



VALIDATION OPINION - CREDITING PERIOD RENEWAL

NUEVA ALDEA BIOMASS POWER PLANT PHASE 1 IN CHILE

(UNFCCC Registration Ref. No. 0258)

REPORT No. 2011-1190

REVISION No. 01

DET NORSKE VERITAS



VALIDATION OPINION - CREDITING PERIOD RENEWAL

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Summary:

Project Name: Nueva Aldea Biomass Power Plant Phase 1**Registration Ref. No.:** 0258**Country:** Chile**Methodology:** ACM0006 **Version:** 12.1.1**GHG reducing Measure/Technology:** Renewable electricity generation using biomass residues**ER estimate:** 193 908 tCO₂e 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☒ Approval and request for renewal☐ Rejected

In summary, it is DNV's opinion that the project activity "Nueva Aldea Biomass Power Plant Phase 1" in Chile, as described in the PDD, version 2 of 4 November 2013, meets all relevant UNFCCC requirements for the renewal of the crediting period. Hence DNV requests the renewal of the crediting period of the project.

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Report title: Nueva Aldea Biomass Power Plant Phase 1 in Chile	
Work carried out by: Fernando Sasdelli, Felipe Antunes	
Work verified by: Simon Wong Yon-Sing	
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification request
CNE	National Energy Commission
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of approval
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PS	Clean Development Mechanism Project Standard
SIC	Chilean Central Interconnected System
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed an assessment of the request by Celulosa Arauco y Constitución S.A. to renew the crediting period of CDM project activity 0258 “Nueva Aldea Biomass Power Plant Phase 1” in Chile. The assessment was performed in accordance with the Validation and Verification Standard (Version 05.0) and the CDM Project Standard (Version 05.0) and included an assessment of:

- (a) An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the validity of the original baseline and/or its update through an assessment. The project correctly applies the baseline and monitoring methodology ACM0006, version 12.1.1 “Consolidated methodology for electricity and heat generation from biomass residues”.

The total emission reductions from the project are estimated to be on the average 193 908 tCO₂e per year over the 2nd 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 CDM project activity 0258 “Nueva Aldea Biomass Power Plant Phase 1” in Chile meets all relevant UNFCCC requirements for the renewal of the crediting period. Hence DNV requests the renewal of the crediting period of the project.

Rio de Janeiro and Oslo, 8 November 2013

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2 INTRODUCTION

DNV Climate Change Services AS (DNV) was commissioned by Celulosa Arauco y Constitución S.A. to perform an assessment of the request to renew the crediting period of CDM project activity 0258 “Nueva Aldea Biomass Power Plant Phase 1” in Chile.

The assessment was performed in accordance with the Validation and Verification Standard (Version 05.0) and the CDM Project Standard (Version 05.0) and included an assessment of:

- (a) An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

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/ Celulosa Arauco y Constitución S.A.: *CDM-PDD for project activity “Nueva Aldea Biomass Power Plant Phase 1” in Chile*, version 2 dated 4 November 2013 and version 1 dated 25 April 2011.
- /2/ Celulosa Arauco y Constitución S.A.: *Project Design Document* for the first crediting period of “Nueva Aldea Biomass Power Plant Phase 1” in Chile, version 2, dated 5 January 2006 and revised monitoring plan approved on 17 August 2008.
- /3/ Celulosa Arauco y Constitución S.A.: *Emission Reduction Calculation Spreadsheet, “Emission Reduction Calculation PDD 04-11-2013.xls”*, dated 4 November 2013.
- /4/ Celulosa Arauco y Constitución S.A.: E-mail from PP to UNFCCC informing their intention to renew the crediting period of the Nueva Aldea Biomass Power Plant Phase 1 sent on 25 April 2011 and the UNFCCC confirmation of receipt on 27 April 2011.
- /5/ Celulosa Arauco y Constitución S.A.: Grid Emission Factor Spreadsheet, “Emission Factor SIC 2010ToolV02.xls”, version 1, dated 8 September 2011.
- /6/ SIC: Interconnected Grid Data, “Fossil Fuel Consumption.zip”, “Fossil Fuel Data”, dated 17 August 2011.
- /7/ Celulosa Arauco y Constitución S.A.: Production History, “Own Consumption.zip”,



dated 17 August 2011.

- /8/ Celulosa Arauco y Constitución S.A.: *Index of Biomass Surplus*, “Index of biomass surplus NAPH1 2010.xlsx”, dated 16 January 2010.
- /9/ CNE: *Chilean Energy Balance 2008*, document “BNE2008.xls” from website <http://www.cne.cl/cnewww/opencms/>.
- /10/ Celulosa Arauco y Constitución S.A.: *Operational Data*, “Monrep data 2009.xlsx”, dated 2009.
- /11/ Celulosa Arauco y Constitución S.A.: *Operational Data*, “Monrep data 2010.xlsx”, dated 2010.
- /12/ Celulosa Arauco y Constitución S.A.: *Baseline heat generation*, “STEP 1.1 Determine total baseline process heat generation.xlsx”, dated 9 February 2012.
- /13/ U.S. Forest Service, Rocky Mountain Research Station: methane emission factor measurements report, dated 26 March 2009
- /14/ Lloyds: Environmental Management System ISO 14001 certificate, dated 16 August 2012

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

- /15/ CDM Executive Board: *Clean Development Mechanism Validation and Verification Standard*, version 05.0
- /16/ CDM Executive Board: *Validity of the original/current baseline and to update the baseline at the renewal of a crediting period*. Version 03.0.1
- /17/ CDM Executive Board: *Clean Development Mechanism Project Standard*, version 05.0
- /18/ CDM Executive Board: *Baseline and monitoring methodology ACM0006*, version 12.1.1, “Consolidated methodology for electricity and heat generation from biomass residues”.
- /19/ CDM Executive Board: *Baseline and monitoring methodology ACM0006*, version 1, “Consolidated baseline methodology for grid-connected electricity generation from biomass residues”.
- /20/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 3.0.0.
- /21/ CDM Executive Board: *Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion*, Version 2.
- /22/ CDM Executive Board: *Tool to determine the baseline efficiency of thermal or electric energy generation systems*, Version 1.
- /23/ CDM Executive Board: *Tool to calculate baseline, project and/or leakage emissions from electricity consumption*, Version 1.
- /24/ CDM Executive Board: *Tool for project and leakage emissions from transportation of freight*, Version 1.1.0
- /25/ DNV: Validation opinion for deviation from methodology entitled “Deviation for determining the baseline efficiency of the heat generator” (M-DEV-0478), dated 07 May 2013, approved by the CDM-EB on 10 October 2013.



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

- /26/ UNFCCC: *Project page view at UNFCCC website*, last accessed on 21 September 2011; <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138279173.34/view>
- /27/ IPCC: Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories. <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>
- /28/ IPCC: 1996 IPCC Guidelines for National Greenhouse Gas Inventories. <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>

3.2 Follow-up interviews with project stakeholders

On 29 September 2011, Fernando Sasdelli and Felipe Antunes of DNV visited the Nueva Aldea Biomass Power Plant Phase 1, located in Nueva Aldea, Region of Bío-Bío, Chile, and performed interviews with project stakeholders.

	Date	Name	Organization	Topic
/29/	29 September 2011	Christian Rodriguez	Celulosa Arauco y Constitución S.A.	<ul style="list-style-type: none"> • Site visit • Baseline confirmation
/30/	29 September 2011	Francisco Seguel		<ul style="list-style-type: none"> • Monitoring plan • Emission reductions estimation • Environmental Licenses and legal compliance

3.3 Resolution of outstanding issues

The objective of this phase of the assessment was to resolve any issues which needed to be clarified prior to DNV's positive conclusion on the project's compliance with applicable CDM requirements.

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 "Nueva Aldea Biomass Power Plant Phase 1" in Chile is enclosed in Appendix A to this report.

