VALIDATION REPORT

VIÑALES BIOMASS POWER PLANT IN CHILE

REPORT NO. 2008-1353

REVISION NO. 01

DET NORSKE VERITAS

VALIDATION REPORT

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Client: Celulosa Arauco y Constitución S.A.		Client ref.: Christian Albert Patrickson

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Summary:

Project Name: Viñales Biomass Power Plant
Country: Chile
Methodology: ACM0006
Version: 09
GHG reducing Measure/Technology: Renewable electricity generation using biomass residues
ER estimate: 150 335 tCO_2e per year (average)
Size

☒ Large Scale ☐ Small Scale

Validation Phases:

☒ Desk Review ☒ Follow up interviews
☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested ☐ Clarifications Requested
☒ Full Approval and submission for registration ☐ Rejected

In summary, it is DNV's opinion that the project activity "Viñales Biomass Power Plant" in Chile, as described in the PDD, version 03 of 28 Dec 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0006, version 09. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2008-1353	Subject Group: Environment
Report title: Viñales Biomass Power Plant in Chile	
Work carried out by: Felipe Lacerda Antunes, David Freire da Costa, Seshan Ranganathan	
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Table of Content *Page*

Abbreviations

CAR	Corrective Action Request
CDEC-SIC	Economic Dispatch Center in the Central Interconnected System
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CIS	Central Interconnected System
CL	Clarification request
CNE	National Energy Commission
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
NGO	Non-governmental Organisation
NPV	Net Present Value
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the project activity "Viñales Biomass Power Plant" in Chile. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is Chile, which fulfils the participation criteria and has approved the project and authorized the project participant Celulosa Arauco y Constitución S.A. There is no Annex I Party identified yet. The DNA from Chile confirmed that the project assists in achieving sustainable development criteria of host country.

The project correctly applies the baseline and monitoring methodology ACM0006, version 09 "Consolidated methodology electricity generation from biomass residues".

The project activity consists in the installation of a new biomass cogeneration power plant in the Viñales sawmill. The new cogeneration unit consists of a 250 ton/hr fluidized bed boiler and a 41 MW condensing / extracting turbo generator unit, allowing for on-site electric power generation, displacing electricity from the central Chilean grid (SIC). As a result, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 150 335 tCO_2e per year over the selected 7 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides 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 DNV's opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV's opinion that the project activity "Viñales Biomass Power Plant" in Chile, as described in the PDD, version 03 dated 28 Dec 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0006, version 09. Hence, DNV requests the registration of the project as a CDM project activity.

2 INTRODUCTION

Celulosa Arauco y Constitución S.A. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the Viñales Biomass Power Plant project in Chile (hereafter called "the project"). This report summarises the findings of the validation of the project, performed 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.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0006. The validation was based on the recommendations in the Validation and Verification Manual /23/.

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

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

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

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

/1/ Project Design Document for the Viñales Biomass Power Plant in Chile. Version 01 of 31 July 2008, Version 02 of 25 May 2009 and Version 03 dated 28 December 2009.

/2/ Arauco: Purchase Order for the power boiler dated 23 April 2008

/3/ Arauco: Environmental Impact Declaration approved by Resolution 80/2009 issued by Environmental Regional Comission in 25 March 2009

/4/ Arauco: Stakeholders consultation process – invitation, report and comments received

/5/ Arauco: Biomass balance for 2008 and supporting evidences (INFOR – National Forestry Institute webpage www.infor.cl and CONAF – National Corporation of Forestry webpage www.conaf.cl)

/6/ Arauco: Emission reduction calculation spreadsheet

/7/ SERCOR S.A.: Feasibility study of cogeneration in Chile, January 1998.

/8/ RNT: Carbon capture project from Radiata Pine plantation in the VI and VIII regions, Chile, December 1999.

/9/ SERCOR S.A.: Carbon bonds study, January 2002.

/10/ Arauco: CDM projects presentation of 26 September 2005

/11/ Arauco: investment analysis of other projects:

- DHM storage building in Lincancel, dated May 2003;
- Thermal plant in Itata complex, dated February 2003;
- Constitución production equipment, dated 1998;
- Arauco port, dated 29 September 1997.

/12/ Budget for the investment in a low-pressure power boiler and Bremer proposal for a boiler dated 15 April 2008

/13/ Arauco: Biomass residues balance dated April 2008

/14/ Arauco: Biomass residues invoices from 2006 to 2008

/15/ PCM: Biomass residues analysis dated 14 April 2008

/16/ Arauco: Colorado plant electric consumption and demineralized water costs

/17/ Budgets for the investment in scenarios 3 and 4, and Nueva Aldea Phase 1 power boiler purchase order dated 2 January 2003

/18/ Arauco: Nueva Aldea Phase 1 O&M costs

/19/ Arauco: Investment analysis spreadsheet

/20/ AF Celpap: Study for Arauco power plants dated December 2007

/21/ Fuel and Electricity Superintendency: Fines resumes (2003 to 2006)

3.1.2 Letters of approval

/22/ CONAMA (DNA of Chile): *Letter of Approval*. 2 September 2010

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/23/ CDM Executive Board: Validation and Verification Manual Version 01.2 http://cdm.unfccc.int/EB/055/eb55_repan01.pdf

/24/ CDM-EB: Approved Consolidated Baseline and Monitoring Methodology ACM0006 - "Consolidated methodology electricity generation from biomass residues". Version 09

/25/ CDM-EB: Approved Consolidated Baseline and Monitoring Methodology ACM0002 - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". Version 10

/26/ CDM EB: Combined tool to identify the baseline scenario and demonstrate additionality. Version 02.2.

/27/ CDM EB: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. Version 02.

/28/ CDM EB: Tool to calculate the emission factor for an electricity system – Version 02.

/29/ CDM EB: *Tool for the demonstration and assessment of additionality*. Version 05 of EB39.

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

/30/ Evidence of sawmills common practice in Chile: "Boletín Estadístico 118", "La Industria del Aserrío, Chile 2007", issued by Chilean Agricultural Ministry

/31/ CNE: Ministerial Resolution 119, issued on 4 November 2001

/32/ CNE: Node price report dated October 2007

/33/ Chilean Law of Income Tax

/34/ Chilean Law 20257/2008

/35/ CDEC-SIC: Transmission fees report dated 14 April 2008

/36/ Economy Ministry: Law 18 410, modified on 19 May 2005

/37/ CDEC-SIC webpage: www.cdec-sic.cl

/38/ Boyce, Meherwan P. "Handbook for cogeneration and combined cycle power plants", Asme press, 2002.
Geroy, Gary D. Passmore, David L. "Assesment of training needs for cogeneration technology in Schuyikill County", Pennsylvania State University, 1987

/39/ Third party studies that ratify the existence of barriers for non-convention renewable power generation in Chile:

- The study: "Evaluaciones del Desempeño Ambiental Chile" (Environmental Performance Review study for Chile), published by the OECD in 2005;
- The study: "Aporte Potencial de Energías Renovables no Convencionales y Eficiencia Energética a la Matriz Eléctrica, 2008 – 2025" (Potential contribution of non-conventional renewable power sources and energy-efficiency to power generation, 2008 – 2025), June 2008, developed by Universidad de Chile and Universidad Técnica Federico Santa María;
- The report: "Chile Energy Policy Review 2009", October 2009, developed by the International Energy Agency;
- The article "Inversiones por US$ 3,000 millones en energías verdes estarían en riesgo por rigidez de la ley" (Investments for US$ 3,000 million would be at risk due to law rigidities), published in November 25th, 2009 in the journal "Electricidad Interamericana"

Main changes between the version of the PDD published for the 30 days stakeholder commenting period and the version of the PDD submitted for registration:

- Changes according to Table 3 of this report
- Updates in the applied methodologies and tools.

3.2 Follow-up interviews with project stakeholders

During the period 8-10 December 2008, DNV carried out an on-site visit to the Viñales sawmill site and interacted with the operating personnel of the project proponent to resolve issues on the following topics:

	Date	Name	Organization	Topic
/40/	2008-12-09/10	Christian Patrickson	Arauco	• Project starting date • Pre-project scenario and Project Baseline • Additionality • Monitoring plan • Emission reductions estimation • Environmental Licenses and legal compliance • Stakeholders consultant
/41/	2008-12-09/10	Cristian Mosella	Arauco	
/42/	2008-12-09/10	Carla Seguel	Arauco	
/43/	2008-12-09/10	Werner Baumgartner	Arauco	
/44/	2008-12-09/10	Arturo Maturana	Arauco	

3.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "Viñales Biomass Power Plant" in Chile is enclosed in Appendix A to this report. The validation protocol enclosed in Appendix B to this report corresponds to earlier versions of the PDD.

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

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The CDM requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

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.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**) or a **corrective action request (CAR)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***Assessment by DNV***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	*Gives reference to documents where the answer to the checklist question or item is found.*	*Means of verification (MoV) are **document review (DR)**, **interview (I)** or any other follow-up actions (e.g., on site visit and telephone or email interviews) and **cross-checking (CC)** with available information relating to projects or technologies similar to the proposed CDM project activity under validation.*	*The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.*	*OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A **corrective action request (CAR)** is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. 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)** during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/ or clarification requests	***Ref. to checklist question in table 2***	***Response by project participants***	***Validation conclusion***
*The **CARs** and/ or **CLs** raised in Table 2 are repeated here.*	*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 conclusions of the CARs and/or CLs.*

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

Figure 1: Validation protocol tables

3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Sectoral competence
Project manager	Antunes	Felipe	Brazil	✓						
Technical team leader (CDM validator)	Antunes	Felipe	Brazil		✓	✓	✓			
Sector expert	Costa	David	Brazil		✓		✓			✓
Sector expert	Ranganathan	Seshan	India		✓		✓			✓
Technical reviewer	Astakala	Vidyacharam	India						✓	

The qualification of each individual validation team member is detailed in Appendix C to this report.

4 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the PDD, version 03 dated 28 Dec 2009.

4.1 Participation requirements

The project participants is Celulosa Arauco y Constitución S.A. of host Party Chile The host Party (Chile) meets all relevant participation requirements. There is no Annex I Party identified yet. The host Party (Chile) meets all relevant participation requirements and has provided written approval of voluntary participation in the project /22/. DNV confirmed from the DNA webpage /22/ the authenticity of the letter provided by the project proponent (PP) and considers that the letter complies with paragraphs 45-48 of the Validation and Verification Manual.

4.2 Project design

The “Viñales Biomass Power Plant in Chile” project located in the commune of Constitución in the Maule Region, Chile is a grid-connected renewable energy project activity, displacing grid electricity with electricity generated from renewable sources (sawdust and bark from sawmills and biomass residues from forestry operations) after meeting the captive steam and electricity requirements of attached sawmill, thus resulting in emission reductions of greenhouse gases in the energy sector.

The project activity consists in the installation of a new biomass cogeneration power plant in the Viñales sawmill. The new cogeneration unit consists of a 250 ton/hr fluidized bed boiler and a 41 MW condensing / extracting turbo generator unit, allowing for additional electricity of 216.3 GWh/year to be displaced from the central Chilean grid (SIC). Prior to the implementation of the project activity, the Viñales sawmill relied on an external company who supplied heat to the Viñales sawmill and on the grid for electric power.

The project design engineering reflects good practice applying the steam Rankine cycle technology for generation of steam and power.

A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 01 November 2011. The starting date of the project activity is 23 April 2008, which corresponds to the boiler purchase order issuance /2/. The expected operational lifetime is 30 years and reasonable.

The project is expected to improve energy use, through power generation from renewable sources, thus contributing to the sustainable development objectives of the Chilean Government.

No public funding is involved, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards the project.

The project description is to the consideration of DNV complete and accurate.

4.3 Application of selected baseline and monitoring methodology

The project activity applies the approved baseline methodology ACM0006 (Version 09) - "Consolidated methodology electricity generation from biomass residues" /24/. The project also applies ACM0002 (Version 10) - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /25/ in combination with "Tool to calculate the emission factor for an electricity system – Version 02" /28/ for the grid emission factor calculation.

This methodology is applicable to the Viñales Biomass Power Plant in Chile as this project consists of a renewable energy co-generation plant for supplying electricity to the Chilean grid (SIC). DNV confirmed during the site visit that the project meets the applicability conditions of ACM0006 as

1 biomass residues generated in the forest industry (from nearby sawmills and from forestry operations) are used in the cogeneration plant; some fossil fuels may be co-fired to a limited extent;

2 no major process change or substantial changes in processing capacities were envisaged due to project activity as the production mix of the Viñales facilities is determined by the sawmill/ market conditions;

3 the bark and sawdust mix are stored in a dedicated place near the Viñales power plant for less than two weeks, as defined in the approved Environmental Impact Declaration /3/ and

4 the biomass residues do not require any preparation (other than mechanical preparation, in some cases) before being used as fuel.

4.4 Baseline determination

In line with the ACM0006 methodology, the following alternative baseline scenarios for power generation (P), heat generation (H) and biomass use (B) have been discussed:

POWER GENERATION

P1: The proposed project activity not undertaken as a CDM project activity;

P2: The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-) fired in the project activity;

P3: The generation of power in an existing captive power plant , using only fossil fuels;

P4: The generation of power in the grid;

P5: The installation of a **new** biomass residue fired power plant , fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case;

P6: The installation of a **new** biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the

relevant industry sector) than the project activity. Therefore, the power output is the same as in the project case;

P7: The **retrofitting** of an existing biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case;

P8: The **retrofitting** of an existing biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity;

P9: The installation of a **new** fossil fuel fired captive power plant at the project site;

P10: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity;

P11: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site.

During the site visit DNV confirmed that i) there is no power generation unit at the project site, and ii) there are no other biomass types available in the region to generate power, as confirmed from the INFOR website /5/. Therefore, the alternatives of P2, P3, P7, P8, P10 and P11 are eliminated. The feasible alternative scenarios for power generation would be P1, P4, P5, P6 and P9.

