Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	Nueva Aldea Biomass Power Plant Phase 1
Reference number of the project activity	0258
Version number of the monitoring report	1
Completion date of the monitoring report	29/05/2014
Registration date of the project activity	31/03/2006
Monitoring period number and duration of this monitoring period	Monitoring Period #1: 01/01/2012 - 31/12/2013
Project participant(s)	Celulosa Arauco y Constitución S.A.
Host Party(ies)	Chile
Sectoral scope(s) and applied methodology(ies)	Sectoral scope 1. ACM0006 (Version 12.1.1), "Consolidated methodology for electricity and heat generation from biomass".
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	387,816 metric tonnes CO_2 equivalent.
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	205,061 metric tonnes CO_2 equivalent.
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	109,864 metric tonnes CO_2 equivalent.
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	95,197 metric tonnes CO_2 equivalent.

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The project activity consists of a 30 MW biomass cogeneration power plant located inside a forestry complex by Celulosa Arauco y Constitución S.A. (from now on, Arauco): the Nueva Aldea Industrial Complex or the Nueva Aldea Project. Arauco is a leading forestry and pulp-producing company in the world.

The project activity is designed to use own and third party biomass for steam and electric power generation. Biomass from industrial and forestry operations in Chile would be normally dumped in piles for natural decay.

It must be noted that since the common practice in the Sawmill and Plywood industries does not include the cogeneration of electric power, the entire net electric power generation capacity of the new power plant in Phase 1 represents a net increase of clean energy in the grid (known as SIC or "Sistema Interconectado Central"). This is the main idea of the project activity.

The proposed project activity assists Chile's sustainable growth by providing electricity to the Nueva Aldea Industrial Complex and to the SIC through biomass power generation, which is a clean and renewable energy source. The Nueva Aldea project activity participants believe that biomass power generation constitutes a sustainable source of power generation that brings clear advantages to mitigate global warming. Using the available natural resources in a rational way, the Nueva Aldea Phase 1 project activity helps promote the development of renewable energy sources in Chile, in particular the use of biomass generated as a byproduct of the forestry industry, which has a significant potential in the country. The project activity is a good example to demonstrate the viability of electricity generation as a source of revenue not only in the Plywood and Sawmill industries, but in all forest-related industries. Although this technological improvement is consistent with Arauco's internal policies of energy efficiency, it must be recognized as an initiative that goes far beyond the common practice of the Sawmill/ Plywood mill industries in Chile.

The technology used in this project for generating megawatt (MW) levels of electricity from biomass is the steam-Rankine cycle operating in a condensing-extraction turbine. (See section B1 for further details).

Relevant dates for the project activity:

Date (DD/MM/YY)	Key events
29/09/2003	Started date
June 2004	Approval permits for construction activities
01/01/2005	Commissioning date
01/01/2005 to 30/09/2006	The 1st monitoring period
01/10/2006 to 30/09/2007	The 2nd monitoring period
01/10/2007 to 30/09/2008	The 3rd monitoring period
01/10/2008 to 31/12/2009	The 4th monitoring period
01/01/2010 to 31/12/2010	The 5th monitoring period
01/01/2011 to 31/12/2011	The 6th monitoring period
01/01/2012 to 31/12/2013	The 2nd crediting period, 1st monitoring period

Total net emission reductions claimed in the 1st monitoring period (from January 1st 2012 to December 31th 2013) are 205,061 tCO_2eq.

A.2. Location of project activity

The project activity is located in the Nueva Aldea Industrial Complex site. The Nueva Aldea Industrial complex is located near the Nueva Aldea community area, Commune of Ranquil, in the province of Ñuble. It is 30 km. west of the Chillan city and 28 km. southeast of the Coelemu city in the VIII Region (Bío-Bío Region), Chile. The project site is located at the geographical coordinates 36°39´18" S and 72°28´31" N.

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Chile	Celulosa Arauco y Constitución S.A.	No

A.4. Reference of applied methodology

The name of the approved baseline methodology applied to the proposed project activity is:

ACM0006 (Version 12.1.1): "Consolidated methodology for electricity and heat generation from biomass".

The project activity also relies on the following methodological tools:

- "Tool to calculate the emission factor for an electricity factor for an electricity system (Version 03.0.0)".
- "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (Version 02)".
- "Tool to determine the baseline efficiency of thermal or electric energy generation systems (Version 01)".
- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 01)".
- "Tool for project and leakage emissions from transportation of freight (Version 01.1.0".

A.5. Crediting period of project activity

Starting date of the 2nd crediting period	01/01/2012
End date of the 2nd crediting period.	31/12/2018
Length of the 2nd crediting period.	Seven (7) years
Type of crediting period.	Renewable
Maximum length of the crediting period.	3. Seven (7) years

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The project activity consists of a 30 MW biomass cogeneration power plant located inside a forestry complex by Arauco: the Nueva Aldea Industrial Complex or the Nueva Aldea Project.

The project activity is designed to use own and third party biomass for steam and electric power generation. Biomass from industrial and forestry operations in Chile is normally dumped in piles for natural decay.
The technology used in this project (which is also the predominant technology everywhere in the world today) for generating megawatt (MW) levels of electricity from biomass is the steam-Rankine cycle, which consists of direct combustion of biomass in a boiler to generate 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 electric power only.

The steam-Rankine cycle involves heating pressurized water, with the resulting steam expanding to drive a turbine-generator, and then condensing back to water for partial or full recycling to the boiler. A heat exchanger is used to recover heat from flue gases to preheat combustion air, and a deaerator to remove dissolved oxygen from water before it enters the boiler.

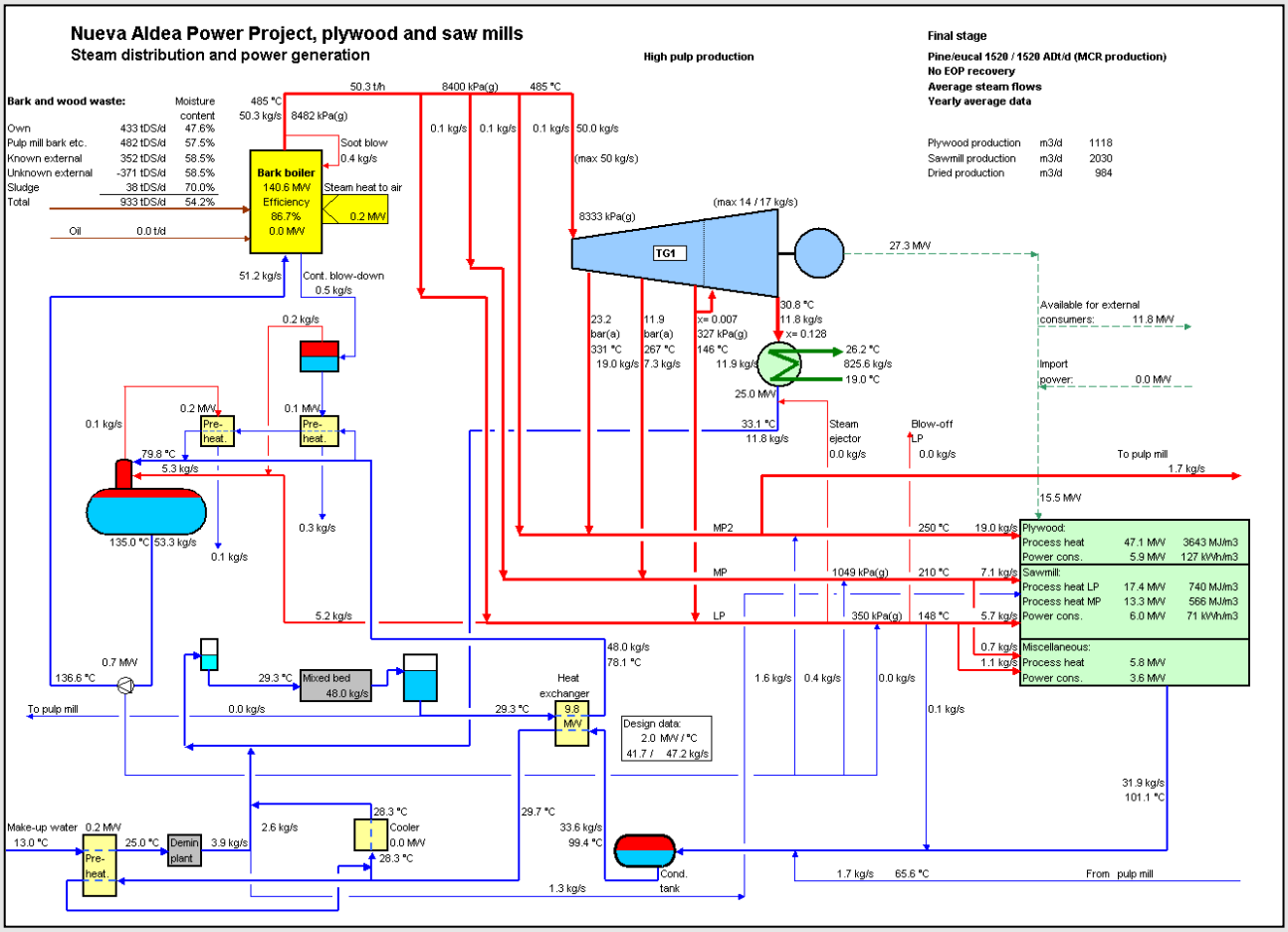
Steam turbines are designed as either "backpressure" or "condensing" turbines. CHP applications typically employ backpressure turbines. The Nueva Aldea Power Plant Phase 1, has a condensing-extraction turbine.