Table 1 of the validation protocol documents the findings of the desk review of the project design documentation and follow-up interviews with project stakeholders. Any findings raised in Table 1 are listed in Table 2 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 2. Table 1 thus may not



reflect all aspects of the project as described in the final PDD submitted for the crediting period renewal.



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 applicable 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 crediting period renewal.

The validation identified four CAR, twenty CLs and no FAR. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the PDD (please refer to Table 3 in Appendix A for further details). In addition to the changes made to the PDD as a result of the validation findings, the following changes to the PDD (version 2 dated 4 November 2013) were made compared to the version of the PDD submitted to DNV when requesting the renewal of the crediting period (version 1 dated 25 April 2011):

- Update from VVM to VVS format.



Validation Protocol Table 1: 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 2: 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 3: 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

This validation opinion 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

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.1 competence
Team leader (Validator)	Antunes	Felipe	Brazil	✓	✓	✓	✓		
Validator	Sasdelli	Fernando	Brazil	✓	✓	✓			✓
Technical reviewer	Wong	Simon Yon-Sing	Malaysia					✓	✓

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



4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The final validation findings relate to the project design as documented and described in the PDD, version 2 dated 4 November 2013.

4.1 Validity of selected baseline and monitoring methodology

The project was originally registered based on version 1 of ACM0006 – “Consolidated methodology electricity generation from biomass residues” /19//26/. The revised CDM-PDD applies version 12.1.1 of ACM0006 – “Consolidated methodology for electricity and heat generation from biomass residues” /18/. This is appropriate as version 12.1.1 was the version of the methodology in effect when the CDM-PDD version 2 was submitted for renewal of crediting period. The methodology is applied in combination with the “*Tool to calculate the emission factor for an electricity system*” (version 3.0.0) /20/, “*Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion*” (version 2) /21/, “*Tool to determine the baseline efficiency of thermal or electric energy generation systems*” (version 1) /22/, “*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*” (version 1) /23/, and the “*Tool for project and leakage emissions from transportation of freight*” (version 1.1.0) /22/.

In line with the CDM-EB “Validation and Verification Standard” (Version 5.0) /15/, the project proponent notified the CDM Secretariat by e-mail message on 25 April 2011 /4/ of their intention to renew the crediting period.

4.2 Applicability of selected baseline and monitoring methodology

The Nueva Aldea Biomass Power Plant Phase 1 in Chile is a new cogeneration power plant that generates electricity and heat from biomass residues. The technology in the project for generating electricity from biomass is the steam-Rankine cycle, which consists of direct combustion of biomass into a boiler to raise steam, which is then expanded through a turbine. Such combined heat and power (CHP), or cogeneration, systems provide greater levels of energy services per unit of biomass consumed than systems that generate power only.

The project activity consists in the installation of a new plant at a site where current no power or heat generation occurs (greenfield project) and fully complies with complies with ACM0006 version 12.1.1 conditions:

1. No other biomass types than biomass residues are used in the project plant.

During site visit DNV verified that the only biomass residues from industrial operations (sawdust, bark and sludge) are used in the project activity /29//30/.

2. Fossil fuel may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on an energy basis.

Due to operational reasons (start-up and shut down) fossil fuel will be co-fired in the boiler. Through assessment of the emission reduction spread sheet /3/ and historical consumption records /10//11/, DNV confirmed that this amount corresponds to less than 0.5% of total emission.



- 3. For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project does 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 the process.**

The core business of Nueva Aldea Biomass Power Plant Phase 1 is the production of sawn timber and wood panels. The implementation of the project will not result in an increase of the processing capacity of raw input. Besides, the project activity consumes biomass residues (sawdust, bark and sludge) that are generated by on-site production. This information was confirmed by DNV during site visit /29//30/.

- 4. The biomass residues used by the project facility are not stored for more than one year.**

During site visit DNV confirmed that there is no available area for to store biomass for a long time /29//30/. The stock available was designed to last no more than one week. Also, in order to keep the net calorific value of the biomass residues, stockpiles are managed to avoid degradations.

- 5. The biomass residues used by the project facility are not obtained from chemically processed biomass (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio- or chemical-degradation, etc) prior to combustion. Moreover, the preparation of biomass-derived fuel does not involve significant energy quantities, except from transportation or mechanical treatment so as not to cause significant GHG emissions.**

The only processes involved in the biomass residues preparation are mechanical (chipping and drying) and transportation /29//30/. Both emissions are accounted as project emissions. DNV confirmed during site visit that there was no chemical process in the biomass preparation /29//30/.

- 6. In the case of fuel switch project activities, the use of biomass residues or the increase in the use of biomass residues as compared to the baseline scenario is technically not possible at the project site without a capital investment in:**

- **The retrofit or replacement of existing heat generators/boilers; or**
- **The installation of new heat generators/boilers; or**
- **A new dedicated biomass residues supply chain established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or**
- **Equipment for preparation and feeding of biomass residues.**

The is no fuel switch activity as the Nueva Aldea Biomass Power Plant Phase 1 is a greenfield project.

- 7. In the case that biogas is used in power and/or heat generation, this methodology is applicable under the following conditions:**

- **The biogas is generated by anaerobic digestion of wastewater (to be) registered as a CDM project activity and the details of the registered CDM project activity must be included in the PDD. Any CERs from biogas energy generation should be claimed under the proposed project activity registered under this methodology;**



- *The biogas is generated by anaerobic digestion of wastewater that is not (and will not) be registered as a CDM project activity. The amount of biogas does not exceed 50% of the total fuel fired on an energy basis.*

Not applicable. There is no biogas consumption in the project activity.

8. In the case of biomass from dedicated plantations: (...)

Not applicable. There is no dedicated biomass plantation in the project activity.

9. The methodology is only applicable if the most plausible baseline scenario, as identified per the “Selection of the baseline scenario and demonstration of additionality” section hereunder, is:

- *For power generation: Scenario P2 to P7, or a combination of any of those scenarios.*
- *For the generation: Scenarios H2 to H7, or a combination of any of those scenarios.*
- *For biomass residues use: Scenarios B1 to B8, or any combination of those scenarios. For scenarios B5 to B8, leakage emissions should be accounted for as per procedures of the methodology.*

As described in the next sections, the most plausible baseline scenario for the project activity is a combination of above scenarios.

All abovementioned criteria's are applicable due to project's characteristics, as confirmed during the site visit. Therefore, DNV concludes that the applicability criteria from the selected baseline and monitoring methodology ACM0006 (version 12.1.1) /18/ are properly satisfied by “Nueva Aldea Biomass Power Plant Phase 1 in Chile”.

The assessment of the project's compliance with the applicability criteria of ACM0006 (version 12.1.1) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.3 Validity of the original baseline or its update

The following steps from the “Assessment of the validity of the original/current baseline and to update the baseline at the renewal of a crediting period” /16/ as per CDM-EB “Clean Development Mechanism Validation and Verification Standard” (version 05.0) /15/ were applied:

Step 1: Assess the validity of the current baseline for the next crediting period

The baseline of the project activity as per the registered PDD would be a “conventional sawmill and plywood mill plant, without power generation capacity”. In the baseline electricity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. The chosen baseline is a combination of scenarios:

- For power generation: the generation of power in the power grid (P7);
- For heat generation: the installation of new plants at the project site different from those installed under the project activity (H5);



- For biomass use: the biomass residues are dumped or left to decay mainly under aerobic conditions (B1) and the biomass residues are used for power or heat generation at the project site in new and/or existing plants (B4).

The “CDM Project Standard” /17/ approved by the CDM Executive Board requires assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline. The validity of the current baseline is assessed using the following sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There are no new national or sectoral policies at the time of the renewal of the crediting period that could affect the baseline scenario – including sourcing generation from the grid (P7), generation of heat using biomass residues (H5) and the natural decay or uncontrolled burning of biomass residues (B1). DNV was able to confirm that cogeneration projects fuelled with sawmill and plywood residues are not common practice in Chile /6/.