HEAT

H1: The proposed project activity not undertaken as a CDM project activity;

H2: The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector);

H3: The generation of heat in an existing captive, cogeneration plant, using only fossil fuels;

H4: The generation of heat in boilers using the same type of biomass residues;

H5: The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the project activity;

H6: The generation of heat in boilers using fossil fuels;

H7: The use of heat from external sources, such as district heat;

H8: Other heat generation technologies (e.g. heat pumps or solar energy);

H9: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels

(biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity;

H10: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site.

During the site visit DNV confirmed that i) there is no captive power plant installed, ii) there is no biomass cogeneration power plant installed, iii) there are no other heat generation technologies available at the site iv) there is no cogeneration power plant based in fossil fuels installed. Therefore, the feasible alternative scenarios for heat generation would be H1, H2, H4, H6, H7 and H9.

BIOMASS

B1: The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields;

B2: The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields;

B3: The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes;

B4: The biomass residues are used for heat and/or electricity generation at the project site;

B5: The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants;3

B6: The biomass residues are used for heat generation in other existing or new boilers at other sites;

B7: The biomass residues are used for other energy purposes, such as the generation of biofuels;

B8: The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry).

During the site visit DNV confirmed that i) there is no biomass boiler at the project site, ii) there is a surplus of biomass available in the region that is not used, iii) the generation of bio-fuels is not developed in Chile and iv) the biomass residues used for energy generation purposes are not the same as the biomass residues used for feedstock or for pulp and paper production. Therefore, the feasible alternative scenarios for biomass would be B1, B2 and B3.

DNV considers the list of realistic and credible alternatives to be complete.

Considering the business as usual practice in the sawmill industry and the level of feasibility and the conservativeness of the alternatives, the most likely and conservative alternative is the installation of a new low pressure biomass boiler with no power generation capacity. This has been detailed in the additionality section. (section 4.4).

The chosen baseline scenario corresponds to scenario n°3, which is a combination of the following baseline scenarios given in ACM0006:

For power generation: The generation of power in the grid-connected power plants (P4);

For heat generation: The generation of heat in boilers using the same type of biomass residues (H4);

For biomass use: The additional biomass is dumped or left to decay under mainly aerobic conditions (B1). Biomass residues which are left to decay in absence of the project activity were considered for possible methane emissions in the baseline activity.

In accordance with ACM0006, an electricity baseline emission factor for the grid mix is calculated in accordance with ACM0002 and Tool to calculate the emission factor for an electricity system Version 02 /28/ as a combined margin emission coefficient, consisting of the combination of a simple adjusted operating margin (OM) emission coefficient and a build margin (BM) emission coefficient (see section 4.7). Both, the OM and BM emission coefficients will be updated ex-post based on the electricity generation data at grid plants for the year of operation of project plant. The electricity system selected to determine the combined margin emission coefficient is the SIC grid system in Chile.

4.5 Additionality

The additionality of the project has been demonstrated in accordance with ACM0006. The additionality of the project has been demonstrated in accordance with ACM0006, using the "Combined tool to identify the baseline scenario and demonstrate additionality" /26/.

4.5.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

It was demonstrated that CDM benefits were taken into account before a final decision to proceed with the process was made. Project starting date was verified to be 23 April 2008 (date of the purchase order of the power boiler) /2/. Moreover, in parallel with the project's implementation, actions were taken to secure CDM status for the project.

The following evidence was provided to demonstrate the prior consideration of the CDM by means of a detailed timeline of the real and continuing actions to secure CDM status for this project activity evidences provided for each event have been reviewed by DNV:

1 Arauco first considered the emission reduction in cogeneration initiatives in 1998, through a study carried out by SERCOR S.A. /7/ that explicitly considered the benefits related to power cogeneration: mainly higher efficiency and lower CO_2 emissions.
2 Arauco first considered the incentives of the CDM in 1999, evaluating and actually implementing a reforestation program /8/ in the coastal dry lands in the south part of the country.
3 During 2002, SERCOR S.A. developed a study about the Kyoto Protocol, the CDM and the Carbon Market possibilities available at that time /9/. This study was presented to members of the Arauco board and contributed to foster the interest in the CDM and the Kyoto Protocol.
4 Arauco presented the first grid-connected baseline methodology for biomass projects in Chile (the NM0081) in October 2004. Arauco began the construction of its first CDM biomass cogeneration project in April 2001, the "Trupan Biomass Power Plant in Chile" (Ref. Nº 0259). After that, Arauco implemented similar cogeneration initiatives in subsequent industrial projects. The "Nueva Aldea Biomass Power Plant

Phase I" (Ref. Nº0258) and the "Nueva Aldea Biomass Power Plant Phase II" (Ref. Nº 0346), were both successfully registered as CDM project activities during 2006.

5 Specifically for the Viñales project activity, the first presentation of the proposed project under CDM to the Arauco Board members, considering the applicable baseline methodology is dated 26 September 2005 /10/.

6 The project start date is 23 April 2008, which is the date of placing the purchase order for the boiler.

7 The validation contract with DNV was signed on 29 July 2008, and the validation process started on 02 August 2008.

4.5.2 Identification of alternatives to the project activity

According to section 4.4, the possible scenarios identified are.

i) Alternative 1 - no investment in new heat and/or power generation equipment (baseline)

ii) Alternative 2- a low-pressure power boiler unit on biomass fuels

iii) Alternative 3- a new cogeneration power plant on biomass fuels, implemented with a lower efficiency or at a later stage, not undertaken as a CDM project activity and

iv) Alternative 4- the proposed project activity not undertaken as a CDM project activity.

All the provided alternatives are in compliance with the legal and regulatory requirements.

4.5.3 Barrier analysis

a) *Investment Barriers*: It has been argued that as a member of the CDEC-SIC dispatch centre, Arauco is exposed to penalties applied to power generators by the national authority in case of any contingency in the power system, which was confirmed by DNV from the Economy Ministry: Law 18 410, modified on 19 May 2005 /36/. According to the law, these penalties are applied in proportion to the installed capacity of each electric power company /31/. This higher risk exposure prevents companies whose core business is not power generation from investing in power cogeneration projects. DNV has also verified that Arauco has paid to the date around US$ 130,000 in fines to the authority because of power contingencies of other grid connected biomass power projects /21/.

b) *Technological Barriers:* The project activity faces two kinds of technological barriers: necessity of skilled and trained labor to operate the power plant and risk of technological failure, because the cogeneration power plant tends to work with higher steam conditions and may interfere with the normal operation of the production processes. DNV confirmed through technical literature that specialized operators are a key issue to the successful operation of a co-generation power plant /38/. DNV also confirmed during the site visit (on-site inspection and interview with plant managers) that the Viñales Complex faces specific characteristics due to the project activity (surplus of electric power generation) that are not usual in the sawmill industry. Those characteristics are: i) more equipment; ii) skilled and trained labour required in order to operate the mill in a way that both the production and power generation are optimized; iii) work with higher steam conditions (i.e. 85 bar and 485°C); iv) may interferes with the normal operation of the operational processes. The risk of technological failure was also corroborated by an AF Celpap study /20/ which was evidenced by DNV.

c) *Barriers due to prevailing practice:* DNV was able to confirm that large scale electric power generation is not a normal practice in the sawmill industry. DNV confirmed with the CDEC-SIC (Economic Dispatch Center in the Central Interconnected System in Chile) that there is no other large scale biomass power plant that operates in the context of the sawmill

industry other than CDM registered projects. DNV has evidenced that there are 10 biomass based power plant in operation in Chile, of which 6 are CDM projects. The other 4 plants are small generators, from 5 to 13 MW, which demonstrates that the project activity at 41 MW installed capacity is not a common practice.

d) *Cultural Barriers*: The production and commercialization of pulp and paper is the principal business of Celulosa Arauco y Constitución S.A. as a consequence the internal culture is strongly influenced by the commodity market, which differ from the culture in the electric power sector. DNV confirmed during the site visit that the production and commercialization of pulp and paper is the principal business of Arauco.

e) *Barriers to entry to the electric power industry*: In Chile, there are no legal framework for grid connected small power generators from non conventional renewable energy and the project developer are not able to define the convenient regulatory scheme to dispatch to the grid. Furthermore, the project faces an operational barrier compared to power units. A dual penalization system is induced by the Chilean power dispatch for power generators that also produce power for their proper demand in case of dispatch failure. In Chile there are not several incentives to implement cogeneration units from non conventional renewable energy to generate electricity. The current initiatives do not make this kind of project financially attractive in the traditional electricity price context. DNV confirmed that the project faces barriers in the electric power industry with the following sources: i) CDEC-SIC Internal Regulation, Article 118; ii) Ministry Resolution RM 40; iii) Ministry Resolution RM 17.

DNV could ratify the existence of the mentioned barriers by assessing independent studies, reports and articles /40/ that confirm the barriers faced for non-conventional renewable power generation sources in Chile.

DNV has verified that while Arauco has other grid connected biomass based power plants in operation at other locations, these are stand alone projects and are not integrated in to the operation of a sawmill as in the case of the project and hence has specific barriers.

4.5.4 Investment analysis

Choice of approach

In order to substantiate the financial barriers and illustrate the CDM relevance for the project, the project proponent decided to conduct an investment analysis. Since the proposed project generates financial and economic benefits through the sales of electricity other than CDM-related income and the project proponent has other alternatives to the project activity, an investment comparison analysis is applicable. NPV analysis has been selected for each alternative defined in step 1 and compared with the alternative scenario 1 of no investment for power and/or heat generation. The NPV values calculated with a discount rate of 12% indicated a negative NPV value for all the alternatives considered.

The comparison was made by comparing the alternative scenarios 3, 4 with the alternative scenario 2. In doing so, a reference heat price was established in order to be the equivalent price required to finance the installation of a low-pressure power boiler unit in Viñales, leading to a zero NPV for alternative scenario 2. This reference price is then used in NPV calculations for alternative scenarios 3 and 4.

Discount Rate selection

The discount rate was established to be 12%. DNV confirms that this discount rate is used internally for project investment analysis in the Arauco group, such as the DHM storage building in Lincancel dated May 2003, thermal plant in Itata complex dated February 2003, Constitución production equipment dated 1998, and Arauco port project dated 29 September 1997 /11/.

Input parameters

DNV confirmed all assumptions and input parameters during the site visit.

- Alternative 2: a low-pressure power boiler unit on biomass fuels;
    - The investment was considered to be USD 17,453,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the boiler supplier's proposal dated 15 April 2008 /12/;
    - Residual value: it was confirmed by assessing Arauco's previous project initiatives /11/ that a residual value of 20 – 25% has been applied;
    - The biomass conversion factor of 0.15 BDt/m^3st was confirmed by assessing the monitoring reports of other registered CDM project activities from Arauco (Trupan – 0259 and Nueva Aldea Phase 1 – 0258);
    - The amount of biomass from Arauco was confirmed by assessing the biomass residues balance /13/;
    - The biomass price was confirmed by checking the historical biomass price from Arauco suppliers from 2006 to 2008 /14/;
    - The wood gross calorific value was confirmed by the PCM laboratory analysis carried on in 14 April 2008 /15/;
    - The combustion efficiency was confirmed by assessing the project energy and mass balance presented in the PDD /1/;
    - The electric consumption (MWh/steam ton) and demineralized water costs were confirmed by assessing the operational data of another similar sawmill without co-generation from Arauco – Colorado plant /16/;
    - The electrical costs were confirmed by assessing the latest CNE Node Price Report available at the time of the decision making /32/;
    - CAPEX: it was confirmed by assessing Arauco's previous project initiatives /11/ that a value of 1% of total investment has been applied;
    - The 10 years of depreciation and the 17% of income tax were confirmed in the Chilean Law of Income Tax /33/;
- Alternative 3: a new cogeneration power plant on biomass fuels (90 ton at 41.5 bar and 15 MW):
    - The investment was considered to be USD 49,034,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the Nueva Aldea Phase 1 project power boiler purchase order dated 2 January 2003 /17/; both power boilers are similar.

- The electrical efficiency, power plant consumption, fuel consumption and biomass demand were confirmed by assessing the project energy and mass balance presented in the PDD /1/;
- The electrical and power costs were confirmed by assessing the latest CNE Node Price Report available at the time of the decision making /32/;
- The ERNC benefits were confirmed by checking the Chilean Law 20257 /34/;
- The O&M costs were assessed by checking the Nueva Aldea Phase 1 O&M costs that were used for reference /18/;
- The transmission and distribution fees were confirmed by the correspondent CDEC-SIC reports /35/;

- Alternative 4: The proposed project activity:
  - The investment was considered to be USD 99,970,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the Nueva Aldea Phase 1 project power boiler purchase order dated 2 January 2003 /17/; both power boilers are similar.
  - Remaining parameters were confirmed as per alternative 3.

Calculation and conclusion

The NPV calculations were provided in a spreadsheet /19/. The calculations were verified and found to be correct. The assumptions used in the calculations were deemed to be correct by DNV as stated in the above section. The results were as follow:

- Alternative 2: USD 0.00;
- Alternative 3: (USD (-) 14,891);
- Alternative 4: (USD (-) 23,025) (normal plant factor) and (USD (-) 9,916) (high plant load factor);

The project-NPV without CDM revenues confirms that the project in the absence of CDM benefits and compared to the baseline (alternative 2) is not financially attractive.

Sensitivity analysis

A sensitivity analysis considering variations in the total investment, power price, heat price and biomass price demonstrates the following:

- Total investments: If the total investments decrease by 30.40% (normal plant factor) or by 13.09% (high plant factor), the project NPV will become positive. However, considering the analysis of the investment behavior in other Arauco projects /11/, the widest fluctuation between the investment estimation and real investment is from -10% to +25%. Therefore, a 13.09% decrease in the total investment is unlikely.
- Power price: Arauco has analysed the last 49 annual hydrological scenarios to determine the possible power price scenarios. For the project activity with normal plant factor, the power price would have to correspond to an extremely dry hydrology, which has not happened in the last 49 years; for the project activity with high plant factor, the power price would have to correspond to an extremely dry hydrology,

which has only happened 3 times in the last 49 years. DNV considers this possibility very unlikely.