Steam expands to a pressure that is still substantially above ambient pressure. It leaves the turbine still as steam and is sent to satisfy industrial heating needs, where it condenses back to water. Additionally, the portion of steam that is not extracted continues to expand to sub-atmospheric pressures, thereby increasing the amount of electricity generated per unit of steam compared to a backpressure turbine. The non-extracted steam is converted back to liquid water in a condenser that utilizes water from a cooling tower as coolant.

The steam extractions used for the mill's heating needs are two medium pressure steam currents and one low pressure steam current.

The following diagram shows actual steam and water flows in the power plant, as well as their temperature and pressure.

Figure 1: Schematic diagram of the Nueva Aldea Power Plant Phase 1



Special events

During this monitoring period, a forest fire affects a wide zone in Biobio region. The fire started on December, 31st, 2011 in the Quillon commune, and then expanded by 17 point more. The fire grew without control during the first days of 2012, due to adverse weather conditions (high temperatures and wind). The result was 28 thousand hectares burned of native and exotic forest plantation, pastureland, shrubbery and the Plywood mill located in Nueva Aldea Complex. The most affected communes were Florida, Quillon, San Rosendo and Ranquil. The last one is identified as the Project location commune.

The fire damage has been identified in the following images. It can be observed that the fire damage the entire Plywood mill and the biomass storage area.

Picture 1: In green, Location of the Power plant Nueva Alde Phase 1.
In Blue, the Plywood mill and Administration buildings.

Picture 2: In blue, the zone that was not affected by fire. In red, the zone that was affected by fire.

After the fire, the power boiler was stopped during 6.8 days. In January, 8th, 2012, the power boiler started in service using only diesel. In January 14th, 2012, the biomass feeding was re-established using an auxiliary conveyor belt.

Is important to highlight that only the Sander dust conveyor belt (TAG 463-FIQ-174) was damage by fire. This critical equipment measure the sander dust from plywood mill. During all this monitoring period the Plywood mill was out of service. The reconstruction project takes from February 2012 to March 2014.

The following table shows the shutdown/stoppages of the project activity due to regular maintenance program during the monitored period.

Out of service day	Starting day	Number of days shut down/stoppages	Comments
02/01/2012	08/01/2012	6.77	Maintenance stoppage
16/01/2012	16/01/2012	0.04	Maintenance stoppage
29/01/2012	29/01/2012	0.08	Maintenance stoppage
30/01/2012	30/01/2012	0.05	Maintenance stoppage
05/03/2012	05/03/2012	0.03	Maintenance stoppage
11/03/2012	11/03/2012	0.06	Operation stoppage
20/03/2012	20/03/2012	0.03	Maintenance stoppage
11/04/2012	11/04/2012	0.03	Maintenance stoppage
16/04/2012	16/04/2012	0.03	Maintenance stoppage
17/04/2012	17/04/2012	0.13	External failure
23/04/2012	23/04/2012	0.09	External failure
21/05/2012	21/05/2012	0.08	External failure
26/05/2012	26/05/2012	0.06	Maintenance stoppage
26/05/2012	27/05/2012	1.27	Maintenance stoppage
09/06/2012	12/06/2012	2.94	Operation stoppage
26/06/2012	26/06/2012	0.10	External failure
06/07/2012	16/07/2012	10.83	Maintenance stoppage
16/07/2012	16/07/2012	0.09	Maintenance stoppage
18/07/2012	19/07/2012	0.77	Operation stoppage
29/07/2012	29/07/2012	0.07	Maintenance stoppage
30/08/2012	31/08/2012	1.07	Maintenance/Operation stoppage
30/09/2012	30/09/2012	0.23	Maintenance/Operation stoppage
01/10/2012	06/10/2012	5.32	Maintenance stoppage
12/11/2012	13/11/2012	0.45	Maintenance stoppage
13/11/2012	30/11/2012	16.45	Maintenance stoppage
01/12/2012	30/03/2013	119.67	Maintenance stoppage
30/03/2013	30/03/2013	0.04	Maintenance stoppage
01/04/2013	01/04/2013	0.05	Maintenance stoppage
08/04/2013	09/04/2013	0.27	Maintenance stoppage
24/06/2013	24/06/2013	0.04	Maintenance stoppage
25/07/2013	27/07/2013	2.28	Maintenance stoppage
18/08/2013	28/08/2013	9.66	Operation stoppage
28/08/2013	29/08/2013	0.12	Maintenance stoppage
18/09/2013	18/09/2013	0.08	Maintenance stoppage

The following equipment was replaced during this monitoring period:

Weighbridge 1 north entrance/ TAG N/A	
Operative during CP1-MP6: Supplier: Mettler Toledo Model: Jagxtreme Serial number: 5437967-5GF Accuracy: Class III	Replaced in 24/01/2012 by: Supplier: Rice Lacke Model: IQ+355 Serial number: 325078 Accuracy: Class III

This change corresponds to a preventive action in maintenance department schedule for year 2012.

Energy meter 1-6 Switchgear/ TAG 468-PM-006	
Operative during CP1-MP6:	Replaced in 22/08/2013 by:
Supplier: Power measurement	Supplier: Power measurement
Model: 7330 ION V277	Model: 7330 ION V277 C/ETH
Serial number: PB-0401A178-11	Serial number: PB-1210A467-11
Accuracy: +/- 0.5%	Accuracy: +/- 0.3% f.s

Energy meter 1-8 Switchgear/ TAG 468-PM-008	
Operative during CP1-MP6:	Replaced in 22/08/2013 by:
Supplier: Power measurement	Supplier: Power measurement
Model: 7330 ION V277	Model: 7331 ION V277 C/ETH
Serial number: PB-0401A161-11	Serial number: PB-1210A067-11
Accuracy: +/- 0.5%	Accuracy: +/- 0.3% f.s

These instruments were changed because the provider validated their measurement until 2013. As these equipment cannot be calibrated (because the model is sealed), they must be changed for new ones.

Pressure transmitter 5.5 bar (main line)/ TAG 465-PIT-9002-A	
Operative during CP1-MP6:	Replaced in 20/08/2013 by:
Supplier: ABB	Supplier: ABB
Model: 264PSPSSB2A1/V1/L1/B2/I2/N6/C1	Model: 264PSPSSB2A1/V1/L1/B2/I2/N6/C1
Serial number: 6404008685	Serial number: 6408023636
Accuracy: +/- 0.075%	Accuracy: +/- 0.075%

This change corresponds to a preventive action in maintenance department schedule for year 2013.

Electronic moisture analyzer/ TAG N/A	
Operative during CP1-MP6:	Replaced in 07/12/2012 by:
Supplier: Sartorius AG. Gongen.	Supplier: Mettler Toledo
Model: MA100H-000230V1	Model: HB43-S
Serial number: 17302238	Serial number: B235265966
Accuracy: Class I	Accuracy: Class II

This change corresponds to a preventive action in maintenance department schedule for year 2012.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

Problems obtaining Biomass parameter

During the present monitoring period there were some problems to obtain reliable measurements of part of the on-site and off-site biomass from industrial operation. As a conservative approach, the Project Participant consider to subtract from the total of biomass the unreliable measurements as is explain as follows:

- On-site biomass from industrial operation: Sawdust from Nueva Aldea sawmill

  The starting of the new methodology ACM0006 (Version 12.1.1) implicate to incorporate new point of measurements. One of these points is the measurement of the sawdust from Nueva Aldea Sawmill. To implement this new point, the Project Participant had to consider all the logistic and administrative impacts that the measurement solution could provoke. The new logistic in the trucks reception at North and South gate of the complex took 12 months to be implemented and decreed in accordance with Forestal Celco. The Project Participant subtracts from the total of on-site biomass all the sawdust from Nueva Aldea sawmill between January to December, 2012.

- Off-site biomass from industrial operation; Bark from Nueva Aldea Cellulose mill

  The fraction of this off-site biomass is transported by a conveyor belt and measured by a weigh meter.

Due to the fire described in section B.1, the conveyor belt suffers some damage impeding the transport of bark from Nueva Aldea Cellulose mill to the biomass storage. This event was during January, 2012. A second fail of the weigh meter integrator was registered from June to September 2013. The Project Participant subtracts from the total of off-site biomass all the bark from Nueva Aldea cellulose mill for these two periods.