Step 1.2: Assess the impact of circumstances

DNV confirms that no changes in relevant circumstances applicable to the project activity came into effect after the submission of the project activity for validation.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) is technically possible

The baseline is not the continuation of the current practice, as Nueva Aldea Biomass Power Plant Phase 1 is a greenfield project and consequently there was no equipment installed within the project boundary before the project implementation.

Step 1.4: Assessment of the validity of the data and parameters

The only data and parameter determined at the starting of the crediting period and not monitored was the Global Warming Potential for CH₄ (GWP_{CH4}).

According to the registered PDD /2/ project participants have chosen Option 2 of *Tool to calculate the emission factor for an electricity system* /20/ and for the second crediting period parameter EF_{BM,y} is determined *ex-ante*.

The update of parameters presented above is presented in Step 2.2.

Conclusion on step 1

No change in regulation policies have occurred with significant impact on the current baseline. Therefore, the current baseline remains to be valid for the 2nd crediting period.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

The original baseline was derived using ACM0006, version 1, and was classified as scenario #3, a combination of:

- P4: the generation of power in existing and/or new grid-connected power plants;
- B1: the biomass is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes;
- B2: the biomass is used for heat and/or electricity generation at the project site; and



- H4: the generation of heat in boilers using the same type of biomass residues.

To remain in line with ACM0006 version 12.1.1, the baseline scenario was updated to “A conventional sawmill/ plywood mill boiler, without power generation capacity”, which is a combination of:

- P7: the generation of power in the power grid;
- H5: the installation of new plants at the project site different from those installed under the project activity;
- B1: the biomass residues are dumped or left to decay mainly under aerobic conditions, and;
- B4: the biomass residues are used for power or heat generation at the project site in new and/or existing plants.

In this regard, as per the methodology ACM0006 (version 12.1.1) /18/, project participants have identified the most plausible baseline scenario and demonstrate additionality using the steps outlined in the Selection of the baseline scenario and demonstration of additionality of the methodology. However, as the baseline scenario for the project activity has not been changed since the first crediting period, there is therefore no need to reassess the baseline scenario for the renewal of the crediting period.

Step 2.2: Update the data and parameters

At time of validation data from 1996 IPCC Guidelines was used /28/ to determine parameter GWP_{CH_4} . For the renewal of the crediting period default value from 2006 IPCC Guidelines was applied for parameter GWP_{CH_4} /27/.

In accordance with the *Tool to calculate the emission factor for an electricity system* /20/ $EF_{BM,y}$ is determined *ex-ante* for the second crediting period and was updated based on data for 2010 by SIC /5//6//9/ and was found to be 0.6953 tCO₂/MWh.

In order to comply with the baseline of the last version of ACM0006, the heat efficiency of the biomass boiler was determined. The determination of the heat efficiency represented a deviation from ACM0006 (version 12.1.1) /18/, this deviation (M-DEV-0478) was approved by the CDM EB on 10 October 2013 /25/. The project participants determined the efficiency to be 85% for the heat generator.

4.4 Validity of monitoring plan

The project applies the approved consolidated monitoring methodology ACM0006, version 12.1.1 – “Consolidated methodology for electricity and heat generation from biomass residues” /18/ in combination with “*Tool to calculate the emission factor for an electricity system*” /20/ for the grid emission factor. Concerning leakage and according to ACM0006 version 12.1.1, /18/, no sources of emissions were identified to the applied baseline. The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

4.4.1 Parameters determined ex-ante

The parameters used emission reduction calculations that are available *ex-ante* are:

- **GWP_{CH_4}** : global warming potential for CH₄. This parameter was determined according to 2006 IPCC Guidelines /27/.



- **CAP_{HG,h}**: baseline capacity of heat generator. According to ACM0006, this parameter was determined by the boiler capacity (150 tonnes/h) multiplied by the saturated steam enthalpy at 30 Bar (2.80317 GJ/ton), resulting in 420.47 GJ/h.
- **LFC_{HG,h}**: baseline load factor of heat generator. According to ACM0006, this parameter was determined as “the ratio between the actual heat generation of the heat generator and its design maximum heat generation along one year of operation”. Considering historical operational data, this value corresponds to 82% /7//10//11//12/.
- **EF_{grid,BM,y}**: CO₂ build margin emission factor of the grid. As per Step 2.2 of section 4.5 of this document, parameter was updated in accordance to 2010 SIC data /5//6//9/ and was found to be 0.6953 tCO₂/MWh.
- **EF_{Br,n,y}**: CH₄ emission factor for uncontrolled burning of the biomass residues category n. The adjusted factors of 874.20 kg CH₄/TJ from mix of sawdust and bark from industrial operations and 93.48 kg CH₄/TJ from mix of sawdust and bark from forest operations were obtained from independent field measurements /1//13/.
- **EF_{CO2,f}**: Default CO₂ emission factor for freight transportation activities. The values of 245 gCO₂/t km for light vehicles and 129 gCO₂/t km for heavy vehicles were applied as determined by the Tool “Project and leakage emissions from transportation of freight” version 1.1.0 /24/.

4.4.2 Parameters monitored ex-post

The parameters used emission reduction calculations that are available *ex-post* are:

- **Biomass residues categories and quantities used in the project activity**: there are five categories of biomass in the baseline:
 1. Sludge from off-site industrial operations that would be used for heat generation (B4).
 2. Mix of sawdust and bark from on-site industrial operations that would be used for heat generation (B4).
 3. Mix of sawdust and bark from on-site industrial operations that would be left to decay under clearly aerobic conditions (B1);
 4. Mix of sawdust and bark from off-site industrial operations that would be left to decay under clearly aerobic conditions (B1);
 5. Mix of sawdust and bark from off-site forestry operations that would be left to decay under clearly aerobic conditions (B1).
- **For biomass residues categories for which scenarios B1, B2 or B3 is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario**: DNV could confirm that availability of a surplus of biomass residues in the defined geographical region /8/.
- **BR_{PJ,n,y}**: Quantity of biomass residues used in the project activity
- **BR_{B4,n,y}**: Quantity of biomass residues used in the project activity for which the baseline scenario is B4.
- **BR_{B1/B3,n,y}**: Quantity of biomass residues used in the project activity for which the baseline scenario is B1 or B3.



- **BR_{B5/B8,n,y}**: Quantity of biomass residues used in the project activity for which the baseline scenario is B5, B6, B7, or B8.
- **FR_{F,m}**: Total mass of freight transported.
- **D_{f,m}**: Return trip road distance between the origin and destination of freight transportation activity.
- **EF_{CO2,i,y}**: CO₂ emission factor of fossil fuel.
- **FC_{i, project plant, y}**: Quantity of fuel type i combusted in power plant.
- **FC_{i, project site, y}**: Quantity of fuel type i combusted in project site.
- **FC_{i, biomass processing, y}**: Quantity of fuel type i combusted due to biomass processing.
- **NCV_{FF, f, y}**: Net calorific value of fossil fuel
- **EF_{CH4,BR}**: CH₄ emission factor for the combustion of biomass residues in the project plant
- **EF_{CO2,LE}**: CO₂ emission factor of the most carbon intensive fuel used in the country.
- **HC_{BL,y}**: Baseline process heat generation.
- **EL_{PJ,gross,y}**: Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary.
- **EL_{PJ,imp,y}**: Project electricity imports from the grid.
- **EL_{PJ,aux,y}**: Total auxiliary electricity consumption required for the operation of the power plants at the project site.
- **NCV_{BR,n,y}**: Net calorific value of biomass residues.
- **Moisture content of the biomass residues**: Moisture content of each biomass type.
- **EF_{grid,CM,y}**: CO₂ emission factor for grid electricity.
- **EF_{grid OM,y}**: CO₂ Operating margin emission factor of the grid.
- **FC_{i,m,y}, FC_{i,k,y}**: Amount of fossil fuel consumed by power plant/unit.
- **NCV_{i,y}**: Net calorific value (energy content) of fossil fuel.
- **EF_{CO2,i,y}, EF_{CO2,m,i,y}**: CO₂ emission factor of fossil fuel.
- **EG_{m,y}, EG_{k,y}**: Net electricity generated and delivered to the grid by power plant/unit.