- Heat price: If the heat prices increase 171% (normal plant factor) or 74% (high plant factor) the project NPV will become positive. However, in both situations the baseline alternative will have a much more attractive result.
- Biomass fuel price: If the biomass fuel price decrease by 65% (normal plant factor) or by 19% (high plant factor), the project NPV will become positive. However, considering the historical biomass prices from 2006 to 2008 /14/, this is not likely to happen.

The sensitivity analysis shows that even with substantial variation of the key indicators, the NPV of the proposed project is negative.

4.5.5 Common practice analysis

DNV verified that while cogeneration is normally used in the pulp industry in Chile (only for self-consumption), this technology is not common practice in the sawmill and panel board industries. Arauco is the only company who has developed biomass cogeneration to the point to become a relevant net energy generator in the SIC. Very few similar companies in the world and no other similar company in Chile have been deliberately designed to generate surplus electricity. The CDEC-SIC data that confirm this information is presented in the annex 3 of the PDD and confirmed in the CDEC-SIC webpage.

In conclusion, the assessment of the arguments presented above is deemed to sufficiently demonstrate that the project is not a likely alternative, and that emission reductions resulting from the project are additional.

4.6 Monitoring

The project applies the approved consolidated monitoring methodology ACM0006 (Version 09) – "Consolidated methodology electricity generation from biomass residues" /24/. The project also applies ACM0002 (Version 10) - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /25/ in combination with "Tool to calculate the emission factor for an electricity system – Version 02" /28/ for the grid emission factor.

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

4.6.1 Parameters determined ex-ante

The parameters used emission reduction calculations that are available *ex ante* are as given below:

- GWP_{CH4}: Global warming potential for CH_4;
- $EF_{burning\ CH4,k,y}$: CH_4 emission factor for uncontrolled burning of the biomass residue.

4.6.2 Parameters monitored ex-post

The monitoring plan allows for collection and archiving of the following key parameters related to the determination of emission reductions resulting from the project activity:

- $BF_{k,y}$: Quantity of biomass residue combusted in the project plant.
- $BF_{T,\,k,y}$: Quantity of biomass residue that has been transported to the project site.
- Moisture content of the biomass residues.
- $EF_{CH4,BF}$: CH_4 emission factor for the combustion of biomass residues in the project plant.
- AVD_y: Average round trip distance between biomass fuel supply sites and the project site.
- TL_y: Average truck load of the trucks used for transportation of biomass.
- $EF_{km,CO2,y}$: Average CO_2 emission factor for the trucks.
- $FF_{project\ plant,i,y}$: Quantity of fossil fuel combusted in the project plant.
- $FF_{project\ site,i,y}$: Quantity of fossil fuel combusted at the project site for other purposes that are attributable to the project activity.
- $FF_{biomass\ processing,i,y}$: Quantity of fossil fuel used for mechanical preparation of the biomass from forestry operations used in the project plant.
- $EG_{project\ plant}$: Net quantity of electricity generated in the project plant.
- NCV_k: Net calorific value of biomass residue.
- ε_{boiler}: Average net energy efficiency of heat generation in the boiler that would generate heat in the absence of the project activity.
- Quantity of biomass residues that are utilized in the defined geographical region.
- Quantity of available biomass in the region.
- $EC_{PJ,y}$: On-site electricity consumption attributable to the project activity.
- $EF_{grid,y}$: CO_2 emission factor for grid electricity.
- $EF_{CO2,LE}$: CO_2 emission factor of the most carbon intensive fuel used in the country.
- $FC_{i,m,y}$: Amount of fossil fuel consumed by power plant.
- $NCV_{i,y}$: Net calorific value of fossil fuel.
- $EF_{CO2,FF,y}$: CO_2 emission factor of fossil fuel.
- $Q_{Viñales\ complex,y}$: Quantity of heat generated by the new cogeneration project plant from firing biomass residues and consumed by the Viñales Industrial Complex.

Since emissions due to displacement of heat have not been considered for the project activity it is not necessary to monitoring the average net energy efficiency of heat generation in the boiler that would generate in the absence of the project activity.

4.6.3 Management system and quality assurance

Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures have been presented. The monitoring practices are considered appropriate.

Details of data to be collected, its certainty, and format and location to be filed are correctly described. The PDD describes the responsibility for project management, monitoring and reporting project activities. The data will be kept for two years after the end of the last crediting period.

The monitoring of sustainable indicators is required neither by the methodology ACM0006 nor by the Chilean DNA.

The application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.

4.7 Estimation of GHG emissions

The algorithm/formulae for calculating baseline and project emissions have been transparently documented and are in line with the requirements of ACM0006.

The emission reductions will be reported as the baseline emission through substitution of equivalent grid power and due to the natural decay or burning of anthropogenic sources of biomass residues, discounting the project emissions, and emissions due to leakage.

The system boundary for the grid electricity system affected by the project is defined as the system of the SIC grid. The combined margin emission coefficient for the grid will be monitored *ex-post* in accordance with ACM0002 which calls the "Tool to calculate the emission factor for an electricity system – Version 02".

The estimations of the *ex-ante* emission factor are based on electricity generation estimates provided by the Central Interconnected System of Chile (SIC) for the electricity generated in grid in the year 2008. The build margin emission coefficient (BM) was calculated considering the most recent 20% power plants capacity additions (in MWh) in the electricity system. The operating margin (OM) emission coefficient is calculated using the simple adjusted method, and is found to be 0.85758 tCO_2e/MWh and the build margin (BM) emission coefficient is 0.45928 tCO_2e/MWh, resulting in a combined margin emission coefficient of 0.658 tCO_2e/MWh (weighted average of the build and operating margin).

Baseline emissions due to the natural decay or burning of anthropogenic sources of biomass residues are calculated based on the incremental quantity of biomass used, its NCV and its methane emission factor for its uncontrolled burning.

The project emissions are due to:

i) biomass transportation, calculated on the basis of distance and the average truck load (Option 1 of ACM0006);

ii) on-site consumption of fossil fuels, related to additional fossil fuel consumption attributed to operational reasons, due to on-site transportation of the additional

biomass, and additional ashes disposal from the power boiler. This is calculated through the product between the amount of fossil fuel times its CO_2 emission coefficient. The latest is the result of the product between the fuel NCV and its CO_2 emission factor, according to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /27/;

iii) consumption of electricity. This source of project emissions is null since the additional electricity consumption related to the project activity is already accounted in the calculation of the net electricity generation;

iv) combustion of biomass residues, calculated based in the quantity of biomass combusted, its NCV and its methane emission factor.

The main potential source of leakage is related to local sawdust and shaving market depletion. The project proponent has performed a detailed research of the biomass supply / demand situation in the area influenced by the project. According to the information obtained in the biomass balance for 2008 /5/ (approach L2 of ACM0006), the Viñales biomass power plant counts with sufficient biomass locally and has not caused other biomass plants in the area to switch from biomass to fossil fuels so far, since the balance demonstrates that there is a surplus of 77.92%. Therefore, leakage emissions are considered to be nil. DNV verified the balance in detail as well as the input data used, and considers it adequate.

The estimated amount of GHG emission reductions from the project is calculated to be 3 157 034 tCO_2e over a 21 years crediting period, resulting in estimated average annual emission reductions of 150 335 tCO_2e.

The emission reduction calculation were provided in a spreadsheet /6/, and it can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

In summary, the GHG calculations are complete and transparent, and their accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.8 Environmental impacts

According to the Chilean environmental regulations, the project proponent submitted in September 2008 an Environmental Impact Declaration to the Environment National Authority, CONAMA, and received the corresponding approval of the project through the "Resolución Exenta N°80/2009" /3/.

No significant environmental impacts are predicted.

4.9 Comments by local stakeholders

Stakeholders involvement was organized through the following channels: television, radio, press, door-to-door presentation of the project to the local community and meetings with local stakeholders such as environmental authorities of the VII Region, Viñales personnel, local business community, CORMA (the Wood Corporation), fisherman federation of the VII Region, Environmental Committee of Constitución and Personnel of the Constitución pulp mill.

Correspondent evidences were provided to DNV /4/. No negative comments were received.

DNV considers the local stakeholder consultation carried out adequate.

4.10 Comments by Parties, stakeholders and NGOs

The PDD of 31 July 2008 was made publicly available on DNV's climate change website (http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1963) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 02 August 2008 to 31 August 2008. No comments were received.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	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	~~CAR 1~~ 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 Procedures §40a	~~CAR 1~~ 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 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	The Chilean DNA is the National Environmental Comission CONAMA. The UK DNA is the Department for Environment, Food and Rural Affairs.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	Chile has ratified the Kyoto Protocol on 28 August 2002. UK has ratified the Kyoto

Requirement	Reference	Conclusion
		Protocol on 31 May 2002.
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §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 Procedures §31b	OK
About additionality		
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.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK
About forecast emission reductions and environmental impacts		
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
For large-scale projects only		
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
About stakeholder involvement		
13. 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
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	The PDD of 31 July 2008 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties,

Requirement	Reference	Conclusion
		stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 02 August 2008 to 31 August 2008. No comments were received.
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. 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	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity					
A.1 Title of the project activity (VVM para 55-57)					
A.1.1 Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes		OK
A.2 Description of the project activity (VVM para 58-64)					
A.2.1 How was the design of the project assessed?	/1/	DR	*What type is the project?* ☐ Project in existing facility or utilizing existing equipment(s) ☐ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis. ☐ The project is an individual small scale project activity with emission reductions		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project *How was the design of the project assessed?* ☒ Physical site inspection ☒ Reviewing available designs and feasibility studies		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	The physical implementation was not in place yet at the time the validation commenced.		OK
A.2.3 If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis:	/1/	DR	Not applicable.		OK
A.2.4 Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR	Yes. The "Viñales Biomass Power Plant in Chile" is a grid-connected renewable energy project activity, displacing grid electricity with electricity generated from renewable sources (sawdust and bark from sawmills and biomass residues from forestry operations) after meeting the captive steam and electricity requirements of attached sawmill, thus resulting in emission reductions of greenhouse gases in the energy sector. The project activity consists in the installation of a new biomass cogeneration power plant in the Viñales sawmill. The new cogeneration unit consists of a 250 ton/hr fluidized bed boiler and a 41 MW condensing / extracting turbo generator		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			unit, allowing for additional electricity of 216.3 GWh/year to be displaced from the central Chilean grid (SIC). Prior to the implementation of the project activity, the Viñales sawmill relied on an external company who supplied heat to the Viñales sawmill and on the grid for electric power.		
A.2.5 Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	No, the project activity consists of the installation of a new biomass cogeneration plant.		OK
A.2.6 Does the project design engineering reflect current good practices?	/1/	DR	The project design engineering reflects good practice applying the steam Rankine cycle technology for generation of steam and power.		OK
A.2.7 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?	/1/	DR	Yes. Technology is imported from Finland.		OK
A.3 Participation requirements (VVM para 51-54, 125-127)					
A.3.1 Do all participating Parties fulfil the participation requirements as follows:	/1/	DR			OK
			Chile (host) UK		
a) Party has ratified the Kyoto Protocol			☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No		
b) Party has designated a Designated National Authority			☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No		
c) The assigned amount has been determined			☒ Yes ☐ No ☒ Yes ☐ No ☐ Yes ☐ No		
A.3.2 Do the letters of approval meet the following requirements?	/1/	DR	DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	~~CAR 1~~	OK
			Chile (host) UK Country Y		