Frequency of the NCV_k samples

For the presented monitoring period, there are two gaps in the measurement frequency of the parameter NCV_k that need to be addressed. The Project Participant measure the following NCV_k during CP2-MP1:

Measurement number	Date of samples	Validity
1	30/11/2011	29/05/2012
2	28/05/2012	27/11/2012
3	28/12/2012	27/06/2013
4	28/10/2013	27/04/2014

According to the table above, there is a first gap between the second and the third measurement. The gap is for one month considered between 01/12/2012 and 31/12/2012 due to monthly calculation of the monitoring parameters. The second gap of the period is between the third and fourth measurement and it was considered between 01/07/2013 to 31/10/2013 (four months) due to monthly register of the monitoring parameters.

Under methodology ACM0006/Ver 12.1.1, NCV_k measurements affect baseline emissions. During the gaps, PP applies guidelines in version 4 of the Clean Development Mechanism Validation and Verification Standard and Clean Development Mechanism Project Standard as follows:

Equation 14 to estimate the baseline biomass-based heat generation, page 63, ACM0006/Ver12.1.1:

$$HG_{BL,BR,y} = \sum_{h} \sum_{n} BR_{B4,n,h,y} \cdot NCV_{BR,n,y} \cdot \eta_{BL,HG,BR,h} \quad = Min(HG)$$

To minimize this term, PP uses the minimum value of the NCV_k published in IPCC guideline (2006) for wood/waste wood, 7.90 (TJ/1000 ton), and other primary solid biomass (sludge), 5.90 (TJ/1000 ton).

To demonstrate that the adopted approaches are conservative, the Project Participant compares with a monitored and measured parameter: Total heat to process. This parameter is monitored according Table $HC_{BL,y}$, page 26, section D.2. According to the approve deviation for determining the efficiency of the heat generator, current PDD, page 155, the biomass consumption is categorized from most to less available and from less to most costly. Then, to generate the total heat to process the baseline considered the use of sludge from industrial operation ($BR_{PJ,1,y}$) and a fraction of the mix of sawdust and bark from industrial operation generated on-site ($BR_{PJ,2,y}$). After applied the approaches describe above, to generate the total heat to process, Project Participant had to use the following types of biomass to obtain the same quantity of heat.

Year	**Total heat to process $HC_{BL,y}$**	Sludge from offsite ind. Op./heat generation $BR_{B4,1,y}$		Sawdust/Bark from onsite ind. Op./heat generation $BR_{B4,2+3,y}$		Heat generation burning $BR_{B4,1,y}$+$BR_{B4,2+3,y}$	Additional biomass required to meet process heat demand*
	[GJ]	[BDt]	[GJ]	[BDt]	[GJ]	[GJ]	[BDt]
2012	**1,334,797**	11,747	128,496	17,753	260,970	389,466	69,138
2013	**1,890,482**	12,841	154,844	70,648	918,441	1,043,211	53,477

* This biomass would be part of the biomass attributable to project activity if the approaches describe above would not occurred.

The new distribution in the consumption of biomass residues considered more biomass to generate heat to process and less biomass attributable to project activity.

In conclusion, less biomass to generate electricity means less baseline emissions reduction. The approaches are applied in a conservative way.

B.2.2. Corrections

No corrections to project information or parameters fixed at validation have been submitted or approved during this monitoring period**.**

B.2.3. Permanent changes from registered monitoring plan or applied methodology

Project Participant solicited a deviation request to methodology ACM0006 (Version 12.1.1), entitled "Deviation for determining the baseline efficiency of the heat generator". The request for deviation date was September 20th, 2012, and the approval date, October 10th, 2013.

The efficiency value use for the registered project is 85%, replacing the default value of the methodology (100%). In this case, use an efficiency value of 100% would not result in the most conservative scenario for the emission reduction calculation, as is describe in page 157 of the current PDD.

B.2.4. Changes to project design of registered project activity

There has not been any notification or request of approval of changes.

B.2.5. Changes to start date of crediting period

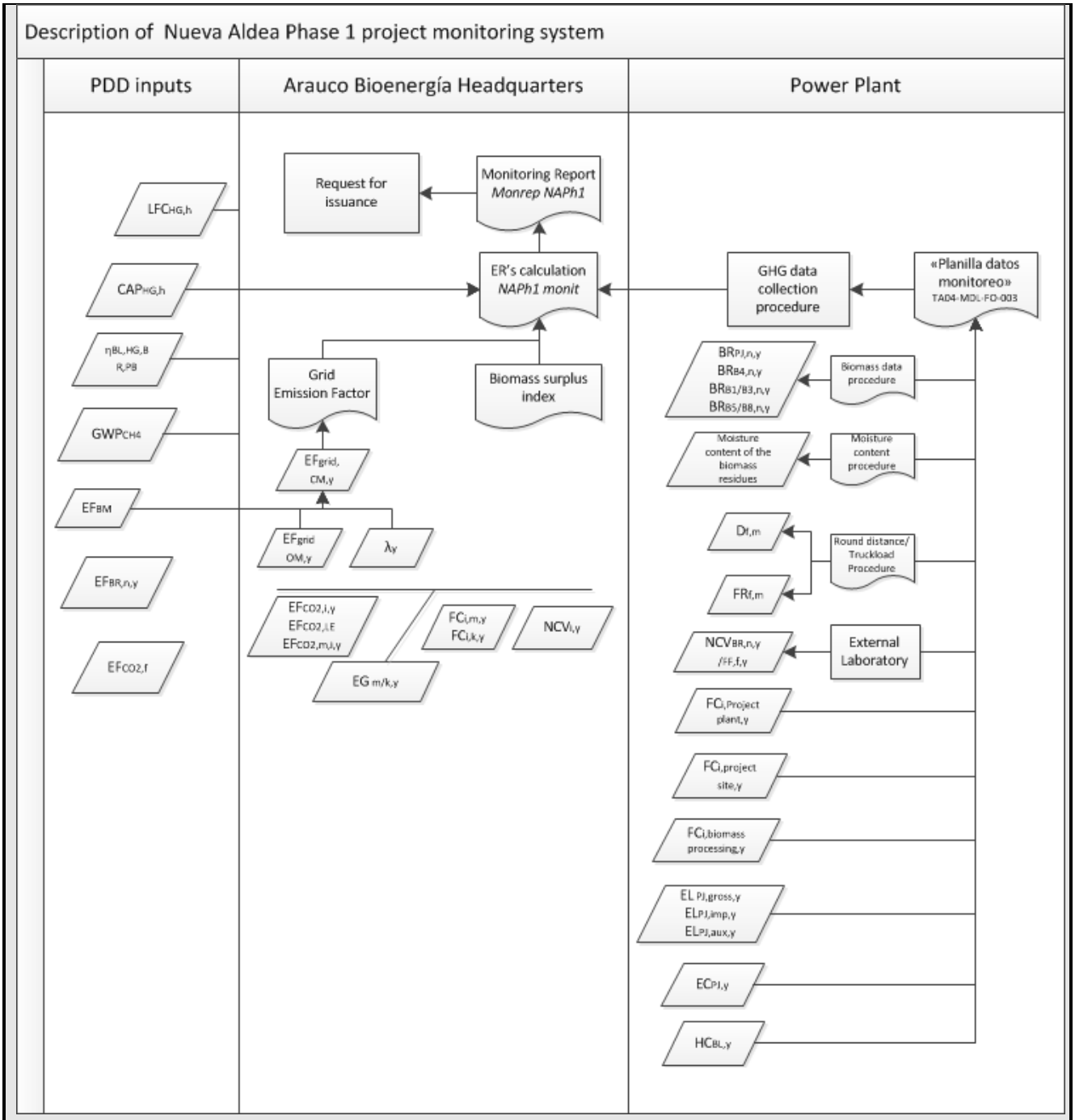
None

B.2.6. Types of changes specific to afforestation or reforestation project activity

Not applicable.

SECTION C. Description of monitoring system

The Project Participant, Arauco, has implemented monitoring procedures according to the monitoring methodology chosen for this project activity. This monitoring methodology accounts for emission reductions in an accurate and conservative manner. The following diagram includes data collection procedure as: Data generation, calculation and reporting.