4.4.3 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 not required either by the methodology ACM0006 or by the Chilean DNA.

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



4.5 Algorithms and/or formulae used to determine emission reductions

The various algorithm/formulae and steps for calculating baseline and project emissions have been transparently documented in line with the requirements of ACM0006 version 12.1.1 /18/.

The emission reductions are calculated as the difference between baseline emissions, project emissions and leakage emissions. The baseline emissions are due to grid emissions savings from electricity generation with biomass residues and due to the natural decay or burning of anthropogenic sources of biomass residues.

Step 1: Determine biomass availability, generation and capacity constraints, efficiencies and power emission factors

At this first step project participants calculated:

- Step 1.1 – $HC_{BL,y}$ (baseline process heat generation): based on the heat (steam) delivered to the project /12/;
- Step 1.2 – $EL_{BL,y}$ (baseline electricity generation): based on the net electricity consumed by the project activity, equation (3) of ACM0006. As per Step 1.2 of ACM0006 $EL_{PJ, gross}$ is based on project data. The value of 169 066 MWh per year was obtained based on historical data /7//10//11/;
- Step 1.3 – $CAP_{EG, total}$ (baseline capacity of electricity generation): the baseline scenario does not comprise any local electricity generation at all, so this value is null;
- Step 1.4 – Baseline availability of biomass residues: based on historical data /7//10//11/;
- Step 1.5 – Efficiencies of heat generators and heat engines: based on the approved deviation /25/;
- Step 1.6 – Emission factor of on-site electricity generation with fossil fuels: this step is not applicable, since $EF_{EG, FF, y} = EF_{EG, GR, y}$.
- Step 1.7 – Emission factor of grid electricity generation: 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 calculated and monitored *ex-post* in accordance with the “*Tool to calculate the emission factor for an electricity system*”. 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 2010. The build margin emission coefficient (BM) will be kept fixed during the crediting period, and it was calculated considering the most recent 20% power plants capacity additions (in MWh) in the electricity system based in information from CDEC-SIC Dispatch Center and Grid Emission Factor Spreadsheet /5//6//9/. The operating margin (OM) emission coefficient is calculated using the simple adjusted method, and is found to be 0.8035 tCO₂e/MWh and the build margin (BM) emission coefficient is 0.6953 tCO₂e/MWh, resulting in a combined margin emission coefficient of 0.722 tCO₂e/MWh (weighted average of the operating and build margin, using weights of 0.25 and 0.75 respectively).

Step 2: Determine the minimum baseline electricity generation in the grid

Project participants have correctly applied equation (13) of ACM0006, resulting in 169 066 MWh/yr.



Step 3: Determine the baseline biomass-based heat and power generation

At *Step 3.1: Determine the baseline biomass-based heat generation* project participants applied equations (14), (15) and (16) of ACM0006. Based on the availability of each biomass, respective net calorific value and boiler efficiency, the resulting baseline biomass-based heat generation ($HG_{BL,BR,y}$) was 2 134 426 GJ/yr.

Considering that there is no co-generation in the baseline scenario, *Step 3.2: Determine the baseline biomass-based cogeneration of process heat and electricity and heat extraction* is not applicable.

Step 4: Determine the baseline demand for fossil fuels to meet the balance of process heat and the corresponding electricity generation

This Step is not applicable to the calculation.

Step 5: Determine the baseline emissions due to uncontrolled burning or decay of biomass residues

Step 5.1 "Determine $BE_{BR,BI/B3,y}$ ": the amount of biomass residues from each categories (k): 3 (104 327 BDt/yr), 4 (126 189 BDt/yr) and 5 (3 803 BDt/yr) were multiplied by the correspondent net calorific value, adjusted CH_4 for uncontrolled burning and CH_4 global warming potential, resulting in 76 214 tCO₂ per year.

Step 5.2 is not applicable, since no biomass residues would be dumped under anaerobic conditions in the baseline scenario.

Step 6: Calculate baseline emissions

The baseline emissions were estimated as 1 398 993 tCO₂, which corresponds to an annual average of 199 856 tCO₂ over the 7 years of the second crediting period.

The project emissions are due to:

- Fossil fuel consumption: related to diesel and LPG consumption in the boilers during plant start-up and shut-down, related to diesel consumption due to on-site biomass transportation and emissions due to mechanical preparation of the biomass residues.
- Electricity imports: related to major maintenance stops, estimated as 2 000 MWh/year.
- Emissions from biomass transportation to the power plant: estimated based on the "Tool for project and leakage emissions from transportation of freight", Version 1.1.0 /24.

The potential source of leakage is related to local sawdust and bark 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 2010 /8/, the Nueva Aldea Biomass Power Plant Phase 1 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.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction conservatively calculated to be 193 908 tCO_{2e} per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and



interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

4.6 Estimation of GHG emissions

The baseline emissions were estimated as 1 398 993 tCO₂, which corresponds to an annual average of 199 856 tCO₂ over the 7 years of the second crediting period.

The project emissions were estimated as 5 949 tCO₂, as annual average over the 7 years of the second crediting period.

The total estimated amount of GHG emission reductions from the project is calculated to be 1 357 354 tCO₂ over a 7 years crediting period, resulting in estimated average annual emission reductions of 193 908 tCO₂.

The emission reduction calculation were provided in a spreadsheet /3/, 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.

APPENDIX A

CDM VALIDATION PROTOCOL

**Table 1 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 (PS § 31, VVS § 62-63)					
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	<input checked="" type="checkbox"/> Clearly identifiable title of the project activity <input checked="" type="checkbox"/> Version number of the PDD is included <input checked="" type="checkbox"/> Date of the PDD is included. The title of the project activity is different from the project title in the project page view at the UNFCCC website.	CL1	OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	<input type="checkbox"/> Yes The names of the project participants and parties are different from the project page view at the UNFCCC website. Date of completion of the application of the baseline study and name of the responsible person/entity are missing under section B.8. Annex 1 is not listing the contact information of all of the project participants.	CL2 CL17 CL18	OK
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVS para 70-133 and VVS § 150-153 for small-scale project activities, as applicable)					
B.1.1 Does the project apply an approved methodology and the correct version thereof?	/1/	DR	During the validation course, the versions 11.1 of ACM0006, and 2.2.0 of the “Tool to calculate the emission factor for an electricity system” had	CAR4 CL3 CL6	OK