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
a) LoA confirms that Party has ratified the Kyoto Protocol	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
b) LoA confirms that participation is voluntary	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?	☒ Yes ☐ No		NA NA		
d) The LoA refers to the precise project activity title in the PDD	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
e) The LoA is unconditional with respect to (a) to (d) above	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
f) The LoA is issued by the respective Party's DNA	☒ Yes ☐ No		☐ Yes ☐ No ☐ Yes ☐ No		
g) The LoA was received directly by the DNA or the PP	☐ DNA ☒ PP		☐ DNA ☐ PP ☐ DNA ☐ PP		
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic	DNV confirmed from the DNA webpage the authenticity of the letter provided by the project proponent (PP)				
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/	DR	DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	~~CAR 1~~	OK
A.4 Technical description of the project activity (VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/	DR	The project is located in the commune of Constitución in the Maule Region, Chile		OK
A.5 Public funding of the project activity					
A.5.1 In case 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	/1/	DR	No public funding is involved, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards the project.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
from and is not counted towards the financial obligations of these Parties?					
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/ /24/	DR	The project activity applies the approved baseline methodology ACM0006 (Version 09) - "Consolidated methodology electricity generation from biomass residues".		OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/ /25/ /28/	DR	The project also applies ACM0002 (Version 10) - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" in combination with "Tool to calculate the emission factor for an electricity system – Version 02" for the grid emission factor calculation.		OK
B.2 Applicability of methodology (and tools) (VVM para 65-76) *Insert a row for each applicability criteria of the applied methodology (and tools)*					
B.2.1 How was it validated that project complies with the following applicability criteria: This methodology is applicable to biomass residue fired electricity generation in power and heat plants project activities, including cogeneration plants?	/1/	DR	This methodology is applicable to the Viñales Biomass Power Plant in Chile as this project consists of a biomass residue energy co-generation plant for supplying electricity to the Chilean grid (SIC).		OK
B.2.2 How was it validated that project complies with the following applicability criteria: The project activity may include the following activities or combinations of these activities: The installation of a new biomass residue fired power plant at a site where currently no power generation	/1/	DR	DNV confirmed during the site visit that prior to the project activity there was no power generation at the project site.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
occurs (greenfield power projects); The installation of a new biomass residue fired power plant, which replaces or is operated next to existing power plants fired with either fossil fuels or the same type of biomass residue as in the project plant (power capacity expansion projects); The improvement of energy efficiency of existing power plant (energy efficiency improvement projects), e.g. by retrofitting the existing plant or by installing a more efficient plant that replaces the existing plant; or the replacement of fossil fuels by biomass residues in an existing or a reference power plant (fuel switch projects)?					
B.2.3 How was it validated that project complies with the following applicability criteria: No other biomass types than biomass residues, as defined above, are used in the project plant and these biomass residues are the predominant fuel used in the project plant (some fossil fuels may be co-fired)?	/1/	DR	DNV confirmed during the site visit that biomass residues generated in the forest industry (from nearby sawmills and from forestry operations) are used in the cogeneration plant; some fossil fuels may be co-fired to a limited extent.		OK
B.2.4 How was it validated that project complies with the following applicability criteria: For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project shall not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process?	/1/	DR	DNV confirmed during the site visit that no major process change or substantial changes in processing capacities were envisaged due to project activity as the production mix of the Viñales facilities is determined by the sawmill/ market conditions.		OK
B.2.5 How was it validated that project complies with the following applicability criteria: The biomass residues used by the project facility should not be stored for more than one year?	/1/ /3/	DR	DNV confirmed during the site visit that the bark and sawdust mix are stored in a dedicated place near the Viñales power plant for less than two weeks, as defined in the approved Environmental Impact Declaration.		OK
B.2.6 How was it validated that project complies with the following applicability criteria: No significant energy quantities, except from transportation or mechanical treatment of the biomass residues, are required to prepare the	/1/	DR	DNV confirmed during the site visit that the biomass residues do not require any preparation (other than mechanical preparation, in some cases) before being used as fuel.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
biomass residues for fuel combustion, i.e. projects that process the biomass residues prior to combustion (e.g. esterification of waste oils)?					
B.2.7 Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	The chosen baseline scenario corresponds to scenario n°3, which is a combination of the following baseline scenarios given in ACM0006: For power generation: The generation of power in the grid-connected power plants (P4); For heat generation: The generation of heat in boilers using the same type of biomass residues (H4); For biomass use: The additional biomass is dumped or left to decay under mainly aerobic conditions (B1). Biomass residues which are left to decay in absence of the project activity were considered for possible methane emissions in the baseline activity.		OK
B.3 Project boundary (VVM para 78-80)					
B.3.1 What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/	DR	In line with ACM0006, the system boundary includes the power plant, the biomass transportation and grid-connected power plants.		OK
B.3.2 Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/	DR	Baseline emissions: CO_2 from grid electricity generation and CH_4 emissions from the natural decay or burning of anthropogenic sources of biomass residue. Project emissions: CO_2 emissions from biomass transportation, on-site consumption of fossil fuels, and combustion of biomass residues.		OK
B.3.3 Does the project involve other emissions sources not foreseen by the methodologies that may question the	/1/	DR	No other project emission or leakage sources contributing more than 1% and not mentioned by		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?			the methodology have been found.		
B.4 Baseline scenario determination (VVM para 81-88, 105-107) *Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.*					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR	In line with the ACM0006 methodology, the following alternative baseline scenarios for power generation (P), heat generation (H) and biomass use (B) have been discussed: **POWER GENERATION** P1: The proposed project activity not undertaken as a CDM project activity; P2: The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-) fired in the project activity; P3: The generation of power in an existing captive power plant , using only fossil fuels; P4: The generation of power in the grid;		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			P5: The installation of a **new** biomass residue fired power plant , fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case; P6: The installation of a **new** biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity. Therefore, the power output is the same as in the project case; P7: The **retrofitting** of an existing biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case; P8: The **retrofitting** of an existing biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			(e.g. an efficiency that is common practice in the relevant industry sector) than the project activity; P9: The installation of a **new** fossil fuel fired captive power plant at the project site; P10: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity; P11: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site. **HEAT** H1: The proposed project activity not undertaken as a CDM project activity; H2: The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector); H3: The generation of heat in an existing captive, cogeneration plant, using only fossil fuels; H4: The generation of heat in boilers using the same type of biomass residues;		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			H5: The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the project activity; H6: The generation of heat in boilers using fossil fuels; H7: The use of heat from external sources, such as district heat; H8: Other heat generation technologies (e.g. heat pumps or solar energy); H9: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity; H10: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site. **BIOMASS** B1: The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields; B2: The biomass residues are dumped or left to		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields; B3: The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes; B4: The biomass residues are used for heat and/or electricity generation at the project site; B5: The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants;3 B6: The biomass residues are used for heat generation in other existing or new boilers at other sites; B7: The biomass residues are used for other energy purposes, such as the generation of biofuels; B8: The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry). DNV considers the list of realistic and credible alternatives to be complete.		
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/ /5/	DR	During the site visit DNV confirmed that i) there is no power generation unit at the project site, and ii) there are no other biomass types available in the region to generate power, as confirmed from the INFOR website. Therefore, the alternatives of P2, P3, P7, P8, P10 and P11 are eliminated. The		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			feasible alternative scenarios for power generation would be P1, P4, P5, P6 and P9. During the site visit DNV confirmed that i) there is no captive power plant installed, ii) there is no biomass cogeneration power plant installed, iii) there are no other heat generation technologies available at the site iv) there is no cogeneration power plant based in fossil fuels installed. Therefore, the feasible alternative scenarios for heat generation would be H1, H2, H4, H6, H7 and H9. During the site visit DNV confirmed that i) there is no biomass boiler at the project site, ii) there is a surplus of biomass available in the region that is not used, iii) the generation of bio-fuels is not developed in Chile and iv) the biomass residues used for energy generation purposes are not the same as the biomass residues used for feedstock or for pulp and paper production. Therefore, the feasible alternative scenarios for biomass would be B1, B2 and B3.		
B.4.3 What is the baseline scenario?	/1/	DR	The chosen baseline scenario corresponds to scenario n°3, which is a combination of the following baseline scenarios given in ACM0006: For power generation: The generation of power in the grid-connected power plants (P4); For heat generation: The generation of heat in boilers using the same type of biomass residues (H4); For biomass use: The additional biomass is		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			dumped or left to decay under mainly aerobic conditions (B1). Biomass residues which are left to decay in absence of the project activity were considered for possible methane emissions in the baseline activity.		
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	Yes, see B.4.3.		OK
B.4.5 Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes, see B.4.1 – B.4.3		OK
B.4.6 Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes, the baseline scenario is in compliance with the legal and regulatory requirements		OK
B.4.7 Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	All literature and sources have been referenced and checked by DNV.		OK
B.4.8 Is the baseline determination adequately documented in the PDD? • All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. • All documentation is relevant as well as correctly quoted and interpreted. • Assumptions and data can be deemed reasonable • Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. • The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/	DR	Yes, see B.4.1 – B.4.7		OK

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B.5 Additionality determination (VVM para 94-121)					
B.5.1 What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /26/	DR	The additionality of the project has been demonstrated in accordance with ACM0006, using the "Combined tool to identify the baseline scenario and demonstrate additionality".		OK
B.5.2 Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	The possible scenarios identified are. Alternative 1 - no investment in new heat and/or power generation equipment (baseline) Alternative 2- a low-pressure power boiler unit on biomass fuels Alternative 3- a new cogeneration power plant on biomass fuels, implemented with a lower efficiency or at a later stage, not undertaken as a CDM project activity and Alternative 4- the proposed project activity not undertaken as a CDM project activity. Yes, the provided alternatives are in compliance with the legal and regulatory requirements.		OK
B.5.3 Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Yes, see further discussion.		OK
B.5.4 What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality is based in both investment and barrier analysis.		OK
Prior consideration of CDM (VVM para 98-103)					
B.5.5 What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /2/ /7/ /8/ /9/ /10/	DR	It was demonstrated that CDM benefits were taken into account before a final decision to proceed with the process was made. Project starting date was verified to be 23 April 2008 (date of the purchase order of the power boiler). The following evidence was provided to		OK

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			demonstrate the prior consideration of the CDM by means of a detailed timeline of the real and continuing actions to secure CDM status for this project activity evidences provided for each event have been reviewed by DNV: • Arauco first considered the emission reduction in cogeneration initiatives in 1998, through a study carried out by SERCOR S.A. that explicitly considered the benefits related to power cogeneration: mainly higher efficiency and lower CO_2 emissions. • Arauco first considered the incentives of the CDM in 1999, evaluating and actually implementing a reforestation program in the coastal dry lands in the south part of the country. • During 2002, SERCOR S.A. developed a study about the Kyoto Protocol, the CDM and the Carbon Market possibilities available at that time. This study was presented to members of the Arauco board and contributed to foster the interest in the CDM and the Kyoto Protocol. • Arauco presented the first grid-connected baseline methodology for biomass projects in Chile (the NM0081) in October 2004. Arauco began the construction of its first CDM biomass cogeneration project in April 2001, the "Trupan Biomass Power Plant in Chile" (Ref. Nº 0259). After that, Arauco implemented similar cogeneration initiatives in subsequent industrial projects. The "Nueva Aldea Biomass Power Plant Phase I" (Ref.		

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			Nº0258) and the "Nueva Aldea Biomass Power Plant Phase II" (Ref. Nº 0346), were both successfully registered as CDM project activities during 2006. • Specifically for the Viñales project activity, the first presentation of the proposed project under CDM to the Arauco Board members, considering the applicable baseline methodology is dated 26 September 2005. • The project start date is 23 April 2008, which is the date of placing the purchase order for the boiler.		
B.5.6 If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/	DR	Not applicable.		OK
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7 What initiatives where 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/	DR	The validation contract with DNV was signed on 29 July 2008, and the validation process started on 02 August 2008.		OK
B.5.8 When did the construction of the project activity start?	/1/	DR	The project activity construction had not started at the beginning of the validation.		OK
B.5.9 When was the project commissioned?	/1/	DR	The project commissioning was not in place at the beginning of the validation.		OK
B.5.10Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Yes, since the validation process started less than four months after the project activity starting date.		OK

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Investment analysis (VVM para 108-114) *The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.*					
B.5.11Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	Yes, the proposed project generates financial and economic benefits through the sales of electricity.		OK
B.5.12Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	Yes, the project proponent has other alternatives to the project activity.		OK
B.5.13Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	Yes, the choice of investment comparison analysis is correct.		OK
B.5.14Is the benchmark/discount rate the latest available at the time of decision?	/1/ /11/	DR	Yes. The discount rate was established to be 12%. DNV confirms that this discount rate is used internally for project investment analysis in the Arauco group, such as the DHM storage building in Lincancel dated May 2003, thermal plant in Itata complex dated February 2003, Constitución production equipment dated 1998, and Arauco port project dated 29 September 1997.		OK
B.5.15What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/	DR	The financial indicator is project NPV after tax.		OK
B.5.16Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	Yes, the underlying assumptions are appropriate.		OK
B.5.17Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/ /33/	DR	Yes. The 10 years of depreciation and the 17% of income tax were confirmed in the Chilean Law of Income Tax.		OK
B.5.18Is the time period of the investment analysis and operating time of the project realistic? Has salvage value	/1/ /11/	DR	Yes, residual value is considered. it was confirmed by assessing Arauco's previous project		OK

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been taken into account? Is working capital returned in the last year of operation?			initiatives that a residual value of 20 – 25% has been applied.		
B.5.19When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR	Not applicable.		OK
B.5.20How was the amount of output (e.g. sales of electricity) assessed?	/1/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☒ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☐ Other approach. *Provide details on how the load factor was validated::* The project is expected to generate 216 GWh per year. DNV confirmed this figure by assessing the energy and mass balance presented in the PDD and elaborated by the third party AF Celpap.		OK
B.5.21How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision?	/1/ /32/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how the output price was validated:* The electrical costs were confirmed by assessing		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the latest CNE Node Price Report available at the time of the decision making.		
B.5.22How were the investment costs assessed? Were the data available and valid at the time of decision?	/1/ /12/ /17/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants *Provide details on how the investment costs were validated:* The investment for Alternative 2 was considered to be USD 17,453,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the boiler supplier's proposal dated 15 April 2008; The investment for Alternative 3 was considered to be USD 49,034,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the Nueva Aldea Phase 1 project power boiler purchase order dated 2 January 2003; both power boilers are similar. The investment for Alternative 4 was considered to be USD 99,970,000. This was confirming by assessing Arauco's correspondent budget and confirming the major investment with the Nueva Aldea Phase 1 project power boiler purchase order dated 2 January 2003; both power boilers are similar.		OK
B.5.23How were the O&M costs assessed? Were the data available and valid at the time of decision?	/1/ /11/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public		OK

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	/18/		announcements and annual financial reports related to the project and the project participants *Provide details on how the O&M costs were validated:* For Alternative 2, it was confirmed by assessing Arauco's previous project initiatives that a value of 1% of total investment has been applied. For Alternatives 3 and 4 the O&M costs were assessed by checking the Nueva Aldea Phase 1 O&M costs that were used for reference.		
B.5.24Describe the assessment of the other input parameters. Were the data available and valid at the time of decision?	/1/ /13/ /14/ /15/ /16/ /34/ /35/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how other input parameters were validated:* The biomass conversion factor of 0.15 BDt/m^3st was confirmed by assessing the monitoring reports of other registered CDM project activities from Arauco (Trupan – 0259 and Nueva Aldea Phase 1 – 0258); The amount of biomass from Arauco was confirmed by assessing the biomass residues balance; The biomass price was confirmed by checking the historical biomass price from Arauco suppliers from 2006 to 2008; The wood gross calorific value was confirmed by the PCM laboratory analysis carried on in 14		OK