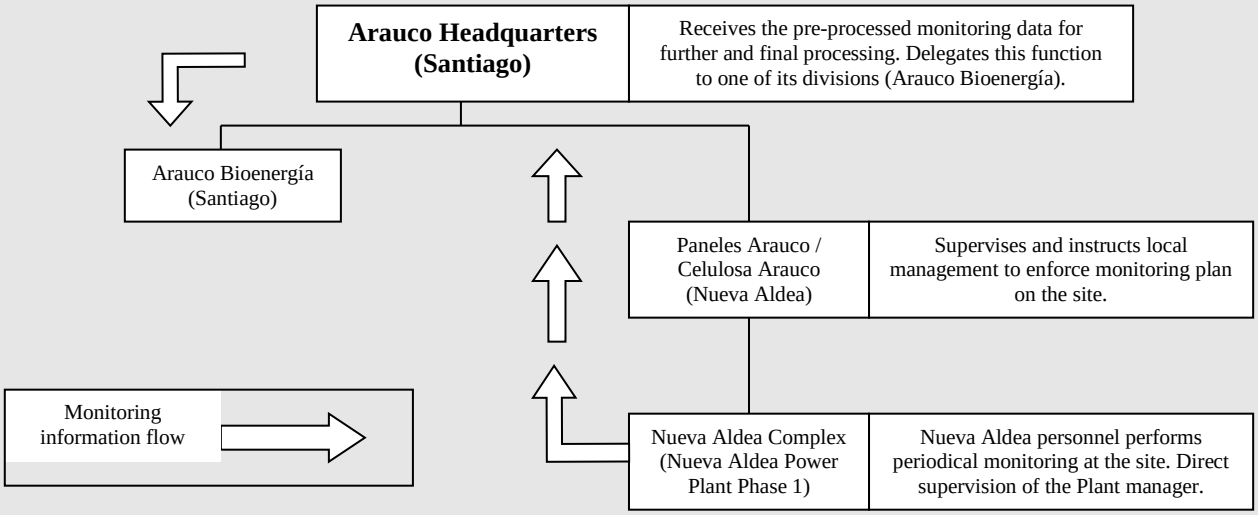
Parameters as $HC_{BL,y}$, $EL_{PJ,gross,y}$, $EL_{PJ,imp,y}$, $EL_{PJ,aux,y}$, $D_{f,m}$, $FC_{project\ plant,y}$, $FC_{project\ site,y}$, $BR_{PJ,n,y}$, $BR_{B4,n,y}$, $BR_{B1/B3.n.v}$ and $BR_{B5/B8.n,v}$ are aggregated in excel files to obtain a monthly value that is reported in the emission reductions calculation file. All data is recorded in electronic tapes and archived two years following the end of the crediting period as is specified in the defined monitoring plan. Even though during this monitoring period there were no emergency situations, the monitoring data management system defined in all the procedures the possibility of emergency occurrences (for example, IT failure system). The on-site personnel were instructed to inform opportunely any inconvenient with the monitoring system or the monitoring instrument. Nueva Aldea Phase 1 plant counts with a qualified electronic control area, which were the responsible of the continuity operation of the monitoring instruments.

Arauco counts with on-site personnel (at the project activity site), who are in charge of gathering and registering all the required information described in the monitoring plan. Such duties are incorporated to the personnel's everyday activities to ensure continuity and high-quality standards. Quantity of biomass used, fossil fuel consumption and net quantity of electricity generated data is monitored continuously and automatically by the Data Control System (DCS). The data is recorded daily and then is aggregated monthly.

The information is partially processed and stored on-site, and is sent periodically (monthly) to Arauco Bioenergía S.A. in Santiago for further and final processing (table formats, reports, etc.). With the information at this level, Arauco carries out the external verifications to verify the emission reduction of the Nueva Aldea Power Plant Phase 1 project activity periodically (i.e. once every year).

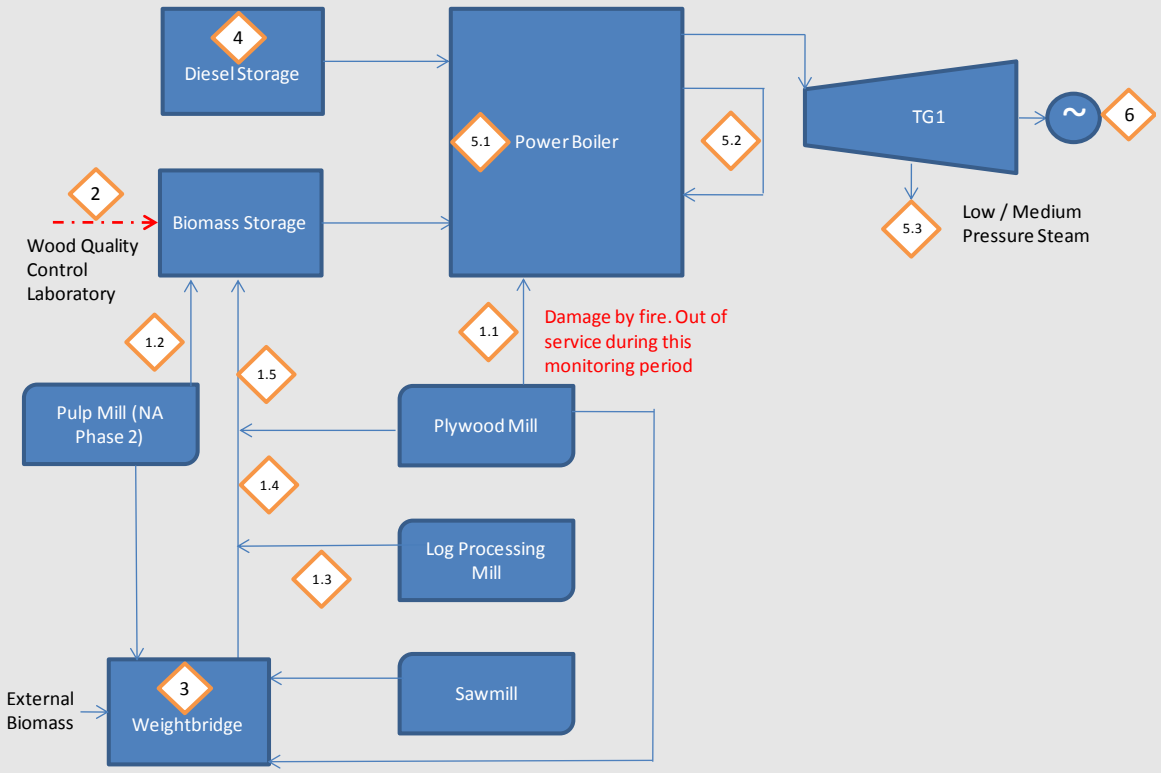
The following table shows the monitoring information flow implemented by Arauco Bioenergía S.A. for the project activity.

Monitoring information flow of Nueva Aldea Power Plant Phase 1 project activity



The following diagram below shows all the relevant monitoring points, including the instruments used to measure the variables that are part of the monitoring plan.

Line Diagram of the Instruments



ITEM	TAG	INSTRUMENT
1.1	463-FIQ-174	Sander Dust conveyor Belt scale
1.2	531-WI-5518A	Pulp Mill Bark conveyor Belt scale
1.3	431-FIQ-502	Log Processing Barkconveyor Belt scale
1.4	431-FIQ-903	Field Biomass conveyor Belt Scale
1.5	431-FIQ-910	Biomass to Storage conveyor Belt Scale
2	N/A	Electronic Moisture Analyzer
3	N/A	Weighbridge 1
	N/A	Weighbridge 2
	N/A	Weighbridge 3
4	461-LT-0460	Level Transmitter
5.1	463-PT-0106	Pressure Transmiter Feed Water
	463-TT-0110	Temperature Transmiter Feed Water
5.2	463-FT-0402	Steam Flow Meter 85 bar (Soot blower)
	463-PT-0403	Pressure Transmiter 85 bar (Soot blower)
	463-TT-0406	Temperature Transmitter 85 bar (Soot blower)
5.3	465-FT-9027	Steam Flow Meter 19 bar (Plywood Mill)
	565-FT-0965	Steam Flow Meter 19 bar (Pulp Mill)
	465-PIT-9000-A	Pressure Transmitter 19 bar (Main line)
	465-PIT-9000-B	Pressure Transmitter 19 bar (Main line)
	465-TT-9028	Temperature Transmitter 19 bar (Pulp Mill)
	465-FT-9025	Steam Flow Meter 11.5 bar (AASA)
	465-PIT-9001-A	Pressure Transmitter 11.5 bar (Main line)
	465-PIT-9001-B	Pressure Transmitter 11.5 bar (Main line)
	465-TT-9026	Temperature Transmitter 11.5 bar
	465-FT-9019	Steam Flow Meter 5.5 bar (AASA)
	465-FT-9023	Steam Flow Meter 5.5 bar (Boiler)
	462-FT-9150	Steam Flow Meter 5.5 bar (Deaerator)
	465-PIT-9002-A	Pressure Transmitter 5.5 bar (Main line)
	465-PIT-9002-B	Pressure Transmitter 5.5 bar (Main line)
	465-PIT-9002-C	Pressure Transmitter 5.5 bar (Main line)
	465-TT-9024	Temperature Transmitter 5.5 bar
6	468-PM-008	Energy Meter Switchgear 1-8
	468-PM-006	Energy Meter Switchgear 1-6
	468-PM-003	Energy Meter Switchgear 1-3

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data / Parameter:	**GWP_{CH4}**
Unit:	(tCO_2e/tCH_4)
Description:	Global Warming Potential for CH_4.
Source of data:	IPCC
Value(s) applied):	21 for the first commitment period. Shall be updated according to any future COP/MOP decisions.
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$CAP_{HG,h}$**
Unit:	(GJ/h)
Description:	Baseline capacity of heat generator h.
Source of data:	Reference plant design parameters.
Value(s) applied):	Low pressure power boiler (heat generator): 420.47(GJ/h).
Purpose of data:	--
Additional comment:	Refer to current PDD, section A.3. Technology and/or measures under the energy/mass balance of conventional BAU power plant.

