activity is in line with local environmental regulations.	The provided document is a letter from ANAM, dated 19/08/2011 and it states that no environmental study is required for this project activity and that project participants must follow the rules and laws for the implementation of this project activity.  This CL is closed



RINA

**CERTIFICATO DI QUALIFICA**  
**QUALIFICATION CERTIFICATE**

Si attesta che il sig./sig.ra:  
*We declare that Mr/Mrs/Ms:*

**Cintia Mara Miranda Dias**

è qualificato come<sup>1</sup>:  
*is qualified as:*

**CDM (TEC, VAL, VER, TL, FIN-EXP)**  
**SCS (VAL, VER, TL)**

per le seguenti aree tecniche:  
*for the following technical areas:*

**1.2, 13.1, 13.2, 15.2**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable Energy sources	1
13.1	Waste Handling and Disposal	13
13.2	Animal waste management	13
15.2	Animal waste management	15

in accordo alle istruzioni della Divisione Certificazione.  
*in accordance with the instructions of the Certification Division.*

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	03-11-2008	-
8	01-06-2012	Annual revision

Il Resp. QPT  
*Head of QPT*

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
VCS: Verified Carbon Standard:  
GS: Gold Standard  
SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

*RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports*



RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Lilian Cristine Poll Herrmann

è qualificato come<sup>1</sup>:  
is qualified as:

CDM (TEC, VAL, VER, -TL, FIN-EXP)  
VCS, GS (VAL, VER, TL)

per le seguenti aree tecniche:  
for the following technical areas:

13.1, 13.2, 15.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
13.1	Waste Handling and Disposal	13
13.2	Animal waste management	13
15.2	Animal waste management	15

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	06-03-08	-
9	12-09-12	Updating qualification as TL

Il Resp. QPT  
Head of QPT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
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RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

Americo Junior Varkulya

We declare that Mr/Mrs/Ms:

è qualificato come<sup>1</sup>:  
is qualified as:

**CDM/VCS/JI/GS/SCS-TEC, CDM-VAL, CDM-VER, CDM-TL,  
CDM-FIN-EXP  
GS-VAL, GS-VER, GS-TL  
SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:  
for the following technical areas:

1.1, 1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation from fossil fuel and biomass including thermal electricity from solar	1
1.2	Energy generation from renewable energy sources	1
13.1	Waste handling and disposal	13.1

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	30-01-2009	-
1	04-05-2009	Annual Revision
2	14-12-2009	Changes in module structure
3	27-04-2010	Annual Revision
4	18-10-2010	Changes in certificate module
5	17-03-2011	Changes due to new accreditation standard
6	13-06-2011	Annual Revision
7	01-06-2012	Annual Revision
8	10-08-2012	Extension to TA 1.2
9	06-09-2012	Updating qualification to TL

Il Resp. QPT  
Head of QPT

<sup>1</sup> Legend:

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RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

Vicente San Valero

We declare that Mr/Mrs/Ms:

è qualificato come<sup>1</sup>:  
is qualified as:

CDM (TEC, VAL, VER, TL, FIN-EXP, ITR)  
VCS, GS, SCS (VAL, VER, TL)

per le seguenti aree tecniche:  
for the following technical areas:

1.2, 2.1, 4.6, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable energy sources	1
2.1	Electricity Distribution	2
4.6	Electrical / Electro technical products	4
13.1	Waste handling and disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	31-01-2008	-
9	01-06-2012	Annual revision

Il Resp. QPT  
Head of QPT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
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SCS: SocialCarbon Standard  
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

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RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Rita Valoroso

è qualificato come1:  
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP  
VCS-TEC, VCS-VAL, VCS-VER, VCS-TL  
GS-TEC, GS-VAL, GS-VER, GS-TL  
SCS-TEC, SCS-VAL, SCS-VER, SCS-TL  
JI-TEC

per le seguenti aree tecniche:  
for the following technical areas:

1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable Energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	18-01-10	-
6	13-07-12	Annual revision

Il Resp. QPT  
Head of QPT

<sup>1</sup> Legend:

VAL: Validator  
VER: Verifier  
TEC: Technical Expert  
TL: Team Leader  
FIN-EXP: Financial Expert  
DET: Determiner

CDM: Clean Development Mechanism  
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RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Saurabh Mittal

è qualificato come<sup>1</sup>:  
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER  
VCS (-TEC, -VAL, -VER)  
GS/JI/SCS - TEC

per le seguenti aree tecniche:  
for the following technical areas:

1.1, 2.1, 4.3, 4.10

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	1
2.1	Electricity Distribution	2
4.3	Iron and steel	4
4.10	Fuel switching and/or energy efficiency and/or waste heat/gas/pressure recovered and utilization for power generation at manufacturing industries	4

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	09-12-2010	-
5	01-06-2012	Annual revision

Il Resp. QPT  
Head of QPT

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RINA

## CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:  
We declare that Mr/Mrs/Ms:

Felice Alfieri

è qualificato come<sup>1</sup>:  
is qualified as:

CDM/VCS/GS/JI/SCS-TEC

per le seguenti aree tecniche:  
for the following technical areas:

13.2, 15.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
13.2	Animal Waste Management	13
15.2	Animal Waste Management	15

in accordo alle istruzioni della Divisione Certificazione.  
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	13-09-2010	-
4	01-06-2012	Annual revision

Il Resp. QPT  
Head of QPT

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VAL: Validator  
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