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			April 2008; The combustion efficiency was confirmed by assessing the project energy and mass balance presented in the PDD; The electric consumption (MWh/steam ton) and demineralized water costs were confirmed by assessing the operational data of another similar sawmill without co-generation from Arauco – Colorado plant; The electrical efficiency, power plant consumption, fuel consumption and biomass demand were confirmed by assessing the project energy and mass balance presented in the PDD; The ERNC benefits were confirmed by checking the Chilean Law 20257; The transmission and distribution fees were confirmed by the correspondent CDEC-SIC reports.		
B.5.25Was the financial calculation spreadsheet verified and found to be correct?	/1/ /19/	DR	The NPV calculations were provided in a spreadsheet. The calculations were verified and found to be correct. The assumptions used in the calculations were deemed to be correct by DNV as stated in the above section. The results were as follow: • Alternative 2: USD 0.00; • Alternative 3: (USD (-) 14,891); • Alternative 4: (USD (-) 23,025) (normal plant factor) and (USD (-) 9,916) (high plant load factor);		OK

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			The project-NPV without CDM revenues confirms that the project in the absence of CDM benefits and compared to the baseline (alternative 2) is not financially attractive.		
B.5.26Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR	A sensitivity analysis was conducted considering variations in the total investment, power price, heat price and biomass price.		OK
B.5.27Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	The range of variations was established to reach the benchmark, which is reasonable.		OK
B.5.28Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/ /11/ /14/	DR	Total investments: If the total investments decrease by 30.40% (normal plant factor) or by 13.09% (high plant factor), the project NPV will become positive. However, considering the analysis of the investment behavior in other Arauco projects, the widest fluctuation between the investment estimation and real investment is from -10% to +25%. Therefore, a 13.09% decrease in the total investment is unlikely. Power price: Arauco has analysed the last 49 annual hydrological scenarios to determine the possible power price scenarios. For the project activity with normal plant factor, the power price would have to correspond to an extremely dry hydrology, which has not happened in the last 49 years; for the project activity with high plant factor, the power price would have to correspond to an extremely dry hydrology, which has only happened 3 times in the last 49 years. DNV considers this possibility very unlikely. Heat price: If the heat prices increase 171%		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			(normal plant factor) or 74% (high plant factor) the project NPV will become positive. However, in both situations the baseline alternative will have a much more attractive result. Biomass fuel price: If the biomass fuel price decrease by 65% (normal plant factor) or by 19% (high plant factor), the project NPV will become positive. However, considering the historical biomass prices from 2006 to 2008, this is not likely to happen. The sensitivity analysis shows that even with substantial variation of the key indicators, the NPV of the proposed project is negative.		
Barrier analysis (VVM para 115-118)					
B.5.29Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	Yes, barriers are complimentary to the investment analysis.		OK
B.5.30How were the investment barriers assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/ /21/ /31/ /36/	DR	It has been argued that as a member of the CDEC-SIC dispatch centre, Arauco is exposed to penalties applied to power generators by the national authority in case of any contingency in the power system, which was confirmed by DNV from the Economy Ministry: Law 18 410, modified on 19 May 2005. According to the law, these penalties are applied in proportion to the installed capacity of each electric power company. This higher risk exposure prevents companies whose core business is not power generation from investing in power cogeneration projects. DNV has also verified that Arauco has paid to the date around US$ 130,000 in fines to		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the authority because of power contingencies of other grid connected biomass power projects.		
B.5.31How does CDM alleviate the investment barriers?	/1/	DR	CDM incomes will help the project developer with revenues in case of penalties. The prospects of a project that will generate CERs, attract financiers who would normally not finance this kind of projects without CDM		OK
B.5.32Is 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/	DR	The baseline scenario is not prevented by the investment barriers.		OK
B.5.33How were the technological barriers assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/ /20/ /38/	DR	The project activity faces two kinds of technological barriers: necessity of skilled and trained labor to operate the power plant and risk of technological failure, because the cogeneration power plant tends to work with higher steam conditions and may interfere with the normal operation of the production processes. DNV confirmed through technical literature that specialized operators are a key issue to the successful operation of a co-generation power plant. DNV also confirmed during the site visit (on-site inspection and interview with plant managers) that the Viñales Complex faces specific characteristics due to the project activity (surplus of electric power generation) that are not usual in the sawmill industry. Those characteristics are: i) more equipment; ii) skilled and trained labour required in order to operate the mill in a way that both the production and power generation are optimized; iii) work with higher steam conditions (i.e. 85 bar and 485°C); iv) may interferes with the normal operation of the		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			operational processes. The risk of technological failure was also corroborated by an AF Celpap study which was evidenced by DNV.		
B.5.34How does CDM alleviate the technological barriers?	/1/	DR	CDM revenues will alleviate the technological barriers.		OK
B.5.35Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	The baseline scenario is not prevented by the technological barriers.		OK
B.5.36How were the barriers due to prevailing practise assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	DNV was able to confirm that large scale electric power generation is not a normal practice in the sawmill industry. DNV confirmed with the CDEC-SIC (Economic Dispatch Center in the Central Interconnected System in Chile) that there is no other large scale biomass power plant that operates in the context of the sawmill industry other than CDM registered projects. DNV has evidenced that there are 10 biomass based power plant in operation in Chile, of which 6 are CDM projects. The other 4 plants are small generators, from 5 to 13 MW, which demonstrates that the project activity at 41 MW installed capacity is not a common practice.		OK
B.5.37How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	The CDM has allowed the company to leverage its energy-efficiency policy, by making the big-scale biomass cogeneration technology feasible.		OK
B.5.38Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	The baseline scenario is not prevented by the prevailing practice barriers.		OK
B.5.39How were the other barriers assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/ /40/	DR	*Cultural Barriers*: The production and commercialization of pulp and paper is the principal business of Celulosa Arauco y		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Constitución S.A. as a consequence the internal culture is strongly influenced by the commodity market, which differ from the culture in the electric power sector. DNV confirmed during the site visit that the production and commercialization of pulp and paper is the principal business of Arauco. *Barriers to entry to the electric power industry*: In Chile, there are no legal framework for grid connected small power generators from non conventional renewable energy and the project developer are not able to define the convenient regulatory scheme to dispatch to the grid. Furthermore, the project faces an operational barrier compared to power units. A dual penalization system is induced by the Chilean power dispatch for power generators that also produce power for their proper demand in case of dispatch failure. In Chile there are not several incentives to implement cogeneration units from non conventional renewable energy to generate electricity. The current initiatives do not make this kind of project financially attractive in the traditional electricity price context. DNV confirmed that the project faces barriers in the electric power industry with the following sources: i) CDEC-SIC Internal Regulation, Article 118; ii) Ministry Resolution RM 40; iii) Ministry Resolution RM 17. DNV could ratify the existence of the mentioned barriers by assessing independent studies, reports and articles that confirm the barriers faced for		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			non-conventional renewable power generation sources in Chile.		
B.5.40How does CDM alleviate the other barriers?	/1/	DR	The prospects of a project that will generate CERs, attract financiers who would normally not finance this kind of projects without CDM		OK
B.5.41Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	The baseline scenario is not prevented by the other barriers.		OK
Common practice analysis (VVM para 119-121)					
B.5.42What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	The geographical scope of the common practice analysis is the SIC grid, which is reasonable.		OK
B.5.43What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/	DR	All grid-connected power plants are considered.		OK
B.5.44What is the data source(s) used for the common practice analysis?	/1/	DR	The CDEC-SIC information is used.		OK
B.5.45How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	DNV verified that while cogeneration is normally used in the pulp industry in Chile (only for self-consumption), this technology is not common practice in the sawmill and panel board industries. Arauco is the only company who has developed biomass cogeneration to the point to become a relevant net energy generator in the SIC. Very few similar companies in the world and no other similar company in Chile have been deliberately designed to generate surplus electricity.		OK
B.5.46How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	Not applicable.		OK
B.5.47What is the conclusion of the common practice analysis?	/1/	DR	The project activity does not represent a common practice in the Chilean SIC grid.		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	Conclusion					
	B.5.48What is the conclusion with regard to the additionality of the project activity?	/1/	DR	In conclusion, the assessment of the arguments presented above is deemed to sufficiently demonstrate that the project is not a likely alternative, and that emission reductions resulting from the project are additional.		OK
B.6	**Calculations of GHG emission reductions**					
	Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
	B.6.1 How was the CH_4 emission factor for uncontrolled burning of the biomass residue verified?	/1/	DR	Methane emission factor was measured by a third party company in 2009, as presented in the PDD Annex 3.		OK
	Baseline emissions (VVM para 89-93)					
	B.6.2 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Baseline emissions are due to substitution of equivalent grid power and due to the natural decay or burning of anthropogenic sources of biomass residues. The system boundary for the grid electricity system affected by the project is defined as the system of the SIC grid. The combined margin emission coefficient for the grid will be monitored *ex-post* in accordance with ACM0002 which calls the "Tool to calculate the emission factor for an electricity system – Version 02". The estimations of the *ex-ante* emission factor are based on electricity generation estimates provided by the Central Interconnected System of Chile (SIC) for the electricity generated in grid in the year 2008. The build margin emission coefficient (BM) was calculated considering the most recent 20% power plants capacity additions (in MWh) in		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the electricity system. The operating margin (OM) emission coefficient is calculated using the simple adjusted method, and is found to be 0.85758 tCO_2e/MWh and the build margin (BM) emission coefficient is 0.45928 tCO_2e/MWh, resulting in a combined margin emission coefficient of 0.658 tCO_2e/MWh (weighted average of the build and operating margin). Baseline emissions due to the natural decay or burning of anthropogenic sources of biomass residues are calculated based on the incremental quantity of biomass used, its NCV and its methane emission factor for its uncontrolled burning.		
B.6.3 Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Yes, see B.6.2		OK
B.6.4 Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes, see B.6.2		OK
Project emissions (VVM para 89-93)					
B.6.5 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /27/	DR	The project emissions are due to: • biomass transportation, calculated on the basis of distance and the average truck load (Option 1 of ACM0006); • on-site consumption of fossil fuels, related to additional fossil fuel consumption attributed to operational reasons, due to on-site transportation of the additional biomass, and additional ashes disposal from the power boiler. This is calculated through the product between the amount of fossil fuel times its		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			CO_2 emission coefficient. The latest is the result of the product between the fuel NCV and its CO_2 emission factor, according to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"; • consumption of electricity. This source of project emissions is null since the additional electricity consumption related to the project activity is already accounted in the calculation of the net electricity generation; • combustion of biomass residues, calculated based in the quantity of biomass combusted, its NCV and its methane emission factor.		
B.6.6 Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Yes, see B.6.5		OK
B.6.7 Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes, see B.6.5		OK
Leakage (VVM para 89-93)					
B.6.8 Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /5/	DR	The main potential source of leakage is related to local sawdust and shaving market depletion. The project proponent has performed a detailed research of the biomass supply / demand situation in the area influenced by the project. According to the information obtained in the biomass balance for 2008 (approach L2 of ACM0006), the Viñales biomass power plant counts with sufficient biomass locally and has not caused other biomass plants in the area to switch from biomass to fossil fuels so far, since the balance demonstrates that there is a surplus of 77.92%. Therefore, leakage emissions are considered to be		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			nil. DNV verified the balance in detail as well as the input data used, and considers it adequate.		
B.6.9 Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Not applicable.		OK
B.6.10Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Not applicable.		OK
Emission Reductions (VVM para 89-93)					
B.6.11Algorithms and/or formulae used to determine emission reductions: • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	/1/ /6/	DR	The estimated amount of GHG emission reductions from the project is calculated to be 3 157 034 tCO_2e over a 21 years crediting period, resulting in estimated average annual emission reductions of 150 335 tCO_2e. The emission reduction calculation were provided in a spreadsheet, and it can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV. In summary, the GHG calculations are complete and transparent, and their accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.		OK
B.7 Monitoring plan (VVM para 122-124)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ /24/ /25/ /28/	DR	The project applies the approved consolidated monitoring methodology ACM0006 (Version 09) – "Consolidated methodology electricity generation from biomass residues". The project also applies ACM0002 (Version 10) -		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" in combination with "Tool to calculate the emission factor for an electricity system – Version 02" for the grid emission factor. The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.		
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	Yes. The monitoring plan allows for collection and archiving of the following key parameters related to the determination of emission reductions resulting from the project activity: • $BF_{k,y}$: Quantity of biomass residue combusted in the project plant. • $BF_{T,\ k,y}$: Quantity of biomass residue that has been transported to the project site. • Moisture content of the biomass residues. • $EF_{CH4,BF}$: CH_4 emission factor for the combustion of biomass residues in the project plant. • AVD_y: Average round trip distance between biomass fuel supply sites and the project site. • TL_y: Average truck load of the trucks		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			used for transportation of biomass. • $EF_{km,CO2,y}$: Average CO_2 emission factor for the trucks. • $FF_{project\ plant,i,y}$: Quantity of fossil fuel combusted in the project plant. • $FF_{project\ site,i,y}$: Quantity of fossil fuel combusted at the project site for other purposes that are attributable to the project activity. • $FF_{biomass\ processing,i,y}$: Quantity of fossil fuel used for mechanical preparation of the biomass from forestry operations used in the project plant. • $EG_{project\ plant}$: Net quantity of electricity generated in the project plant. • NCV_k: Net calorific value of biomass residue. • ε_{boiler}: Average net energy efficiency of heat generation in the boiler that would generate heat in the absence of the project activity. • Quantity of biomass residues that are utilized in the defined geographical region.		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			• Quantity of available biomass in the region. • $EC_{PJ,y}$: On-site electricity consumption attributable to the project activity. • $EF_{grid,y}$: CO_2 emission factor for grid electricity. • $EF_{CO2,LE}$: CO_2 emission factor of the most carbon intensive fuel used in the country. • $FC_{i,m,y}$: Amount of fossil fuel consumed by power plant. • $NCV_{i,y}$: Net calorific value of fossil fuel. • $EF_{CO2,FF,y}$: CO_2 emission factor of fossil fuel. • $Q_{Viñales\ complex,y}$: Quantity of heat generated by the new cogeneration project plant from firing biomass residues and consumed by the Viñales Industrial Complex. Since emissions due to displacement of heat have not been considered for the project activity it is not necessary to monitoring the average net energy efficiency of heat generation in the boiler that would generate in the absence of the project activity.		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	Quantity of biomass – weight or volume meters. Truckloads – weighbridge Quantity of fossil fuels – flowmeter Electricity generated – electric meters Heat generated – measured indirectly by flowmeters, thermo couples and pressure gauges.		OK
B.7.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR	• $BF_{k,y}$: Weightbridge (±0,125% - ±3%) and weight meter (±1,2% - ±3%); • $BF_{T,k,y}$: Weightbridge (±0,125% - ±3%); • TL_y: Weightbridge (±0,125% - ±3%); • $FF_{project\ plant,i,y}$: Flowmeter (±1% - ±1,5%); • $EG_{project\ plant}$: Electricity meter (±0,2% - ±2%); • $Q_{Horcones\ complex,y}$: Flowmeter (±0,025% - ±0,075%), Thermocouples (±0,1% - ±0,15%) and Pressure gauges (±0,075%).		OK
B.7.5 In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	Yes, the calibrations will be carried out as per manufacturer's requirements.		OK
B.7.6 Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	Yes: • $BF_{k,y}$, $BF_{T,k,y}$, and Moisture content of the biomass residues: Continuously; • $EF_{CH4,BF}$: Quarterly; • AVD_y, and TL_y: Continuously.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			• $EF_{km,CO2,y}$: Annually. • $FF_{project\ plant,i,y}$, $FF_{project\ site,i,y}$, and $FF_{biomass\ processing,i,y}$: Continuously. • $EG_{project\ plant}$: Continuously. • NCV_k: Every six months. • Quantity of biomass residues that are utilized in the defined geographical region and Quantity of available biomass in the region: Annually. • $EC_{PJ,y}$: Continuously. • $EF_{grid,y}$: Annually. • $EF_{CO2,LE}$: Annually. • $Q_{Viñales\ complex,y}$: Continuously.		
B.7.7 Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	Yes: • $BF_{k,y}$, $BF_{T,\ k,y}$, and Moisture content of the biomass residues: Continuously; • $EF_{CH4,BF}$: Quarterly; • AVD_y, and TL_y: Continuously. • $EF_{km,CO2,y}$: Annually. • $FF_{project\ plant,i,y}$, $FF_{project\ site,i,y}$, and $FF_{biomass\ processing,i,y}$: Continuously. • $EG_{project\ plant}$: Continuously. • NCV_k: Every six months. • Quantity of biomass residues that are		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			utilized in the defined geographical region and Quantity of available biomass in the region: Annually. • $EC_{PJ,y}$: Continuously. • $EF_{grid,y}$: Annually. • $EF_{CO2,LE}$: Annually. • $Q_{Viñales\ complex,y}$: Continuously.		
Ability of project participants to implement monitoring plan					
B.7.8 How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	During the site visit it was observed that the application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.		OK
B.7.9 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Yes. Details of data to be collected, its certainty, and format and location to be filed are correctly described.		OK
B.7.10Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR	Yes, the plant QMS assures that emission reductions cam be reported and verified.		OK
B.7.11Will 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, for this project activity, whichever occurs later?	/1/	DR	Yes.		OK
Monitoring of sustainable development indicators/ environmental impacts					
B.7.12Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in	/1/	DR	It has been confirmed that the host country laws do not require for the monitoring of sustainable		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
the host country?			development indicators / environmental impacts for the project activity.		
B.7.13Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Same as above.		OK
B.7.14Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Same as above.		OK
C Duration of the project activity / crediting period					
C.1.1 Start date of project activity (VVM para 99-100, 104)					
C.1.2 How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/ /2/	DR	The starting date of the project activity is 23 April 2008, which corresponds to the boiler purchase order issuance. The construction activity had not started at the beginning of validation.		OK
C.1.3 Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	The expected operational lifetime is 30 years and reasonable.		OK
C.1.4 Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 01 November 2011.		OK
D Environmental Impacts (VVM para 131-133)					
D.1.1 Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /3/	DR	According to the Chilean environmental regulations, the project proponent submitted in September 2008 an Environmental Impact Declaration to the Environment National Authority, CONAMA, and received the corresponding approval of the project through the		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			"Resolución Exenta N°80/2009".		
D.1.2 Does the project comply with environmental legislation in the host country?	/1/	DR	Yes, see D.1.1		OK
D.1.3 Will the project create any adverse environmental effects?	/1/	DR	No significant environmental impacts are predicted.		OK
D.1.4 Have identified environmental impacts been addressed in the project design?	/1/	DR	Yes.		OK
D.1.5 Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Yes, no significant environmental impacts are predicted.		OK
D.1.6 Are transboundary environmental impacts considered in the analysis?	/1/	DR	No transboundary environmental impacts are predicted.		OK
E Stakeholder Comments (VVM para 128-130)					
E.1.1 Have relevant stakeholders been consulted?	/1/ /4/	DR	Stakeholders involvement was organized through the following channels: television, radio, press, door-to-door presentation of the project to the local community and meetings with local stakeholders such as environmental authorities of the VII Region, Viñales personnel, local business community, CORMA (the Wood Corporation), fisherman federation of the VII Region, Environmental Committee of Constitución and Personnel of the Constitución pulp mill. DNV considers the local stakeholder consultation carried out adequate.		OK
E.1.2 Have appropriate media been used to invite comments by local stakeholders?	/1/ /4/	DR	Yes, see E.1.1		OK
E.1.3 If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder	/1/ /4/	DR	Yes, see E.1.1		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
consultation process been carried out in accordance with such regulations/laws?					
E.1.4 Is a summary of the stakeholder comments received provided?	/1/ /4/	DR	Correspondent evidences were provided to DNV. No negative comments were received.		OK
E.1.5 Has due account been taken of any stakeholder comments received?	/1/	DR	No negative comments were received.		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
CAR 1 DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	A.3.2 A.3.3	Both letters of approval will be obtained once the Project Proponent had solved all the observations made by the DOE to the Viñales PDD. The reason is that the Chilean DNA issues the letter of approval related to a specific version of the PDD. Therefore, if the PDD suffers changes during the validation process, the letter of approval may become invalid.	The Chilean letter of Approval was found to be issued in 2 September 2010. Inversiones Celco has withdrawal its participation in the project activity. Therefore this CAR is closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
No FAR was raised.		