Data / Parameter:	**$LFC_{HG,h}$**
Unit:	Ratio ( )
Description:	Baseline load factor of heat generator h (ratio).
Source of data:	Reference plant design parameters.
Value(s) applied):	0.82
Purpose of data:	--
Additional comment:	The load factor has been chosen to be 0.82. According to reputed consultants, 20% is a reasonable margin considering sawmill and panel/plywood mills would not suffer from big variations in steam demand because summer and winter conditions. This can further be explained as dryers for sawmills and Panel board/Plywood consume relatively small volume of air and thereby, environmental conditions, such as outside temperature would have relatively low impact internal steam consumption.

Data / Parameter:	**$EF_{grid,BM,y}$**
Unit:	(tCO_2/MWh)
Description:	CO_2 Build Margin emission factor of the grid.
Source of data:	- CDEC-SIC Dispatch centre reports. - Chilean Ministry of Energy reports. - IPCC lower calorific values.

Value(s) applied):	0.695
Purpose of data:	Baseline emissions calculation.
Additional comment:	The Build Margin (BM) will remain fixed for the second and third crediting periods.

Data / Parameter:	**$EF_{BR,n,y}$**
Unit:	(tCH_4/GJ)
Description:	CH_4 emission factor for uncontrolled burning of the biomass residues category n during the year y (tCH_4/GJ)
Source of data:	Conduct measurements.
Value(s) applied):	See table below.
Purpose of data:	Baseline emissions calculation.
Additional comment:	The Project Participant would like to note that differences between IPCC default values and measurements conducted are mainly due to the compactness level of the biomass residues burned. In the case of the mix of sawdust and bark from industrial operations, it was densely packed allowing for very little oxygen in the combustion process, which leads to high methane emission factors. In the case of the mix of sawdust and bark from forest operations, since these are mainly branches allow for plenty of oxygen during the combustion, which leads to much lower methane emission factors. (For additional information see Appendix 5 of the current PDD, page 138.)

Biomass residues category k.	Biomass residues type.	Biomass residues source.	CH4 factor for biomass uncontrolled burning (KgCH4/TJ)	Conservativeness factor (%) (Note)	Adjusted CH_4 default factor
3	Mix of sawdust and bark from industrial operations.	On-site production	930 +/- 167	0.94	874.20
4	Mix of sawdust and bark from industrial operations	Off-site production	930 +/- 167	0.94	874.20
5	Mix of sawdust and bark from forest operations	Off-site production	114 +/- 114	0.82	93.48

Note: The conservativeness factor has been obtained from Table 3, page 46 of the ACM0006 (Version 12.1.1).

Data / Parameter:	**$EF_{CO2,f}$**
Unit:	(g CO_2/t km)
Description:	Default CO_2 emission factor for freight transportation activity f.

Source of data:	<table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>Emission factor was obtained from empirical data from European vehicles.</td><td>Light vehicles.</td></tr><tr><td>Emission factor has been derived from based on custom design transient speed-time-gradient drive cycle (adapted from the international FIGE cycle), vehicle dimensional data, mathematical analysis of loading scenarios, and dynamic modelling based on engine power profiles, which, in turn, are a function of gross vehicle mass (GVM), load factor, speed/acceleration profiles and road gradient. The following assumptions on key parameters have been made: an average driving speed of 30 km/h, an average gradient of 15, and a load factor attained when biomass is transported were assumed.</td><td>Heavy vehicles.</td></tr></table>
Value(s) applied):	<table><tr><th>Vehicle class</th><th>Emission factor (g CO_2/t km)</th></tr><tr><td>Light vehicles</td><td>245</td></tr><tr><td>Heavy vehicles</td><td>129</td></tr></table>
Purpose of data:	Project emissions calculation from transportation of freight.
Additional comment:	Applicable to Option B of the Tool “Project and leakage emissions from transportation of freight” (Version 01.1.0).

D.2. Data and parameters monitored

Data / Parameter:	**$BR_{PJ,n,y}$/$BR_{B1/B3,n,y}$,$BR_{B4,n,y}$,$BR_{B5/B8,n,y}$**
Unit:	Tonnes on dry-basis (BDt)
Description:	Quantity of Biomass residues of category n used in the project activity in year y.
Measured/ Calculated / Default:	On-site measurements.
Source of data:	Power Plant’s procurement department. The biomass residues quantities used will be monitored separately for each type and source of production, as it is shown in current PDD table, page 100-102.
Value(s) of monitored parameter:	<table><tr><th>Biomass residues (BDt)</th><th>2012</th><th>2013</th></tr><tr><td>(B_1) Sludge from industrial operations.</td><td>11,747</td><td>12,841</td></tr><tr><td>(B_2+B_3) Sawdust/bark on-site industrial operations.</td><td>17,753</td><td>70,648</td></tr><tr><td>(B_4) Sawdust/bark off-site industrial operations.</td><td>175,867</td><td>155,404</td></tr><tr><td>(B_5) Sawdust/bark forestry operations.</td><td>0</td><td>10,691</td></tr><tr><td>Total biomass consumed by Project activity.</td><td>205,368</td><td>249,583</td></tr></table>

	Monitoring equipment:	463-FIQ-174* Type: Sander dust Conveyor Belt weight meter KCM/SWB-600 Accuracy class: +/- 1% Serial number: 965691 Calibration frequency: 6 months Dates of calibration: 13/12/2011 Validity: 12/06/2012 *This equipment was out of service during the present monitoring period due to the fire in Nueva Aldea complex (See section B.1). 531-WI-5518A Type: Pulp mill bark Conveyor Belt weight meter KEPRO 2200 Accuracy class: +/- 1.5% Serial number: N/A Calibration frequency: Annual Dates of calibration: 01/09/2011-07/06/2012-14/11/2012-05/09/2013 Validity: 04/09/2014 431-FIQ-502 Type: Log processing bark Conveyor Belt weigh meter BW500 Accuracy class: +/- 1% Serial number: PBD/W 1020545PJ Calibration frequency: Annual Dates of calibration: 13/12/2011-26/06/2012-26/12/2012-04/06/2013 Validity: 03/06/2014 Type: Weighbridge 1: North entrance JAGXTREME* Accuracy class: Class III (+/- 30 kg) Serial number: 5437967-5GF Calibration frequency: Biannual Dates of calibration: 27/07/2011 Validity: 26/01/2012 * Instrument was replaced on 24/01/2012 as a preventive action by the maintenance department Type: Weighbridge 1: North entrance Rice Lake IQ+355 Accuracy class: +/- 30 Kg. Serial number: 325078 Calibration frequency: Biannual** Dates of calibration: 27/07/2011-24/01/2012-30/01/2013-31/07/2013 Validity: 30/01/2014 Type: Weighbridge 2: South entrance JAGXTREME Accuracy class: Class III (+/- 30 kg) Serial number: 5429421-5EF Calibration frequency: Biannual** Dates of calibration: 27/07/2011-24/01/2012-25/07/2012-30/01/2013-31/07/2013 Validity: 30//01/2014	

	Type: Weighbridge 3: Truck exit JAGXTREME Accuracy class: Class III (+/- 30 kg) Serial number: 5437969-5GF Calibration frequency: Biannual** Dates of calibration: 27/07/2011-24/01/2012-25/07/2012-30/01/2013-31/07/2013 Validity: 30/01/2014 ** The recommended biannual frequency of calibration means twice a year and not necessarily once every six months.
Measuring/ Reading/ Recording frequency:	Continuously and aggregated as appropiate. Sawdust and bark from on-site industrial operations are measured by weight meters installed in the feed conveyors belt. The off-site industrial operations biomass is measured in weighbridge at the entrance of Complex Nueva Aldea. Sander dust is measured by a weight meter installed in the feed closed piping. Sander dust is a highly flammable material and must be transported separately for safety reasons.
Calculation method (if applicable):	The amount of dry biomass residues is determinated adjusting for the corresponding moisture content by each type of biomass. Dry biomass (BDt) = Wet biomass (t) x (1 - % moisture) The mix of sawdust and bark corresponding to categories 2 and 3 are the same type of biomass originated form on-site industrial operations, and due to the same origin, they are jointly monitored. The biomass corresponding to category 3 will be given by the total measurement of biomass residues (category 2 and 3) minus the amount of biomass residue category 2 which will be calculated from the heat demanded by the facility processes using equation 14 of the ACM0006/ver 12.1.1.
QA/QC procedures:	Crosscheck with an energy balance based on purchased quantities and stock changes. The Project Participant carried out an annual energy balance as a consistency crosschecking measure, and the result was 86.6% for the efficiency of the power boiler. All biomass values were consistent with the efficiency of the power plant (The manufacturer reference indicates 87%). The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 77% in 2012 and 78% in 2013 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.
Purpose of data:	Baseline and project emissions calculations.
Additional comment:	--

Data / Parameter:	**$FR_{f,m}$**
Unit:	Tonnes (ton)
Description:	Total mass of freight transported in freight transportation activity f in monitoring period m.