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



Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>expired.</p> <p>Version of the tools presented in the PDD are no the latest available. Version of the <i>Tool to determine the baseline efficiency of thermal or electric energy generation systems</i> is missing.</p> <p>The PDD is making reference to Table 6 of the ACM0006, version 12.1.1 when discussing the Conservativeness Factors. There is no Table 6 in the ACM0006, version 12.1.1.</p> <p>According to the ACM0006 version 12.1.1 the grid emission factor should be calculated using the <i>Tool to calculate the emission factor for an electricity system</i>, not the ACM0002.</p> <p>The methodology version applied in the PDD is version 12.1.1 and consistency shall be kept throughout the entire document.</p>	CL-14 CL-16	
B.2 Applicability of methodology (and tools) (VVS § 73-77)					
B.2.1 How was it validated that project complies with the following applicability criteria: No biomass types other than biomass residues are used in the project plant?	/1/ /29/ /30/	DR	During site visit DNV verified that the only biomass residues from industrial operations (sawdust, bark and sludge) are used in the project activity.		OK
B.2.2 How was it validated that project complies with the following applicability criteria: Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired does not exceed 80% of the total fuel fired on an energy basis?	/1/ /3/	DR	Due to operational reasons (start-up and shut down) fossil fuel will be co-fired in the boiler. Through assessment of the emission reduction spread sheet, DNV confirmed that this amount corresponds to less than 0.5% of total emission.		OK
B.2.3 How was it validated that project complies with the following applicability criteria:	/1/ /29/	DR	The core business of Nueva Aldea Biomass Power Plant Phase 1 is the production of sawn		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project does 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?	/30/		timber and wood panels. The implementation of the project will not result in an increase of the processing capacity of raw input. This information was confirmed by DNV during site visit.		
B.2.4 How was it validated that project complies with the following applicability criteria: The biomass residues used by the project facility are not stored for more than one year?	/1/ /29/ /30/	DR	During site visit DNV confirmed that there is no available area for to store biomass for a long time. The stock available was designed to last no more than one week. Also, in order to keep the net calorific value of the biomass residues, stockpiles are managed to avoid degradations.		OK
B.2.5 How was it validated that project complies with the following applicability criteria: The biomass residues used by the project facility are not obtained from chemically processed biomass (e.g. through esterification, fermentation, hydrolysis, pyrolysis, bio- or chemicaldegradation,etc.) prior to combustion. Moreover, the preparation of biomass-derived fuel do not involve significant energy quantities, except from transportation or mechanical treatment so as not to cause significant GHG emissions?	/1/ /29/ /30/	DR	The only processes involved in the biomass residues preparation are mechanical (chipping and drying) and transportation. Both emissions are accounted as project emissions. DNV confirmed during site visit that there was no chemical process in the biomass preparation.		OK
B.2.6 How was it validated that project complies with the following applicability criteria: In the case of fuel switch project activities, the use of biomass residues or the increase in the use of biomass residues as compared to the baseline scenario is technically not possible at the project site without a capital investment in: <ul style="list-style-type: none"> • The retrofit or replacement of existing heat generators/boilers; or • The installation of new heat generators/boilers; or • A new dedicated biomass residues supply chain established 	/1/	DR	There is no fuel switch activity as the Nueva Aldea Biomass Power Plant Phase 1 is a greenfield 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.
<p>for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); or</p> <p>• Equipment for preparation and feeding of biomass residues</p>					
<p>B.2.7 How was it validated that project complies with the following applicability criteria:</p> <p>In the case that biogas is used in power and/or heat generation, this methodology is applicable under the following conditions:</p> <ul style="list-style-type: none"> • The biogas is generated by anaerobic digestion of wastewater (to be) registered as a CDM project activity and the details of the registered CDM project activity must be included in the PDD. Any CERs from biogas energy generation should be claimed under the proposed project activity registered under this methodology; • The biogas is generated by anaerobic digestion of wastewater that is not (and will not) be registered as a CDM project activity. The amount of biogas does not exceed 50% of the total fuel fired on an energy basis. 	/1/	DR	Not applicable. There is no biogas consumption in the project activity.		OK
<p>B.2.8 How was it validated that project complies with the following applicability criteria:</p> <p>The methodology is only applicable if the most plausible baseline scenario, as identified per the “Selection of the baseline scenario and demonstration of additionality” section hereunder, is:</p> <ul style="list-style-type: none"> • For power generation: Scenario P2 to P7, or a combination of any of those scenarios. • For the generation: Scenarios H2 to H7, or a combination of any of those scenarios. • For biomass residues use: Scenarios B1 to B8, or any combination of those scenarios. For scenarios B5 to B8, leakage emissions should be accounted for as per procedures of the methodology. 	/1/	DR	The baseline scenario is a combination of P7, H5 and B1/B4.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.2.9 Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	Yes. The baseline scenario is a combination of P7, H5 and B1/B4.		OK
B.3 Project boundary (VVS § 82-87)					
B.3.1 What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined?	/1/	DR	Project boundary consists of the cogeneration facility, on-site fossil fuel consumption, off-site biomass transportation, and the power plants connected to the SIC grid.		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	It is not clear if under project activity CO ₂ emissions due to on-site fossil fuel consumption and to off-site transportation of biomass residues is or not an important emission source.	CL-4	OK
B.3.3 Do the system boundaries for the project as described in the PDD fully comply with the project boundaries stipulated by the applied baseline methodology?	/1/	DR	Yes, the boundaries are in line with ACM0006.		OK
B.3.4 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/	DR	No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.		OK
B.4 Baseline scenario determination and description (VVS § 88-95 / Identification of alternatives to the project activity (VVS § 113-116)					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete? Does the list include as one of the options that the project activity is undertaken without being registered as a proposed project activity? Does the list contains all plausible alternatives which are viable means of supplying the comparable outputs or	/1/	DR	Only four categories of biomass are described in the PDD and emission reduction spread sheet. During the site visit it was observed that a fifth category of biomass, sludge, was being used as a fuel in the boiler. The baseline biomass-based heat generation	CAR-2 CAR-3	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
services that are to be supplied by the proposed project activity?			efficiency is not available under option F of the Tool to determine the baseline efficiency of thermal or electric energy generation systems.		
B.4.2 Could the project activity in absence of the CDM or other baseline alternatives also be implemented by other entities than the CDM project participants? If so, has this also been included in the list of baseline scenarios?	/1/	DR	No, the project activity will be implemented inside Arauco's facilities.		OK
B.4.3 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	Other scenarios were eliminated based on investment barriers, technological barriers, prevailing practice barriers, cultural barriers, and regulatory barriers.		OK
B.4.4 What is the baseline scenario?	/1/	DR	The chosen baseline is a combination of scenarios: <ul style="list-style-type: none"> • For power generation: the generation of power in the power grid (P7); • For heat generation: the installation of new plants at the project site different from those installed under the project activity (H5); • For biomass use: the biomass residues are dumped or left to decay mainly under aerobic conditions (B1) and the biomass residues are used for power or heat generation at the project site in new and/or existing plants (B4). 		OK
B.4.5 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	Biomass residues dumped or left to decay under clearly anaerobic conditions are wrongly classified under baseline scenario of biomass B1.	CL-5	OK
B.4.6 Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes, conservative assumptions were taken.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4.7	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies? Does the baseline scenario comply with all applicable and enforced legislation?	/1/	DR	Yes, there are no new national or sectoral policies that could affect the baseline scenario during the renewal of the crediting period.		OK
B.4.8	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes, available data and literature were referenced.		OK
B.4.9	Is the baseline determination adequately documented in the PDD? <ul style="list-style-type: none"> • 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, the baseline determination is adequately documented in the PDD.		OK
B.5	Calculations of GHG emission reductions					
	Data and parameters that are available at validation and that are not monitored (VVS § 96-100)					
B.5.1	How was the CAP_{HG,h} (Baseline capacity of heat generator h) verified?	/1/	DR	Parameters CAP _{HG} and LFC _{HG} are missing under section B.6.2 of the PDD.	CL-8	OK
B.5.2	How was the LFC_{HG,h} (Baseline load factor of heat generator h) verified?	/1/	DR	Parameters CAP _{HG} and LFC _{HG} are missing under section B.6.2 of the PDD.	CL-8	OK