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APPENDIX B

ORIGINAL CDM VALIDATION PROTOCOL

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR/I	The project located in the commune of Constitución in the Maule Region, Chile. The UTM geographical coordinates of the project activity location are 6,082,769 N and 735,202 E.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR/I	The spatial extent of the project boundary and its geographical coordinates are not clear defined in the PDD. The gases related to heat generation are not included in the baseline boundary in section B.3 of the PDD. The table in section B.3 includes methane emissions from wastewater treatment of biomass residues. However, section B.6.1 states that the project activity does not originate wastewater from biomass residues treatment.	~~CL 1~~ ~~CL 2~~	OK
A.2. Participation Requirements *Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party,*					

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Letter of Approval, Authorization and Project Participant.					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR/I	The project participants are Celulosa Arauco y Constitución S.A. of Chile and Inversiones Celco SL of United Kingdom. The host Party Chile and the Annex I Party United Kingdom meet all relevant participation requirements.		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR/I	DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	~~CAR 1~~	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR/I	Yes. Chile has ratified the Kyoto Protocol on 28 August 2002. The Chilean DNA is the National Environmental Comission CONAMA. United Kingdom has ratified the Kyoto Protocol on 31 May 2002. The United Kingdom DNA is the Department for Environment, Food and Rural Affairs. DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in	~~CAR 1~~	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			achieving sustainable development		
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR/I	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Chile.		OK
A.3. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR/I	The project activity consists in the installation of a new biomass cogeneration power plant in the Viñales sawmill. The new cogeneration unit consists of a new 250 ton/hr fluidized bed power boiler and a 41 MW condensing / extracting turbo generator unit, allowing for excess electricity to be dispatched to the central Chilean grid (SIC). Before the implementation of the project activity, the Viñales sawmill relied on an external company who supplied heat to the Viñales sawmill and on the grid for electric power.		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR/I	The project design engineering reflects good practice applying the steam Rankine cycle technology for generation of steam and power.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	Yes. The plant has implemented an ISO 9001 based quality management system.		OK
A.4. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR/I	DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	CAR1	
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR/I	The project is expected to improve energy use efficiency and power generation from renewable sources, thus contributing to the sustainable development objectives of the Chilean Government.		OK
B Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/	DR/I	The project applies the approved consolidated baseline methodology ACM0006 (Version 09) - "Consolidated		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			methodology electricity generation from biomass residues". The project also applies ACM0002 (Version 10) - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" in combination with "Tool to calculate the emission factor for an electricity system – Version 02" for the grid emission factor.		
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR/I	The project meets the applicability conditions of ACM0006 as i) biomass residues generated in the forest industry (from nearby sawmills and from forestry operations) are used in the cogeneration plant; some fossil fuels may be co-fired to a limited extent; ii) no major process change or substantial changes in processing capacities were envisaged due to project activity while the production mix of the Viñales facilities is determined by the sawmill/MDF market conditions; iii) the bark and sawdust mix are stored in a dedicated place near the Viñales power plant for less than two weeks and iv) the biomass residues do not require any preparation before being used as fuel. DNV requests evidences that confirm the compliance to ACM0006 applicability criteria:	~~CL 3~~	OK

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			- The implementation of the project will not increase the biomass production; - The biomass will not be stored at the project facility for more than one year.		
B.2. Baseline Scenario Determination *The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.*					
B.2.1. What is the baseline scenario?	/1/	DR/I	The chosen baseline scenario corresponds to scenario n°3, which is a combination of the following baseline scenarios given in ACM0006: For power generation: The generation of power in the grid-connected power plants (P4); For heat generation: The generation of heat in boilers using the same type of biomass residues (H4); For biomass use: The additional biomass is dumped or left to decay under mainly aerobic conditions (B1). Biomass residues which are left to decay in absence of the project activity were considered for possible methane emissions in the baseline activity. It is to be clarified how the parameters of the	~~CL 4~~	OK

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			baseline boiler were determined.		
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR/I	The possible scenarios are identified, i.e. i) no investment in new heat and/or power generation equipment; ii) a low-pressure power boiler unit on biomass fuels; iii) a new cogeneration power plant on biomass fuels, implemented with a lower efficiency or at a later stage, not undertaken as a CDM project activity and iv) the proposed project activity not undertaken as a CDM project activity.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR/I	No. It is to be clarified how the parameters of the baseline boiler were determined. DNV requests evidence of the contract established with the steam supplier for the actual situation.	~~CL 4~~ ~~CL 5~~	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR/I	As per B.2.3.		OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR/I	Yes. The baseline scenario takes into account the National policies which favour the development of renewable sources of energy.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR/I	As on B.2.3		OK

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B.2.7. Have the major risks to the baseline been identified?	/1/	DR/I	No major risks are identified to the baseline.		OK
B.3. Additionality Determination *The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.*					
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR/I	The additionality of the project has been demonstrated in accordance with ACM0006. Although ACM0006 suggests using the "Combined tool to identify the baseline scenario and demonstrate additionality", according to this combined tool the additionality tool may be applied in cases where one or more alternatives are not available options to project participants, such as in the case of grid-connected power projects. According to ACM0006, the "Combined tool to identify the baseline scenario and demonstrate additionality" should be applied instead of the "Tool for the demonstration and assessment of additionality".	~~CAR 2~~	OK
B.3.2. Are all assumptions stated in a transparent and conservative manner?	**/1/**	DR/I	*Step 1 - Identification of alternative scenarios*: According to section 4.3, the possible scenarios identified are. i) no investment in new heat and/or power	~~CL 6~~ ~~CL 7~~	OK

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			generation equipment; ii) a low-pressure power boiler unit on biomass fuels; iii) a new cogeneration power plant on biomass fuels, implemented with a lower efficiency or at a later stage, not undertaken as a CDM project activity and iv) the proposed project activity not undertaken as a CDM project activity. The provided alternatives are in compliance with the legal and regulatory requirements. *Step 2 - Investment analysis:* An investment analysis was carried out for the project activity by following investment comparison analysis approach, and project IRR has been selected for calculating the NPV analysis of each alternative scenarios defined in step 1 and compared with the scenario 1 of no additional investment for power and/or heat generation. The NPV values calculated with a discount rate of 12% indicated a negative NPV value for all the alternatives considered. Regarding the investment analysis, the following is required: - The spreadsheet with NPV calculation, and evidence of the related data; - The NPV calculation for project scenario including CDM revenues; - The sensitivity analysis should not be executed with fixed variations. Instead of		

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			this, the value at which the scenarios' NPV become positive and the likelihood of that being achieved is to be determined. - NPV for option 01 is considered to be zero. However, steam is bought in this scenario. *Step 3 - Barrier analysis:* *a) Investment Barriers*: As a member of the CDEC-SIC dispatch centre, Arauco is exposed to fines applied to power generators by the national authority. *b) Technological Barriers:* A sawmill with electric power generation: i) requires skilled and trained labour in order to operate the power plant; ii) tends to work with higher steam data; iii) may interferes with the normal operation of the production processes. Besides that, the engineering as well as most of the technology employed in the design of Arauco's sawmills is imported from northern European countries, particularly Sweden and Finland. *c) Barriers due to prevailing practice:* According to the PDD, the technology used in the Viñales project is not a normal practice in the industry. *d) Cultural Barriers*: The production and commercialization of pulp and paper is		

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			the principal business of Celulosa Arauco y Constitución S.A. as a consequence the internal culture strongly influenced by the commodity market, which differ from the culture in the electric power sector. *e) Barriers to entry to the electric power industry*: In Chile, there are not a legal framework for grid connected small power generators from non conventional renewable energy and the project developer are not able to define the convenient regulatory scheme to dispatch to the grid. Furthermore, the project faces an operational barrier compared to power units. DNV requests document evidences of the barriers presented in step 3. *Step 4 - Common practice analysis:* It has been argued that sawmill, plywood, MDF and panel board industries with integrated cogeneration on-site is not common practice in Chile.		
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	See B.3.2.		
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM	/1/	DR/I	The starting date of the project activity is 23 April 2008 with an expected operational lifetime of 30 years.	~~CL 8~~ ~~CL 9~~	OK

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was seriously considered in the decision to proceed with the project activity?			It was demonstrated that CDM benefits were taken into account before a final decision to proceed with the process was made. Project starting date is 23 April 2008. Arauco first considered the emission reduction in cogeneration initiatives in 1998, through a study carried out by SERCOR S.A. that explicitly considered the benefits related to power cogeneration: mainly higher efficiency and lower CO2 emissions. Arauco first considered the incentives of the CDM in 1999, evaluating and actually implementing a reforestation program in the coastal dry lands in the south part of the country. Arauco began the construction of its first CDM biomass cogeneration project in April 2001, the "Trupan Biomass Power Plant in Chile" (Ref. Nº 0259). After that, Arauco implemented similar cogeneration initiatives in subsequent industrial projects. The "Nueva Aldea Biomass Power Plant Phase I" (Ref. Nº0258) and the "Nueva Aldea Biomass Power Plant Phase II" (Ref. Nº 0346), were both successfully registered as CDM project activities during 2006. Finally, during 2002, SERCOR S.A. developed a study about the Kyoto Protocol, the CDM and the Carbon Market possibilities available at that time.		