Measured/ Calculated / Default:	Measured.
Source of data:	Power Plant's procurement department.
Value(s) of monitored parameter:	2012: 167,894 (BDt) 2013: 149,190 (BDt)
Monitoring equipment:	Type: Weighbridge 1: North entrance JAGXTREME* Accuracy class: Class III (+/- 30 kg) Serial number: 5437967-5GF Calibration frequency: Biannual Dates of calibration: 27/07/2011 Validity: 26/01/2012 * Instrument was replaced on 24/01/2012 as a preventive action by the maintenance department Type: Weighbridge 1: North entrance Rice Lake IQ+355 Accuracy class: +/- 30 Kg. Serial number: 325078 Calibration frequency: Biannual** Dates of calibration: 27/07/2011-24/01/2012-30/01/2013-31/07/2013 Validity: 30/01/2014. Type: Weighbridge 2: South entrance JAGXTREME Accuracy class: Class III (+/- 30 kg) Serial number: 5429421-5EF Calibration frequency: Biannual** Dates of calibration: 27/07/2011-24/01/2012-25/07/2012-30/01/2013-31/07/2013 Validity: 30/01/2014
Measuring/ Reading/ Recording frequency:	Continuously and aggregated as appropriate.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Crosscheck with an energy balance based on purchased quantities and stock changes. The Project Participant carried out an annual energy balance as a consistency crosschecking measure, and the result was 86.6% for the efficiency of the power boiler. All biomass values were consistent with the efficiency of the power plant (The manufacturer reference indicates 87%). The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 77% in 2012 and 78% in 2013 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.
Purpose of data:	Project emissions calculations.

Additional comment:	This parameter is applicable to Option B of the "Project and leakage emissions from transportation of freight". Only biomass coming from outside the complex and attributable to the project activity will be considered in this case.

Data / Parameter:	**$D_{f,m}$**
Unit:	Kilometre (Km)
Description:	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m.
Measured/ Calculated / Default:	Measured.
Source of data:	Records by Project Participants in which are specified the total biomass residues purchased (monthly), from known locations with known distances to the plant.
Value(s) of monitored parameter:	

Commune	Road Distance	Commune	Road Distance
Arauco	144.87	Pelluhue	159
Bulnes	17.37	Pemuco	56.31
Cabrero	53.4	Penco	67.16
Cauquenes	159.43	Pinto	66.24
Chanco	202.97	Portezuelo	43.07
Chiguayante	85.35	Quillón	0
Chillan	42.63	Quirihue	116.44
Chillán Viejo	41.57	Ranquil	26.3
Cobquecura	149.86	Retiro	115.22
Coelemu	83.74	San Carlos	68.2
Coihueco	70.2	San Fabián	109.26
Colbún	173.54	San Ignacio	48.01
Concepción	74.43	San Javier	175.85
Coronel	103.12	San Nicolás	57.47
El Carmen	52.12	San Pedro de la Paz	80.81
Empedrado	238.47	San Rosendo	102.57
Florida	23.6	Santa Juana	125.49
Hualpén	89.06	Talca	192.63
Hualqui	98.95	Talcahuano	80.05
Linares	146.62	TOME	82.09
Longaví	127.56	Treguaco	93.17
Lota	111.25	Villa Alegre	165.59
Maule	180.43	Yerbas Buenas	158.11
Ninhue	79.1	Yumbel	70.65
Parral	104.3		

Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Determinated using road maps. The Project Participant will updated whenever the road distance changes.

Calculation method (if applicable):	Not applicable.
QA/QC procedures:	--
Purpose of data:	Project emissions calculations.
Additional comment:	Applicable to Option B of the tool "Project and leakage emissions from transportation of freight" to calculate the CO_2 emissions from transportation of biomass to the Power Plant.

Data / Parameter:	**$EF_{CO2,i,y}$**
Unit:	(t CH_2/GJ)
Description:	Weight average CO_2 emission factor of fuel type i in year y.
Measured/ Calculated / Default:	Default.
Source of data:	IPCC default value at the upper limit of uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (energy) of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value(s) of monitored parameter:	The applied values are: 0.0748 (tCO_2/GJ) for Diesel 0.788 (tCO_2/GJ) for Fuel Oil 0.6560 (tCO_2/GJ) for LPG
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Anually
Calculation method (if applicable):	The measurement of this parameter will be performed using Option B in accordance with the procedure established in the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion": $EF_{CO2,FF,i}$ (tCO_2/GJ): Carbon content of FF (tC/TJ) * Fraction of carbon oxidized * CO_2/C conversion factor (tCO_2/tC) *(1TJ/1,000GJ) Where Fossil Fuel (FF) denotes for fossil fuels types: Diesel, Fuel oil and LPG. Any future revision of the IPCC guidelines will be taken into account.
QA/QC procedures:	Not applicable since a default factor will be used in this case.
Purpose of data:	Project emissions calculations.
Additional comment:	Note that the monitoring of this variable applies, since according to the "Tool to calculate projector leakage CO_2 emissions from fossil fuel combustion", this PDD is using Option B to determine the CO_2 emission coefficient of fuel type i.

<table>
<tr><td>Data / Parameter:</td><td>$FC_{i,Project\ plant,y}$</td></tr>
<tr><td>Unit:</td><td>Mass or volume per year (ton/y or m^3/y)</td></tr>
<tr><td>Description:</td><td>Quantity of fuel type i combusted in process j during the year y.</td></tr>
<tr><td>Measured/ Calculated / Default:</td><td>Measured.</td></tr>
<tr><td>Source of data:</td><td>On-site measurements by Power Plant’s procurement department.</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>
<table>
<tr><th>Fuel type i (ton/y)</th><th>2012</th><th>2013</th></tr>
<tr><td>Diesel</td><td>1,434</td><td>247</td></tr>
<tr><td>LPG</td><td>0</td><td>0</td></tr>
<tr><td>Fuel Oil</td><td>0</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment:</td><td>461-LT-0460
Type: Level transmitter 264HCHRBEFSSA1/E6/L1/I2/N6/C1
Accuracy class: +/- 0.075%
Serial number: 6404010868
Calibration frequency: 18 months
Dates of calibration: 07/06/2011-09/07/2012-15/01/2013-22/08/2013
Validity: 21/02/2014

Type: Propane tank level transmitter ROCHESTER GAUGES 6283-J21-41-J01
Serial number: Not Available.
Calibration: Though this instrument is property of the propane supplier and not belong to the Project Participant, calibrations must be done in order to comply with the Chilean law "Reglamento de servicio de gas de red"</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Continuously.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>As is mentioned in current PDD, page 109, Project Participant would like to inform the following:

- Annual verification of calibrations will be conducted according to the manufacture recommendations.
- The instrument used to measure LPG consumption is property of the supplier and not belong to the Project Participant, calibrations must be done in order to comply with the Chilean law.

Measurement of this parameter will be performed in accordance with the procedure established hereby:

<u>Fossil fuel consumption in the Power Boiler</u>:

Dedicated fuel tank level meter with accuracy of +/- 0.075% will be used to monitor Diesel and Fuel Oil consumption.

Since the instrument (s) used to measure the LPG consumption is property of the LPG´s supplier, all information related to the instrument (s) will be managed externally to the plant.</td></tr>
</table>

QA/QC procedures:	The consistency of fuel consumption measurement has been cross-checked by an annual energy and mass balance based on purchased quantities and stock changes. The results for year 2012 and 2013 are 77% and 78%. Both values are between the defined range [66%-90%].
Purpose of data:	Project emissions calculations.
Additional comment:	Value applied of Diesel contemplates consumption due to technical constraints, start-up operations and general stoppage of the plant based on previous monitored periods. Note that operational events, such as trips of the power boiler and failure of equipment are not contemplated in this range, as these are unpredictable events.