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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.3 How was the GWP_{CH_4} (Global Warming Potential for CH ₄) verified?	/1/ /27/	DR	This parameter was determined according to 2006 IPCC Guidelines.		OK
B.5.4 How was the $EF_{grid,BM,y}$ verified?	/1/	DR	Values are missing for the parameter grid emission factor at the correspondent table of the PDD.	CL-15	OK
B.5.5 How was the $EF_{Br,n,y}$ verified?	/1/ /13/	DR	The adjusted factors of 874.20 kg CH ₄ /TJ from mix of sawdust and bark from industrial operations and 93.48 kg CH ₄ /TJ from mix of sawdust and bark from forest operations were obtained from independent field measurements.		OK
B.5.6 How was the $EF_{CO_2,f}$ verified?	/1/ /24/	DR	The values of 245 gCO ₂ /t km for light vehicles and 129 gCO ₂ /t km for heavy vehicles were applied as determined by the Tool “Project and leakage emissions from transportation of freight” version 1.1.0.		OK
Baseline emissions (VVS § 96-100)					
B.5.7 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	<p>The gross electric power capacity of the power plant presented in the spreadsheet “<i>Emission Reduction Calculation REV1.xls</i>” is different from the capacity presented in section A.2 of the PDD.</p> <p>The PDD shall describe the emission reduction calculation under the step-wise applied on ACM0006.</p> <p>Although the methodology ACM0006, version 12.1.1 does not declares a calculation method for the “biomass available in the baseline used for heat generation” and “baseline biomass-based</p>	CL-19 CL-20	OK



Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			heat generation”, it should be in accordance with the thermodynamic laws. The enthalpy levels presented in the “ <i>Emission Reduction Calculation REVI.xls</i> ” used for the calculation of these values are incorrect. The enthalpy levels at the baseline are different from the enthalpy levels at the project activity.		
B.5.8 Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	See B.5.7	CL-19 CL-20	OK
B.5.9 Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	See B.5.7	CL-19 CL-20	OK
Project emissions (VVS § 96-100)					
B.5.10 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /24/	DR	Yes. The project emissions are due to: <ul style="list-style-type: none"> - Fossil fuel consumption: related to diesel and LPG consumption in the boilers during plant start-up and shut-down, related to diesel consumption due to on-site biomass transportation and emissions due to mechanical preparation of the biomass residues. - Electricity imports: related to major maintenance stops, estimated as 2 000 MWh/year. - Emissions from biomass transportation to the power plant: estimated based on the “Tool for project and leakage emissions from transportation of freight” , Version 1.1.0. 		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.11 Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Yes, see B.5.10		OK
B.5.12 Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes, see B.5.10		OK
Leakage (VVS § 96-100)					
B.5.13 Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	References shall be presented for the table with the biomass surplus calculation “Supply/Demand situation in the Nueva Aldea Biomass Power Plant Phase 1 power plant influence area”, presented in the PDD.	CL-11	OK
B.5.14 Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	See B.5.13.	CL-11	OK
B.5.15 Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	See B.5.13.	CL-11	OK
Emission Reductions (VVS § 96-100)					
B.5.16 Algorithms and/or formulae used to determine emission reductions: <ul style="list-style-type: none"> • 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/	DR	The table presented under section A.4.4 is not in line with the values presented in the spreadsheet “ <i>Emission Reduction Calculation REV1.xls</i> ” All cells of the spreadsheet “ <i>Emission Reduction Calculation REV1.xls</i> ” shall be visible. Hidden cells are not allowed.	CAR-1 CL-10	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6 Monitoring plan (VVS § 131-133)					
Data and parameters monitored					
B.6.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	Parameter $EF_{Br, n, y}$ should be under section B.7.1 of the PDD. Parameter $EF_{CH_4 BR}$ should also be, and its value should be 0. The monitoring table from ACM0006 “For biomass residues categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario” is missing. Parameter “Emissions from fossil fuel consumption in biomass from forestry operations processing” is missing under section B.7.1 of the PDD.	CL9	OK
B.6.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	The diesel oil density is not available at the 2006 IPCC guidelines. A reference is missing for this parameter.	CL7	OK
B.6.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	Biomass residues categories and quantities used in the project activity, $BR_{PJ,n,y}$, $BR_{B4,n,y}$, $BR_{B1/B3,n,y}$, $BR_{B5/B8,n,y}$, $FR_{F,m}$: weighbridge; $FC_{i, project plant, y}$, $FC_{i, project site, y}$, $FC_{i, biomass processing, y}$: mass or volume meters; $HC_{BL,y}$: enthalpy process (steam flow, temperature and pressure); $EL_{PJ,gross,y}$, $EL_{PJ,imp,y}$, $EL_{PJ,aux,y}$: electricity meters. Moisture content of the biomass residues: scales.		OK
B.6.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe	/1/	DR	The accuracy and frequency of calibration of the measuring equipment shall be presented under	CL12	OK

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



Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
each relevant parameter.			section B.7.1 when applicable.		
B.6.5 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	The accuracy and frequency of calibration of the measuring equipment shall be presented under section B.7.1 when applicable.	CL-12	OK
B.6.6 Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	It is not clear how the parameter “Moisture content of the biomass residues” will be monitored continuously.	CL-13	OK
B.6.7 Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	It is not clear how the parameter “Moisture content of the biomass residues” will be monitored continuously.	CL-13	OK
Ability of project participants to implement monitoring plan					
B.6.8 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.6.9 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.6.10 Are 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/ /14/	DR	Yes, the plant Environmental Management System assures that emission reductions can be reported and verified.		OK
B.6.11 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	/1/	DR	Yes, 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		OK

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



Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
project activity, whichever occurs later?			CERs		

**Table 2 Resolution of corrective action requests and clarification requests**

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
CAR 1 The table presented under section A.4.4 is not in line with the values presented in the spreadsheet " <i>Emission Reduction Calculation REV1.xls</i> "	B.5.16	The Project Proponent made the corresponding correction to the table presented under section A4.4 in the PDD document and makes sure this coincide with values presented in the updated spreadsheet " <i>Emission Reduction Calculation REV2 30-12-2010.xls</i> "	DNV assessed the revised PDD and the revised CER spread sheet and confirmed that the presented values under section A.4.4 are in line with the expected emission reductions Therefore this CAR is closed.
CAR 2 Only four categories of biomass are described in the PDD and emission reduction spread sheet. During the site visit it was observed that a fifth category of biomass, sludge, was being used as a fuel in the boiler.	B.4.1	The Project Proponent made the corresponding correction in the PDD and to emission reduction spread sheet. The amount of primary and secondary sludge, generated by pulp mill operations, is considered as a category of biomass residues used as fuel in the power boiler.	DNV assessed the revised PDD and confirmed that a fifth biomass category was included. Therefore this CAR is closed.
CAR 3 The baseline biomass-based heat generation efficiency is not available under option F of the Tool to determine the baseline efficiency of thermal or electric energy generation systems /22/.	B.4.1	The range of the efficiency value of the boiler considered for the baseline power boiler, would be between 85% (lowest value) and 90% (highest value), according to power boiler manufactures. In this case, the efficiency considered for the power boiler that would be installed in the absence of the project activity would be 85%.	A request for deviation of the methodology was presented to EB and approved on 10 October 2013. The request for deviation proposed an efficiency of 85% for the baseline boiler that was shown to be more conservative than the 100% default value of the " <i>Tool to determine the baseline efficiency of thermal or electric energy generation systems</i> ". This fact is mainly

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
		<p>Since this value (85%) was not available under option F (use of default values) of the latest approved version of the “Tool to determine the baseline efficiency of thermal or electric energy systems” at the date of the re-validation (second period of accreditation) of the project activity.</p> <p>The value chosen is more conservative than the default value of 100% available under the latest version of the “Tool to determine the baseline efficiency of thermal or electric energy systems”, since a lower baseline efficiency leads to a higher amount of biomass combusted in the power boiler, and according to equation 14 of ACM0006 (Version 11.1), a higher amount of biomass leads to lower emission reduction due to electricity displacement from the grid.</p> <p>The Project Proponent will request a deviation to the corresponding “Tool to determine the baseline efficiency of thermal or electric energy systems” in order to be able to use the proposed value.</p>	<p>due to the emission of the fossil fuel used during technical constraints (start-up and shut-downs). According to equation 14 of ACM0006 version 12.1.1 the heat generation from fossil fuel is directly proportional to the boiler efficiency.</p> <p>Therefore this CAR is closed.</p>



Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
		As a result, this efficiency value was determined by Project Proponent, based on the efficiency calculation of a real low-pressure boiler installed in one of the Arauco industrial facilities.	
CAR 4 During the validation course, the versions 11.1 of ACM0006, and 2.2.0 of the “Tool to calculate the emission factor for an electricity system” had expired.	B.1.1	The PDD was revised in order to be in line with the updated meth and tool versions.	The revised PDD version 2 now correctly applies ACM0006 version 12.1.1 and the “Tool to calculate the emission factor for an electricity system” version 3.0.0. Therefore this CAR is closed.
CL 1 The title of the project activity is different from the project title in the project page view at the UNFCCC website.	A.1.1	The Project Proponent made the corresponding correction to the title in the PDD document.	DNV assessed the revised PDD and the title was found to be in line with the UNFCCC website. Therefore this CL is closed.
CL 2 The names of the project participants and parties are different from the project page view at the UNFCCC website.	A.1.2	The Project Proponent made the corresponding correction to the names of the project participants and parties in the PDD document.	DNV assessed the revised PDD and the project participants and parties are in line with the UNFCCC website. Therefore this CL is closed.
CL 3 Version of the tools presented in the PDD are no the latest available. Version of the <i>Tool to determine the baseline efficiency of thermal or electric energy generation systems</i> is missing.	B.1.1	The Project Proponent made the corresponding correction to the tools presented in the PDD document.	DNV assessed the revised PDD and confirmed that the versions of the presented tools are the latest available and applicable to the project activity. Therefore this CL is closed.
CL 4 It is not clear if under project activity CO ₂	B.3.2	The Project Proponent made the corresponding correction to clarify that	The revised PDD is now clear and is listing the emissions from on-site fossil

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
emissions due to on-site fossil fuel consumption and to off-site transportation of biomass residues is or not an important emission source.		emission from on-site consumption and off-site transportation of fossil fuel are relevant emission sources for the project activity.	fuel consumption and off-site transportation of biomass as important emission sources. Therefore this CL is closed.
CL 5 Biomass residues dumped or left to decay under clearly anaerobic conditions are wrongly classified under baseline scenario of biomass B1.	B.4.5	The Project Proponent made the corresponding correction to the conditions under which baseline scenario of biomass B1 is classified (i.e. from anaerobic to aerobic).	In the revised PDD, in the absence of the project activity, the biomass residues from categories 3, 4 and 5 would be left to decay under aerobic condition, with is in line with scenario B1 of the approved methodology. Therefore this CL is closed.
CL 6 The PDD is making reference to Table 6 of the ACM0006, version 12.1.1 when discussing the Conservativeness Factors. There is no Table 6 in the ACM0006, version 12.1.1.	B.1.1	The Project Proponent made the corresponding correction of the reference Table (from Table 6 to Table 3) where conservativeness factors were obtained from.	The revised PDD is now referring to the correct table of the ACM0006, version 12.1.1. Therefore this CL is closed.
CL 7 The diesel oil density is not available at the 2006 IPCC guidelines. A reference is missing for this parameter.	B.6.2	In this case Project Proponent uses the CNE (National Energy Commission) Energy Balance for 2008, as reliable and documented national energy statistics, to reference fuel density. The web link is presented as follows: www.cne.cl . Search for “BNE 2008”.	The PP state in the revised PDD that the source for the diesel oil density is the CNE (National Energy Commission) /9/. DNV assessed the reference and confirmed the diesel oil density values. Therefore this CL is closed.
CL 8 Parameters CAP _{HG} and LFC _{HG} are missing under section B.6.2 of the PDD.	B.5.1 B.5.2	The Project Proponent made the corresponding correction including both parameters under section B.6.2.	DNV assessed the revised PDD and confirmed that parameters CAP _{HG} and LFC _{HG} were correctly included in

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
			section B.6.2. Therefore this CL is closed.
<p>CL 9</p> <p>Parameter $EF_{Br, n, y}$ should be under section B.7.1 of the PDD. Parameter $EF_{CH_4 BR}$ should also be, and its value should be 0. The monitoring table from ACM0006 “For biomass residues categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario” is missing.</p> <p>Parameter “Emissions from fossil fuel consumption in biomass from forestry operations processing” is missing under section B.7.1 of the PDD.</p>	B.6.1	<p>The Project Proponent made the corresponding corrections including both parameters ($EF_{Br, n, y}$ and $EF_{CH_4 BR}$) under section B.7.1 of this PDD.</p> <p>The Project proponent made the corresponding correction and included the monitoring table in this PDD to demonstrate that B1, B2 or B3 is a credible alternative scenario. This tables is supported by the spreadsheet calculation “<i>Index of biomass surplus NAPH1 2010.xls</i>”</p> <p>The parameter fossil fuel consumption of processing biomass residues from forestry operations has been included in section B 7.1 of the PDD.</p> <p>During the renewal period of Trupan CDM project activity, Project participants presented as evidence data of fossil fuel consumption due to processing biomass residues from forestry operations.</p> <p>Data/calculations is presented as follows:</p> <p>Data:</p>	<p>The PP have included in the revised PDD parameters $EF_{Br,n,y}$ and $EF_{CH_4 BR}$ under section B.7.1.</p> <p>PP have also included the monitoring table “For biomass residues categories for which scenarios B1:, B2: or B3: is deemed a plausible baseline alternative, project participants shall demonstrate that this is a realistic and credible alternative scenario”.</p> <p>Parameter $FC_{Diesel,biomassprocessing,y}$ was included in section B.7.1..</p> <p>Therefore this CL is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
		(1) Fossil fuel consumption index: 1.2 (L/m ³ st) (2) BDt factor: 0.15 (BDt/m ³ st) (3) Biomass residues from forestry operations: 3,803 (BDt/yr). (4) Fossil fuel (diesel) density: 0.84 (kg/lt) Calculations: (5) Fuel processing consumption index [(1)/(2)]: 8.0 (L/BDt). Total estimated fossil fuel (diesel) consumption [(5)*(4)*(3)]: 8.0 (L/BDt) * 0.84 (kg/lt) * 3,803 (BDt/yr) * (1 ton/1000 kg) = 25.42 (ton/yr.)	
CL 10 All cells of the spreadsheet “ <i>Emission Reduction Calculation REV1.xls</i> ” shall be visible. Hidden cells are not allowed.	B.5.16	The Project Proponent made visible all hidden cells in the excel sheet.	In the revised spread sheet presented to DNV all cell are visible. Therefore this CL is closed.
CL 11 References shall be presented for the table with the biomass surplus calculation “Supply/Demand situation in the Nueva Aldea Biomass Power Plant Phase 1 power plant influence area”, presented in the PDD.	B.5.13 B.5.14 B.5.15	The Project Proponent made the corresponding correction. The document of reference “Index of biomass surplus NAPH1 2010.xls that support the table with the biomass surplus calculation will be provided to the auditors.	The evidence containing the biomass surplus calculation is the presented file “Index of biomass surplus NAPH1 2010.xlsx” /8/, where all biomass production and consumption in the region could be verified by DNV. Therefore this CL is closed.
CL 12 The accuracy and frequency of calibration of	B.6.4 B.6.5	The Project Proponent included under section B.7.1 of this PDD the accuracy	DNV assessed the revised PDD and the PP had included the accuracy of the