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			This study was presented to members of the Arauco board and contributed to foster the interest in the CDM and the Kyoto Protocol. Specifically for the Viñales project activity, the first assessments of the proposed project in the CDM, considering the applicable baseline methodology and the corresponding emission reduction calculation are dated January 2007. DNV requests for a documented evidence that CDM was seriously considered before the starting of the project especially with respect to the present project activity. DNV requests an evidence of the project starting date. The project proponent is requested also to clarify in section C.1.1 of the PDD to which event corresponds this date.		
B.4. Calculation of GHG Emission Reductions – Project emissions *It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The project emissions are due to biomass transportation, on-site consumption of fossil fuels, consumption of electricity and	~~CL 10~~ ~~CL 11~~	OK

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			combustion of biomass residues. DNV requests a copy of the emission reduction calculation spreadsheet. According to the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion", Option A should be the preferred approach for the CO2 emission coefficient COEFi,y.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR/I	See B.4.1.	~~CL 10~~ ~~CL 11~~	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR/I	See B.4.1.	~~CL12~~	OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions *It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The system boundary for the grid electricity system affected by the project is defined as the system of the SIC grid. The combined margin emission coefficient for the grid is estimated *ex-ante* and will be monitored *ex-post* in accordance with ACM0002 which calls the "Tool to calculate the emission	~~CL 12~~ ~~CL 13~~	OK

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			factor for an electricity system – Version 02". The calculations of the *ex-ante* emission reduction forecast are based on electricity generation estimates provided by the Central Interconnected System of Chile (SIC) for the electricity generated in grid in the year 2007. The build margin emission coefficient (BM) was calculated considering the most recent 20% power plants capacity additions (in MWh) in the electricity system. The operating margin (OM) emission coefficient is calculated using the simple adjusted method, and is found to be 0.77504 tCO_2e/MWh and the build margin (BM) emission coefficient is 0.48887 tCO_2e/MWh, resulting in a combined margin emission coefficient of 0.6320 tCO_2e/MWh (weighted average of the build and operating margin). The project proponent is required to follow the steps of the "Tool to calculate the emission factor for an electricity system" in order to demonstrate the grid emission factor calculation in the PDD. The project proponent is required to demonstrate that the results of the methane emission factor analysis in Annex 3 for		

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			Trupan and Nueva Aldea are valid for the Viñales project.		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR/I	See B.5.1.	~~CL 12~~ ~~CL 13~~	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR/I	See B.5.1.	~~CL 12~~ ~~CL 13~~	OK
B.6. Calculation of GHG Emission Reductions – Leakage *It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The main potential source of leakage is related to local sawdust and shaving market depletion. The project proponent has performed a detailed research of the biomass supply / demand situation in the area influenced by the project. According to the information obtained (approach L2 of ACM0006), the Viñales biomass power plant counts with sufficient biomass locally and has not caused other biomass plants in the area to switch from biomass to fossil fuels so far. Therefore, leakage emissions are considered to be nil. DNV requests evidence of the research of the	~~CL 14~~	OK

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			biomass supply/demand situation in the Viñales influence area.		
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR/I	See B.6.1.	~~CL 14~~	OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR/I	See B.6.1.	~~CL 14~~	OK
B.7. Emission Reductions *The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.*					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR/I	The project is expected to reduce CO_2 emissions to the extent of 3 157 034 tCO_2e (150 335 tCO_2e/year on average) over a 21 years crediting period.		OK
B.8. Monitoring Methodology *It is assessed whether the project applies an appropriate monitoring methodology.*					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	Yes, the approved consolidated monitoring methodology ACM0006 (Version 09) – "Consolidated methodology electricity generation from biomass residues". The project also applies ACM0002 (Version 10) - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" in combination with		OK

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			"Tool to calculate the emission factor for an electricity system – Version 02" for the grid emission factor has been used.		
B.8.2. 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, for this project activity, whichever occurs later?	/1/	DR/I	The data will be kept for two years after the end of the first crediting period.		OK
B.9. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR/I	The monitoring plan allows for collection and archiving of the following key parameters related to the determination of emission reductions resulting from the project activity: • $BF_{k,y}$: Quantity of biomass residue combusted in the project plant. • $BF_{T,\ k,y}$: Quantity of biomass residue that has been transported to the project site. • Moisture content of the biomass residues. • $EF_{CH4,BF}$: CH_4 emission factor for the	~~CL 15~~	OK

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			combustion of biomass residues in the project plant. • AVD_y: Average round trip distance between biomass fuel supply sites and the project site. • TL_y: Average truck load of the trucks used for transportation of biomass. • $EF_{km,CO2,y}$: Average CO_2 emission factor for the trucks. • $FF_{project\ plant,i,y}$: Quantity of fossil fuel combusted in the project plant. • $FF_{project\ site,i,y}$: Quantity of fossil fuel combusted at the project site for other purposes that are attributable to the project activity. • $FF_{biomass\ processing,i,y}$: Quantity of fossil fuel used for mechanical preparation of the biomass from forestry operations used in the project plant. • $EG_{project\ plant}$: Net quantity of electricity generated in the project		

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			plant. • NCV_k: Net calorific value of biomass residue. • $EF_{burning,CH4,k,y}$: CH_4 emission factor for uncontrolled burning of the biomass residue. • ε_{boiler}: Average net energy efficiency of heat generation in the boiler that would generate heat in the absence of the project activity. • Quantity of biomass residues that are utilized in the defined geographical region. • Quantity of available biomass in the region. • $EC_{PJ,y}$: On-site electricity consumption attributable to the project activity. • $EF_{grid,y}$: CO_2 emission factor for grid electricity. • $EF_{CO2,LE}$: CO_2 emission factor of the		

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			most carbon intensive fuel used in the country. • $FC_{i,m,y}$: Amount of fossil fuel consumed by power plant. • $NCV_{i,y}$: Net calorific value of fossil fuel. • $EF_{CO2,FF,y}$: CO_2 emission factor of fossil fuel. • $Q_{Viñales\ complex,y}$: Quantity of heat generated by the new cogeneration project plant from firing biomass residues and consumed by the Viñales Industrial Complex. The following is to be observed with regards to the monitoring plan: - It is to be determined if default values will be used for the CH4 emission factor for the combustion of biomass residues in the project plant, or if this parameter will be measured on-site; - It is to be confirmed if the CO2 emission factor values for fossil fuel used in the project plant is not provided by the fuel supplier in invoices (option a);		

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			- It is to be confirmed if the net calorific values for fossil fuel used in the project plant is not provided by the fuel supplier in invoices (option a); - If the parameter "average net energy conversion efficiency of power unit m" will not be necessary it shall be excluded from the monitoring plan.		
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR/I	Yes. The choice of the GHG indicator of CO_2 is in line with the monitoring methodology.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR/I	See B.9.1		OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR/I	Yes. The PDD describes the equipment to be used for monitoring purposes.		OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	Yes. The plant has a QMS ISO 9001 implemented.		OK
B.9.6. Is the measurement *interval* identified and deemed appropriate?	/1/	DR/I	Yes		OK
B.9.7. Is the *registration, monitoring, measurement* and *reporting* procedure defined?	/1/	DR/I	Procedures for the registration, monitoring, measurement and reporting of the parameters in the monitoring plan have been identified.		OK

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B.9.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	See B.9.5.		OK
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	See B.9.5.		OK
B.10. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.*					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR/I	The parameters used emission reduction calculations that are available *ex ante* are as given below: • GWP_{CH4}: Global warming potential for CH_4; • $EF_{burning\ CH4,k,y}$: CH_4 emission factor for uncontrolled burning of the biomass residue. The project proponent is required to demonstrate that the results of the methane emission factor analysis in Annex 3 for Trupan and Nueva Aldea are valid for the Viñales project.	~~CL 13~~	OK
B.10.2. Are the choices of baseline GHG indicators	/1/	DR/I	Yes. The choice of the GHG indicator of CO_2		OK

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reasonable and conservative?			is in line with the monitoring methodology.		
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR/I	Yes.		OK
B.10.4. Is the measurement *equipment* described and deemed appropriate?	/1/	DR/I	Yes. The PDD describes the equipment to be used for monitoring purposes.		OK
B.10.5. Is the measurement *accuracy* addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	Yes. The plant has a QMS ISO 9001 implemented.		OK
B.10.6. Is the measurement *interval* for baseline data identified and deemed appropriate?	/1/	DR/I	Details of data to be collected, its certainty, and format and location to be filed are correctly described.		OK
B.10.7. Is the registration, *monitoring*, *measurement* and *reporting* procedure defined?	/1/	DR/I	Procedures for the registration, monitoring, measurement and reporting of the parameters in the monitoring plan have been identified.		OK
B.10.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	See B.10.5.		OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	See B.10.5.		OK

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B.11. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR/I	The project proponent does not consider the proposed project activity will generate leakage. However, parameters related to the approach L2 of ACM0006 will be monitored in order to confirm this. DNV requests evidence of the research of the biomass supply/demand situation in the Viñales influence area.	~~CL 14~~	OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR/I	See B.11.1		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR/I	See B.11.1		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR/I	The monitoring of sustainable indicators is not required neither by the methodology ACM0006 nor by the Chilean DNA.		OK

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B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR/I	See B.12.1.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR/I	See B.12.1.		OK
B.13. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR/I	Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures have been presented. The monitoring practices are considered appropriate.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR/I	Yes. The plant has a QMS ISO 9001 implemented.		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	Viñales sawmill counts with a plenty of safety measures and security procedures implemented in the facility in case of emergencies or accidental events that might lead to unintended emissions.		OK
B.13.4. Are procedures identified for review of reported	/1/	DR/I	See B.13.2.		OK

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results/data?					
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR/I	See B.13.2.		OK
C Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR/I	The starting date of the project activity is 23 April 2008 with an expected operational lifetime of 30 years. DNV requests an evidence of the project starting date. The project proponent is requested also to clarify in section C.1.1 of the PDD to which event corresponds this date.	~~CL 9~~	OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR/I	A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 01 November 2010.		OK
D Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR/I	According to the Chilean environmental regulations, the project proponent must submit an Environmental Impact Declaration	~~CL 16~~	OK

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			to the Environmental Authority. This document will be presented to the Environmental National Authority, CONAMA in August, 2008. No significant environmental impacts are predicted. DNV request evidences of the Environmental Impact Declaration.		
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR/I	See D.1.1	~~CL 16~~	OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	See D.1.1	~~CL 16~~	OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR/I	See D.1.1	~~CL 16~~	OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR/I	See D.1.1	~~CL 16~~	OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR/I	See D.1.1	~~CL 16~~	OK
E Stakeholder Comments *The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been*					

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taken of any comments received.					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR/I	Stakeholders involvement was organized through the following channels: television, radio, press, door-to-door presentation of the project to the local community and meetings with local stakeholders such as environmental authorities of the VII Region, Viñales personnel, local business community, CORMA (the Wood Corporation), fisherman federation of the VII Region, Environmental Committee of Constitución and Personnel of the Constitución pulp mill. According to the PDD, the comments related to the project activity were positive. DNV requests evidences of the stakeholder consultation process.	~~CL 17~~	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	See E.1.1	~~CL 17~~	OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR/I	See E.1.1	~~CL 17~~	OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR/I	See E.1.1	~~CL 17~~	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR/I	See E.1.1	~~CL 17~~	OK

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

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

A.1. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.		DR	DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	~~CAR 1~~	OK
A.2. Project design					
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?			Yes, see Table 2 A.3.1		OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?			The CDM project activity was under construction at the start of the validation. The starting date of the project activity indicated in the PDD is 23 April 2008. DNV requests an evidence of the project starting date. The project proponent is requested also to clarify in section C.1.1 of the PDD to which event corresponds this date. See Table 2 C.1.1.	~~CL 9~~	OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?			The project is a large project. The site visit was carried out from 9 to 11 December 2009.		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?			No, the project activity will use new equipment. See Table 2 A.3.1.		OK

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

A.3. Project emissions not addressed by the methodology					
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).			Yes. See Table 2 B.4 and B.5.		OK
A.4. Documentation of baseline emissions					
A.4.1 Documentation of the baseline determination: a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity			Yes. See Table 2- B.1.1, B.2.1, B.2.2 and B.5.		OK
A.5. Documentation of the calculations					
A.5.1 Algorithms and/or formulae used to determine emission reductions • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced			Yes, see Table 2 B.4 and B.5.		OK