Data / Parameter:	**$FC_{i,Project\ site,y}$**
Unit:	Mass or volume per year (ton/y or m^3/y)
Description:	Quantity of fuel type i combusted in process j during the year y.
Measured/ Calculated / Default:	Measured.
Source of data:	On-site measurements by Power Plant's procurement department
Value(s) of monitored parameter:	**Fuel type i (ton/y)** / **2012** / **2013** **Diesel** / 78 / 64
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	The Diesel consumption will be determined by monitoring the fuel consumption of trucks, diesel-fuelled bulldozers and/or front loaders that will transport the biomass to the power boiler biomass feeding lines. The Project Participant would like to note that the monitored data of this parameter will be determined from the transportation subcontractors´ information.
QA/QC procedures:	Consistency of measurements has been checked with vehicles specific fuel consumption rates: litres of fuel consumed per hour of operation, litres of fuel consumed per kilometre driven or other as appropriate. In this case the results for cross-check values are 12.9 and 12.5 for 2012 and 2013 respectively. Both values are according the quality assurance range: [10.77-18.13 l/h] The Project Participant would like to note that the transportation subcontractors will not inform the purchase fuel invoices to the plant, consequently the former of the QA/QC procedures above described will be used to check consistency of measurements obtained
Purpose of data:	Project emissions calculations.

Additional comment:	Note that this parameter does not include fossil fuels co-fired in the Project Plant, but any other fossil fuel consumption at the project site attributable to the project activity

Data / Parameter:	**$FC_{i,Project\ processing,y}$**
Unit:	Mass or volume per year (ton/y or m^3/y)
Description:	Quantity of fuel type i combusted in process j during the year y.
Measured/ Calculated / Default:	Measured.
Source of data:	Fuel consumption records from subcontractors that process the biomass from forest operations.
Value(s) of monitored parameter:	**Fuel type i (ton/y)** / **2012** / **2013** **Diesel** / 78 / 64
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	Measurement of this parameter will be performed in accordance with the procedure established hereby: Fuel consumption records, from subcontractors that process the biomass residues from forest operations consumed in the project activity. The Project Participant would like to note that the monitored fuel consumption will be informed by subcontractors quarterly.
QA/QC procedures:	Consistency of measurements should be checked with vehicles specific fuel consumption rates: litres of fuel consumed per hour of operation, litres of fuel consumed per kilometre driven or other as appropriate. Cross-check values are the ratio between the expected consumption defined by Power plant and the informed data by the subcontractor. Values of 3.5% and 1.5% for 2012 and 2013 respectively are according the expected difference defined as quality assurance range. The Project Participant would like to note that the transportation subcontractors will not inform the purchase fuel invoices to the plant, consequently the former QA/QC procedure above described will be used to cross-check this parameter.
Purpose of data:	Project emissions calculations.
Additional comment:	--

Data / Parameter:	**$NCV_{FF,f,y}$**
Unit:	GJ per mass or volume unit (GJ/m^3 or GJ/ton)
Description:	Weight average net calorific value of fossil fuel type i in year y.
Measured/ Calculated / Default:	Default.

Source of data:	Project Participant will select default values from the IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, and Table 1.2 at the upper limit of the uncertainty at a 95% confidence interval.
Value(s) of monitored parameter:	43.3(GJ/ton) for Diesel. 41.7(GJ/ton) for Fuel Oil 52.2(GJ/ton) for LPG
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	Any future revision of the IPCC Guidelines should be taken into account.
QA/QC procedures:	Not applicable since a default factor will be used in this case.
Purpose of data:	Project emissions calculations.
Additional comment:	The monitoring of this variable applies, since according to the "Tool to calculate projector leakage CO_2 emissions from fossil fuel combustion", this PDD uses Option B ($COEF_{i,y} = NCV_{i,y} * EF_{CO2,i,y}$) to determine the CO_2 emission coefficient of fuel type i.

Data / Parameter:	**$EF_{CH4,BR}$**
Unit:	(tCH_4/GJ)
Description:	CH_4 emission factor for the combustion of biomass residues in the Project Plant (tCH_4/GJ).
Measured/ Calculated / Default:	Measured.
Source of data:	On site measurement.
Value(s) of monitored parameter:	0.0000 (tCH_4/GJ) The Project Participant would like to note that the applied value, based on measurements conducted in previous monitoring periods, is used instead of the default methane emission factor provided by the baseline methodology.
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	At least quarterly, taking at least three samples per measurement.
Calculation method (if applicable):	The CH_4 emission factor will be determined by taking samples from the power boiler flue gases and performing a gas stack analysis using calibrated analyser in a specialized laboratory.

QA/QC procedures:	Cross-check measurements performed with measurements obtained in previous monitoring periods in similar projects: Year | Nueva Aldea Biomass Power Plant Phase 1, Ref:0258 | Trupan Biomass Power Plant, Ref:0259 2013 | 0.0000 | 0.0000 2012 | 0.0000 | 0.0000 2011 | | 0.0000 In this case the measurement results equal as previous measurements, then is not relevant compared with other relevant data source.
Purpose of data:	Project emissions calculations.
Additional comment:	The monitoring of this parameter for project emissions is required, since in the case of this project activity the CH_4 emissions from biomass combustion are contemplated in the project boundary. Note that a conservative factor will be applied, as specified in the baseline methodology.

Data / Parameter:	**$EF_{CO2,L\ E}$**
Unit:	(tCO_2/GJ)
Description:	CO_2 emission factor of the most carbon intensive fuel used in the country.
Measured/ Calculated / Default:	Default.
Source of data:	Identify the most carbon intensive fuel type from the national communication, other literature sources (e.g. IEA). Possibly consult with the national agency responsible for the national communication/GHG inventory. If available, use national default values for the CO^2 emission factor. Otherwise, IPCC default values may be used.
Value(s) of monitored parameter:	Not used, since leakage is assumed to be 0.
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	--
Calculation method (if applicable):	The appropriateness of the data will be reviewed annually.
QA/QC procedures:	--
Purpose of data:	Leakage emissions calculations.
Additional comment:	Note that this parameter will be required for a period in which leakage for a biomass type i, could not be ruled out, otherwise, this will be not used.

Data / Parameter:	$HC_{BL,y}$
Unit:	(GJ)
Description:	Baseline process heat generation in year y (GJ)
Measured/ Calculated / Default:	Measured and Calculated.
Source of data:	On-site measurement.
Value(s) of monitored parameter:	2012: 1,334,797 (GJ) 2013: 1,890,482 (GJ)
Monitoring equipment:	462-FT-9150 Type: Steam flow meter 5.5 bar (Deaerator) ABB 264DSGSSB2A3/V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404006181 Calibration frequency: 18 months Date of calibration: 08/12/2010-07/01/2012-02/07/2012-20/08/2013 Validity: 19/02/2015 463-FT-0402 Type: Steam flow meter 85 bar (Soot blower) ABB 264DSHSSB2A3/V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6403015454 Calibration frequency: 18 months Date of calibration: 07/12/2010-09/07/2012-20/08/2013 Validity: 19/02/2015 463-PT-0106 Type: Pressure Transmitter Feed water ABB 264PSSSSB2A3V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6403015456 Calibration frequency: 18 months Date of calibration: 07/12/2010-07/01/2012-10/07/2012-20/08/2013 Validity: 19/02/2015 463-PT-0403 Type: Pressure Transmitter 85 bar (Soot blower) ABB 264PSQSSB2A3V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6403015460 Calibration frequency: 18 months Date of calibration: 07/12/2010-09/07/2012-21/08/2013 Validity: 20/02/2015 463-TT-0110 Type: Temperature Transmitter Feed water Rosemount 3244MVF1NAA01B4C2C4Q4 Accuracy class: +/- 0.10 °C Serial number: 458205 Calibration frequency: 5 years

		Date of calibration: 07/12/2010-09/07/2012-23/08/2013 Validity: 22/08/2018 463-TT-0406 Type: Temperature Transmitter 85 bar (Soot blower) Rosemount 3244MVF1NAA01B4C2C4Q4 Accuracy class: +/- 0.10 °C Serial number: 458156 Calibration frequency: 5 years Date of calibration: 08/12/2010-13/07/2012 Validity: 12/07/2017 465-FT-9019 Type: Steam flow meter 5.5 bar (AASA) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2 Accuracy class: +/- 0.025% Serial number: 34310 Calibration frequency: 5 years Date of last calibration: 09/12/2010-11/07/2012-23/08/2013 Validity: 22/08/2018 465-FT-9023 Type: Steam flow meter 5.5 bar (Boiler) Rosemount 3051SFADS180ZCHPS52T1000 Accuracy class: +/- 0.025% Serial number: 24439 Calibration frequency: 5 years Date of calibration: 10/12/2010-11/07/2012-23/08/2013 Validity: 22/08/2018 465-FT-9025 Type: Steam flow meter 11.5 bar (AASA) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2 Accuracy class: +/- 0.025% Serial number: 8808 Calibration frequency: 5 years Date of calibration: 09/12/2010-11/07/2012-22/08/2013 Validity: 21/08/2018 465-FT-9027 Type: Steam flow meter 19 bar (Plywood mill) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2 Accuracy class: +/- 0.025% Serial number: 8809 Calibration frequency: 5 years Date of calibration: 09/12/2010-11/07/2012-22/08/2013 Validity: 21/08/2018 465-PIT-9000-A Type: Pressure Transmitter 19 bar (Main line) ABB 264PSQSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008677	

		Calibration frequency: 18 months Date of calibration: 10/12/2010-09/07/2012-20/08/2013 Validity: 19/02/2015 465-PIT-9000-B Type: Pressure Transmitter 19 bar (Main line) ABB 264PSQSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008676 Calibration frequency: 18 months Date of calibration: 10/12/2010-09/07/2012-20/08/2013 Validity: 19/02/2015 465-PIT-9001-A Type: Pressure Transmitter 11.5 bar (Main line) ABB 264PSPSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008680 Calibration frequency: 18 months Date of calibration: 09/12/2010-10/07/2012-21/08/2013 Validity: 20/02/2015 465-PIT-9001-B Type: Pressure Transmitter 11.5 bar (Main line) ABB 264PSPSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008679 Calibration frequency: 18 months Date of calibration: 09/12/2010-10/07/2012-22/08/2013 Validity: 21/02/2015 465-PIT-9002-A* Type: Pressure Transmitter 5.5 bar (Main line) ABB 264PSPSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008685 Calibration frequency: 18 months Date of calibration: 10/12/2010-07/01/2012-10/07/2012 Validity: 09/01/2014 *Instrument was replaced on 20/08/2013 as a preventive action by the maintenance department.	