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
the measuring equipment shall be presented under section B.7.1 when applicable.		and frequency information of calibration when applicable to measuring equipment.	meters under section B.7.1. The PP also stated that the calibration will be done according to the industry standards. DNV considers this information enough, therefore this CL is closed.
CL 13 It is not clear how the parameter “Moisture content of the biomass residues” will be monitored continuously.	B.6.6 B.6.7	<p>The Project Proponents will monitor and register periodically moisture content of biomass residues categories, by taking biomass samples from the corresponding sources.</p> <p>Humidity content will be calculated by evaporating 100% of the water of the wet sample and measuring the weight before and after water content has been evaporated.</p> <p>This process will be carried out in dedicated scales.</p> <p>The moisture content will be monitored for each batch of biomass of homogeneous quality. The weight average will be calculated for each monitoring period and used in the calculations.</p> <p>This parameter will be monitored for each batch and aggregated annually. Mean values will be calculated at least annually.</p>	<p>The PP states in the revised PDD that the parameter moisture content will be monitored for each batch of biomass. This is in accordance with the monitoring frequency requested by the methodology.</p> <p>Therefore this CL is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
CL 14 According to the ACM0006 version 12.1.1 the grid emission factor should be calculated using the <i>Tool to calculate the emission factor for an electricity system</i> , not the ACM0002.	B.1.1	The Project Proponent made the corresponding correction in the PDD document. The “Tool to calculate the emission factor for an electricity system” is used instead of ACM0002.	The revised PDD is now correctly referring to the “ <i>Tool to calculate the emission factor for an electricity system</i> ”. Therefore this CL is closed.
CL 15 Values are missing for the parameter grid emission factor at the correspondent table of the PDD.	B.5.4	The Project Proponent made the corresponding correction and will only include (in section B.7.1) the monitored parameters for the ACM0006 (Version 11.1) used in the calculation of $EF_{EG,GR,y}$. The Project Proponent have included under appropriate sections B.6.2 and B.7.1 of this PDD the parameters $EF_{OM,y}$ and $EF_{BM,y}$, as was required by the DOE.	DNV assessed the revised PDD and confirmed that parameter $EF_{grid,BM}$ is correctly listed under section B.6.2 and parameters $EF_{grid,OM,y}$ and $EF_{grid,GR,y}$ are correctly listed under section B.7.1. Therefore this CL is closed.
CL 16 The methodology version applied in the PDD is version 12.1.1 and consistency shall be kept throughout the entire document.	B.1.1	The Project Proponent made the corresponding correction on the PDD document.	DNV assessed the revised PDD and confirmed that PP are only referring to version 12.1.1 of ACM0006. Therefore this CL is closed.
CL 17 Date of completion of the application of the baseline study and name of the responsible person/entity are missing under section B.8.	A.1.2	The Project Proponent made the corresponding corrections in section B.8 of this PDD document.	Under section B.8 Arauco Bioenergia S.A. is listed as the responsible entity for the baseline study. The date of completion of the application was also included in the same section. Therefore this CL is closed.
CL 18	A.1.2	The Project Proponent made the	DNV assessed the revised PDD and

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
Annex 1 is not listing the contact information of all of the project participants.		corresponding corrections including all of the project participants in Annex 1 of this PDD.	confirmed that all project participants are listed under Annex 1. Therefore this CL is closed.
CL 19 The gross electric power capacity of the power plant presented in the spreadsheet " <i>Emission Reduction Calculation REV1.xls</i> " is different from the capacity presented in section A.2 of the PDD. The PDD shall describe the emission reduction calculation under the step-wise applied on ACM0006.	B.5.7 B.5.8 B.5.9	The Project Proponent made the corresponding correction to the spreadsheet " <i>Emission Reduction Calculation REV1.xls</i> ". The gross electric power capacity of the power plant is 30 MW. A description of the emission reduction calculation is presented by Project Proponent following ACM0006 (version 11.1).	In the revised PDD the gross electric power capacity of the power plant was corrected and is in line with the capacity verified by DNV during the site visit. The emission reduction calculation presented in the PDD is now following the ACM0006 step-wise. Therefore this CL is closed.
CL 20 Although the methodology ACM0006, version 12.1.1 does not declares a calculation method for the "biomass available in the baseline used for heat generation" and "baseline biomass-based heat generation", it should be in accordance with the thermodynamic laws. The enthalpy levels presented in the " <i>Emission Reduction Calculation REV1.xls</i> " used for the calculation of these values are incorrect. The enthalpy levels at the baseline are different from the enthalpy levels at the project activity.	B.5.7 B.5.8 B.5.9	According to the ACM0006 (Version 11.1), the amount of process heat that would be generated in the baseline in year y ($HC_{BL,y}$) is determined as the difference of the enthalpy of the process heat (steam or hot water) supplied to process heat loads in the project activity minus the enthalpy of the feed-water, the boiler blow-down and any condensate return to the heat generators. In this case, since the differences between baseline and the CDM project activity configuration (see section A.4.3 of this PDD) would be exclusively derived from the high-pressure steam	DNV assessed the revised CER spread sheet and the revised PDD and confirmed that the calculation method has changed. DNV assessed the documents "Monrep data 2009.xlsx" /10/, "Monrep data 2010.xlsx" /11/ and "STEP 1.1 Determine total baseline process heat generation.xlsx" /12/ and confirmed that the parameter HC_{BL} was calculated in accordance to ACM0006, version 12.1.1, considering the steam conditions and enthalpy levels as ones presented in the project activity.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Validation conclusion
		<p>generation capacity of the CDM project alternative for on-site electric power generation both alternatives (baseline and CDM project activity) show the same steam flow consumption for the Nueva Aldea Phase 1 mills.</p> <p>Considering above, in this case the baseline process heat generation will be determined based on past monitored data (years 2009 and 2010) of heat generation in the real project plant. The Project Proponents will use average data of medium and low pressure steam flows and enthalpies calculated as a function of temperature and pressure. This leads to a more accurate and realistic determination of the process heat that would be generated in the baseline scenario.</p> <p>Evidence of historical data from years 2009 and 2010 is presented as follows: “STEP 1.1 Determine total baseline process heat generation”.xls Monrep Data 2009.xls Monrep Data 2010.xls</p>	Therefore this CL is closed.

**Table 3 Forward action requests**

Forward action request	Reference to Table 1	Response by project participants
No FAR was issued.		

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Fernando Sasdelli

Fernando Sasdelli holds a Bachelor's Degree in Mechanical Engineering from University of São Paulo and has a Specialization in Business Administration from FGV.

Prior to joining DNV Fernando has four years of experience in cogeneration projects, including project design and development for biomass and natural gas power plants. Fernando has worked in middle and large size cogeneration projects, from hotels and commercial buildings to chemical industries and large sugar cane mills.

His qualification and industrial experience demonstrate his sufficient sectoral competence in thermal energy generation from fossil fuels and biomass.

Felipe Antunes

Felipe Antunes holds a Master's Degree in Production Engineering (Quality) and a Post Graduate Diploma in Environmental Management and Industrial Waste Management and Treatment. Possesses an International experience of more than 10 years in the field of quality and environmental auditing, working two years as the responsible of the QMS of Rede Metrológica RS and since 1999 as a QMS and EMS auditor in DNV.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV, both in South America & abroad. He has also been actively involved in Management System Audits such as ISO 9001, ISO 140001 and OHSAS 18001 standards in various industrial sectors for more than 10 years in DNV.

His qualification and experience in CDM demonstrate him sufficient sectoral competence in energy generation from renewable energy sources, waste handling and disposal, and animal waste management.

Simon Wong Yon Sing

Simon Wong Yon Sing holds a Bachelor's Degree in Chemical Engineering with Environmental Engineering, with a year experience in the field of design and operation/maintenance of wastewater treatment as part of working in wastewater design & equipment supply services. His experience in designing and maintaining the wastewater treatment systems covers the fields of various manufacturing and chemical industries in Malaysia. He has experience of more than 6 years in validation and verification of numerous CDM projects in DNV, both in Malaysia and abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in Energy Generation from Renewable Energy Sources, Waste Handling and Disposal and Animal Waste Management System.