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

• All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.					
A.6. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project by monitored ex-post and verified later by a DOE?			Yes, see Table 2 B.8, B.9 and B.10.		OK
A.7. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46			See Table 2 B.3.4.		OK

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

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1 DNV requests written approval of voluntary participation from the DNA of Chile and DNA of United Kingdom, including the confirmation that the project assists it in achieving sustainable development	A.2.2 A.2.3 A.4.1	Both letters of approval will be obtained once the Project Proponent had solved all the observations made by the DOE to the Viñales PDD. The reason is that the Chilean DNA issues the letter of approval related to a specific version of the PDD. Therefore, if the PDD suffers changes during the validation process, the letter of approval may become invalid.	The Chilean letter of Approval was found to be issued in 2 September 2010. Inversiones Celco has withdrawal its participation in the project activity. Therefore this CAR is closed.
CAR 2 According to ACM0006, the "Combined tool to identify the baseline scenario and demonstrate additionality" should be applied instead of the "Tool for the demonstration and assessment of additionality"..	B.3.1	The PDD was revised to version 3, considering the application of the combined tool.	The revised PDD clearly and correctly applies the Combined Tool, according to ACM0006 requirements. Therefore this CAR is closed.
CL 1 The spatial extent of the project boundary and its geographical coordinates are not clear defined in the PDD.	A.1.2	The Project Proponent included the UTM coordinates in section A.4.1.4 of the PDD, in order to provide a more precise location of the site in which the proposed project activity will be implemented.	The geographical coordinates were included in the PDD as required. Therefore this CL is closed.
CL 2 The gases related to heat generation are not included in the baseline boundary in section	A.1.2	The Project Proponent added the gases related to heat generation in the baseline boundary in section B.3 of the PDD.	The PDD section B.3 was revised accordingly. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
B.3 of the PDD. The table in section B.3 includes methane emissions from wastewater treatment of biomass residues. However, section B.6.1 states that the project activity does not originate wastewater from biomass residues treatment.		However, the Project Proponent would like to outline the following: 1. The proposed project activity does not claim emission reductions due to heat displacement. 2. Heat generation is not influenced by the proposed project activity. This means that the amount of heat would be the same with or without the implementation of the proposed project activity. 3. Heat generation in the new cogeneration facility is accomplished using renewable, carbon neutral biomass residues. The Project Proponent changed section B.3 of the PDD and excluded the methane emissions from wastewater treatment, given that the proposed project activity does not generate wastewater from biomass treatment.	
CL 3 DNV requests evidences that confirm the compliance to ACM0006 applicability criteria: - The implementation of the project will not increase the biomass production;	B.1.2	The implementation of the proposed project activity is not related at all to the biomass residues production capacity of the Viñales Sawmill. The new project activity will require the	According to the evidences provided, the applicability criteria of ACM0006 are met. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
- The biomass will not be stored at the project facility for more than one year.		purchase of additional biomass from third parties. There will be no capacity additions or product mix changes in the Viñales Sawmill due to the implementation of the proposed project activity. This was verified during the site visit of DNV's auditor. In addition, page 11 of the Environmental Impact Declaration of the Viñales power plant establishes a maximum biomass storage capacity of approximately 30,000 m^3. Considering that the Viñales new power plant will consume arround, 2.0 million of cubic meters (volumetric) of biomass residues, the maximum residence time of the stored biomass will be one week at most.	
CL 4 It is to be clarified how the parameters of the baseline boiler were determined.	B.2.1 B.2.3	meters of the baseline power boiler were determined according to the heat requirements of the Viñales sawmill. This was duly verified on-site during the validation visit of DNV's auditor.	The parameters were confirmed during the site visit through an interview with the consultant. Therefore this CL is closed.
CL 5 DNV requests evidence of the contract established with the steam supplier for the	B.2.3	The Project Proponent provided the contract with the heat supplier to DNV	Evidences were provided as required and were found to be OK.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
actual situation.		during the validation visit.	Therefore this CL is closed.
CL 6 Regarding the investment analysis, the following is required: - The spreadsheet with NPV calculation, and evidence of the related data; - The NPV calculation for project scenario including CDM revenues; - The sensitivity analysis should not be executed with fixed variations. Instead of this, the value at which the scenarios' NPV become positive and the likelihood of that being achieved is to be determined. - NPV for option 01 is considered to be zero. However, steam is bought in this scenario.	B.3.2	The Project Proponent provided all these documents and evidences after the validation visit. In particular: - The spreadsheet with NPV calculation and evidence of the related data. - The NPV calculation for project scenario, including CDM revenues. - A fully documented and justified sensitivity analysis. - It is true, however, this option is considered to have a 0 NPV, since it is the current situation (no additional investment). The rationale behind this is fully explained in the new financial evaluation in the PDD:	The investment analysis and evidences of the used input values were provided and found to be correct. Therefore this CL is closed.
CL 7 DNV requests document evidences of the barriers presented in step 3.	B.3.2	The Project Proponent provided DNV the requested evidence that supports the barriers presented in step 3 of the additionality test.	All requested evidences were provided and accepted by DNV, as discussed in Section 4.4 of this report. Therefore this CL is closed.
CL 8 DNV requests for a documented evidence that CDM was seriously considered before the starting of the project especially with respect to the present project activity**.**	B.3.4	During the validation visit, the Project Proponent provided plenty of documented evidence that showed that the CDM was a decisive factor to proceed with the Viñales project activity.	The project proponent has provided evidences that the Viñales was conceptualized as a CDM project activity, according to several internal presentations and e-mail messages from Arauco from September 2005 on.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		After the validation visit, the Project Proponent also provided evidence about the real actions undertaken by Arauco to secure the registration of the proposed project activity in the CDM. According to the above, the Project Proponent provided the evidence on the prior consideration of the CDM as per the guidance of EB 41, Annex 46, paragraph 5 for existing project activities.	Therefore this CL is closed.
CL 9 DNV requests an evidence of the project starting date. The project proponent is requested also to clarify in section C.1.1 of the PDD to which event corresponds this date.	B.3.4 C.1.1	The starting date of the proposed project activity corresponds to the date in which the purchase order of the power boiler was confirmed and assigned to the Viñales biomass power plant project. The evidence that supports this date is the signed purchase order for the power boiler, a letter to the vendor confirming this order and documents assigning this equipment to the Viñales project. The Project Proponent provided a clarification related to this date in Section C.1.1 of the corresponding PDD.	The letter to the power boiler dated 23 April 2008 confirming the purchase order is considered to be the first commitment in expenditures for the project activity, which is defined to be the starting date of the project activity. Therefore this CL is closed.
CL 10 DNV requests a copy of the emission	B.4.1	During the validation visit, the Project Proponent provided a copy of the	The emission reduction calculation spreadsheet were provided as required,

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
reduction calculation spreadsheet.	B.4.2 B.4.3	emission reduction calculation spreadsheet to DNV.	and the calculation was found to be correct. Therefore this CL is closed.
CL 11 According to the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", Option A should be the preferred approach for the CO_2 emission coefficient $COEF_{i,y}$.	B.4.1 B.4.2 B.4.3	During the validation visit, the Project Proponent showed that the fuel supplier did not provide the information required to use Option A to determine the CO_2 emission coefficient $COEF_{i,y}$. As a result, the Project Proponent had to use Option B instead.	DNV could confirm in the site visit that the information required to Option A was not available in all power plants in the grid, so the approach in selecting Option B is reasonable. Therefore this CL is closed.
CL 12 The project proponent is required to follow the steps of the "Tool to calculate the emission factor for an electricity system" in order to demonstrate the grid emission factor calculation in the PDD.	B.5.1 B.5.2 B.5.3	The Project Proponent modified the PDD in order to explicitly follow the steps of the "Tool to calculate the emission factor for an electricity system" in the PDD.	The PDD was revised accordingly. Therefore this CL is closed.
CL 13 The project proponent is required to demonstrate that the results of the methane emission factor analysis in Annex 3 for Trupan and Nueva Aldea are valid for the Viñales project.	B.5.1 B.5.2 B.5.3 B.10.1	The Project Proponent decided to conduct a new measurement to determine the methane emission factor for uncontrolled buring of the biomass types that will be used in the proposed project activity. This new measurement will provide a conservative and representative methane emission factor that will comply with the requirements of the ACM0006 (Version 06.1) and will be used to calculate the emission	A new third party analysis was conducted to measure the methane emission factor and was provided for DNV and accepted. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		reductions of the proposed project activity.	
CL 14 DNV requests evidence of the research of the biomass supply/demand situation in the Viñales influence area.	B.6.1 B.6.2 B.6.3 B.11.1	During the validation visit, the Project Proponent provided a biomass availability study for the Viñales biomass power plant. The study drew from publicly and official information and used the L2 approach of the ACM0006 (Version 06.1) to establish leakage emissions. The study showed that there is enough biomass in the Viñales supply area so as to conclude that the proposed project activity will not cause leakage emissions.	All evidences of the biomass availability were provided as required and confirmed by DNV. Therefore this CL is closed.
CL 15 The following is to be observed with regards to the monitoring plan: - It is to be determined if default values will be used for the CH_4 emission factor for the combustion of biomass residues in the project plant, or if this parameter will be measured on-site; - It is to be confirmed if the CO_2 emission factor values for fossil fuel used in the project plant is not provided by the fuel supplier in invoices (option a); - It is to be confirmed if the net calorific values for fossil fuel used in the project plant	B.9.1	The Project Proponent would like to provide the following clarifications: 1. The Project Proponent will conduct direct measurements of the CH_4 emission factor for the combustion of biomass residues in the power plant. 2. During the validation visit, the Project Proponent showed that the fuel supplier does not provide the CO_2 emission factor of the fossil fuel (Option A). As a result, the Project Proponent has to use Option B instead.	Clarifications were provided as requested, and the PDD was revised accordingly. Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
is not provided by the fuel supplier in invoices (option a); - If the parameter "average net energy conversion efficiency of power unit m" will not be necessary it shall be excluded from the monitoring plan.		3. During the validation visit, the Project Proponent showed that the fuel supplier does not provide the net calorific value of fossil fuels in the invoices (Option A). As a result, the Project Proponent has to use Option B. instead. 4. Since the parameter "average net energy conversion efficiency of power unit m" is not necessary, the Project Proponent excluded it from the monitoring plan.	
CL 16 DNV request evidences of the Environmental Impact Declaration.	D.1.1 – D.1.6	The Project Proponent will provide the Environmental Impact Declaration and the corresponding letter of approval.	The Environmental Impact Declaration and its approval were provided as requested. Therefore this CL is closed.
CL 17 DNV requests evidences of the stakeholder consultation process.	E.1.1 – E.1.5	During the validation visit, the Project Proponent provided evidence of the public consultation process that was carried out for the Viñales CDM project. This information was further ratified and completed during the visit to the Viñales project site.	Evidences of local stakeholder consultation process were provided as required and found to OK. Therefore this CL is closed.

APPENDIX C

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Felipe Antunes

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJI-i1)

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas			Sept 2009			
Renewables	*Hydro power*	Jan 2009	Sept 2009		Jan 2009	Jan 2009
	Wind power		Sept 2009			
	Other renewable		Sept 2009			
Biomass		Jan 2009	Jan 2009			
Grid connection of isolated system			Sept 2009			
Cement						
Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management		Jan 2009	Jan 2009			
Waste / wastewater treatment		Jan 2009	Jan 2009			Feb 2010
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal			Sept 2009			
CO_2 recovery						
Transport						
Non-renewable biomass			Sept 2009			
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 3 February 2010

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJI-i1)

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*	Jan 2009	Jan 2009			
	Wind power		Sept 2009			
	Other renewable		Sept 2009			
Biomass		Jan 2009	Jan 2009		Jan 2009	Jan 2009
Grid connection of isolated system			Sept 2009			
Cement						
Waste-heat / waste-gas recovery			Sept 2009			
Efficiency of thermal power plants			Sept 2009			
Coal mine methane						
Fuel switch			Sept 2009			
Manure management						
Waste / wastewater treatment						
Energy efficiency		Jul 2009	Jul 2009			
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal			Sept 2009			
CO_2 recovery			Sept 2009			
Transport						
Non-renewable biomass			Sept 2009			Aug 2009
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 1 Sept 2009

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

David Costa

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJI-i1)

GHG Auditor:		Yes				
Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Expert***	***Methodology Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*	Jan 2009	Jan 2009			
	Wind power		Sept 2009			
	Other renewable		Sept 2009			
Biomass				Jan 2009		
Grid connection of isolated system			Sept 2009			
Cement						
Waste-heat / waste-gas recovery						
Efficiency of thermal power plants						
Coal mine methane						
Fuel switch						
Manure management						
Waste / wastewater treatment						
Energy efficiency						
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 1 September 2009

Michael Lehmann
Technical Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Ranganathan Seshan

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJI-i1)

GHG Auditor:	Yes[1]

Technical Area		***CDM Validator***	***CDM Verifier***	***Sector Knowledge***	***Sector Expert***	***Technical Reviewer***
Landfill gas						
Renewables	*Hydro power*					
	Wind power					
	Other renewable					
Biomass						
Grid connection of isolated system						
Cement						
Waste-heat / waste-gas recovery					Nov 2009	
Efficiency of thermal power plants					Nov 2009	
Coal mine methane						
Fuel switch						
Manure management						
Waste / wastewater treatment				Nov 2009		
Energy efficiency					Jan 2009	
N_2O						
HFCs						
Flare reduction						
PFCs						
Charcoal						
CO_2 recovery						
Transport						
Non-renewable biomass						
Biofuel						
Pipeline leakage reduction						
SF_6						

Høvik, 23 August 2010

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change and Environmental Service