		465-PIT-9002-A Type: Pressure Transmitter 5.5 bar (Main line) ABB 264PSPSSB2A1/V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6408023636 Calibration frequency: 18 months Date of calibration: 20/08/2013 Validity: 19/02/2015 465-PIT-9002-B Type: Pressure Transmitter 5.5 bar (Main line) ABB 264PSPSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404027440 Calibration frequency: 18 months Date of calibration: 10/12/2010-07/01/2012-12/07/2012-22/08/2013 Validity: 21/02/2015	
		465-PIT-9002-C Type: Pressure Transmitter 5.5 bar (Main line) ABB 264PSPSSB2A3/V1/L1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6404008681 Calibration frequency: 18 months Date of calibration: 10/12/2010-07/01/2012-12/07/2012-20/08/2013 Validity: 19/02/2015 465-TT-9024 Type: Temperature Transmitter 5.5 bar Rosemount 3244MVF1NAA01B4C2C4Q4 Accuracy class: +/- 0.10 °C Serial number: 456395 Calibration frequency: 5 years Date of calibration: 11/12/2010-07/07/2012-22/08/2013 Validity: 21/08/2018 465-TT-9026 Type: Temperature Transmitter 11.5 bar Rosemount 3244MVF1NAA01B4C2C4Q4 Accuracy class: +/- 0.10 °C Serial number: 456304 Calibration frequency: 5 years Date of calibration: 11/12/2010-07/07/2012-21/08/2013 Validity: 20/08/2018 465-TT-9028 Type: Temperature Transmitter 19 bar Rosemount 3244MVF1NAA01B4C2C4Q4 Accuracy class: +/- 0.10 °C Serial number: 456397 Calibration frequency: 5 years Date of calibration: 09/12/2010-07/07/2012-22/08/2013 Validity: 21/08/2018	

	565-FT-0965 Type: Steam flow meter 19 bar (Pulp mill) ABB 264DSMSSA2A3/V1/B2/I2/N6/C1 Accuracy class: +/- 0.075% Serial number: 6406022860 Calibration frequency: 18 months Date of calibration: 24/03/2011-10/07/2012-22/08/2013 Validity: 21/02/2015
Measuring/ Reading/ Recording frequency:	This parameter will be monitored continuously and aggregated monthly, to calculate the emission reductions.
Calculation method (if applicable):	This parameter will be 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 generator. The respective enthalpies will be determined based on the mass (or volume) flows, the temperature and, in case of superheated steam, the pressure. Steam tables or appropriate thermodynamic equations may be used to calculate the enthalpy as a function of temperature and pressure. For superheat steam, condensates and feed water, the level of accuracy of the pressure is +/- 0.075%, of calibrated span; of temperature measurement is +/- 0.10 °C of calibrated span, and of flow meters measurement is +/- 0.025% and 0.075% depending on flow meter type.
QA/QC procedures:	--
Purpose of data:	Baseline and project emissions calculations.
Additional comment:	--

Data / Parameter:	**$EL_{PJ,gross,y}$**
Unit:	(MWh)
Description:	Gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year y (MWh).
Measured/ Calculated / Default:	Measured.
Source of data:	On-site measurements by Power Plant electric meters. This variable was monitored using electric meters that are standard in the electric power industry in Chile.
Value(s) of monitored parameter:	2012: 170,723 (MWh) 2013: 138,313 (MWh)

Monitoring equipment:	468-PM-008* Type: Energy Meter Switchgear (1-8) Power Measurement ION 7330 V277 Accuracy class: +/- 0.5% Serial number: PB-0401A161-11 Calibration frequency: 7 years Date of last calibration: 12/12/2010[1] Validity: 31/12/2013 *Equipment was replaced on 22/08/2013 as part of the maintenance program of the Plant. 468-PM-008 Type: Energy Meter Switchgear (1-8) Power Measurement ION 7330 V277 Accuracy class: +/- 0.3% Serial number: PB-1210A067-11 Calibration frequency: 7 years Date of last calibration: 22/08/2013 Validity: 21/08/2020
Measuring/ Reading/ Recording frequency:	Continuously. Energy values are recorded every 15 minutes and aggregated monthly.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Electricity meters received periodic maintenance and calibration as per instructed by the equipment manufacturer. In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of these instruments applying a validity control check. The validity report recommended changes the equipment during the year 2013. During the validity control check both equipment approve all the measurements validations. The consistency of metered electricity generation will be crosschecked with receipts from electricity sales. The results are 4.37% for 2012 and 4.21% for 2013. Considering the loss of energy in transmission line, this difference is considering acceptable.
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$EL_{PJ,imp,y}$**
Unit:	(MWh)
Description:	Project electricity imports from the grid in year y (MWh)
Measured/ Calculated / Default:	Measured.

[1] In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of the equipment applying a validity control check. The validity report recommended changes the equipment during the year 2013.

Source of data:	On-site measurements by Power Plant electric meters. This variable was monitored using electric meters that are standard in the electric power industry in Chile.
Value(s) of monitored parameter:	2012: 8,983 (MWh) 2013: 15,582 (MWh)
Monitoring equipment:	468-PM-003 Type: Energy Meter Switchgear (1-6) Power Measurement ION 7330 V277 Accuracy class: +/- 0.5% Serial number: PB-0607A312-11 Calibration frequency: 7 years Date of last calibration: 12/12/2010[2] Validity: 31/12/2013 468-PM-003 Type: Energy Meter Switchgear (1-6) Power Measurement ION 7330 V277 Accuracy class: +/- 0.5% Serial number: PB-1210A504-11 Calibration frequency: 7 years Date of last calibration: 22/08/2013 Validity: 21/08/2020
Measuring/ Reading/ Recording frequency:	Continuously. Energy values are recorded every 15 minutes and aggregated monthly.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Electricity meters received periodic maintenance and calibration as per instructed by the equipment manufacturer. In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of these instruments applying a validity control check. The validity report recommended changes the equipment during the year 2013. During the validity control check both equipment approve all the measurements validations. The consistency of metered electricity generation will be crosschecked with receipts from electricity sales. The results are 4.37% for 2012 and 4.21% for 2013. Considering the loss of energy in transmission line, this difference is considering acceptable.
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$EL_{PJ,aux,y}$**
Unit:	(MWh)
Description:	Total auxiliary electricity consumption required for the operation of the power plant as the project site in year y (MWh)

[2] In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of the equipment applying a validity control check. The validity report recommended changes the equipment during the year 2013.

Measured/ Calculated / Default:	Measured.
Source of data:	On-site measurements by Power Plant electric meters. This variable was monitored using electric meters that are standard in the electric power industry in Chile.
Value(s) of monitored parameter:	2012: 46,850 (MWh) 2013: 47,838 (MWh)
Monitoring equipment:	468-PM-006 Type: Energy Meter Switchgear (1-6) Power Measurement ION 7330 V277 Accuracy class: +/- 0.5% Serial number: PB-0401A178-11 Calibration frequency: 7 years Date of last calibration: 12/12/2010[3] Validity: 31/12/2013 468-PM-006 Type: Energy Meter Switchgear (1-6) Power Measurement ION 7330 V277 Accuracy class: +/- 0.5% Serial number: PB-1210A467-11 Calibration frequency: 7 years Date of last calibration: 22/08/2013 Validity: 21/08/2020
Measuring/ Reading/ Recording frequency:	Continuously. Energy values are recorded every 15 minutes and aggregated monthly.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Electricity meters received periodic maintenance and calibration as per instructed by the equipment manufacturer. In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of these instruments applying a validity control check. The validity report recommended changes the equipment during the year 2013. During the validity control check both equipment approve all the measurements validations. The consistency of metered electricity generation will be crosschecked with receipts from electricity sales. The results are 4.37% for 2012 and 4.21% for 2013. Considering the loss of energy in transmission line, this difference is considering acceptable.
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

[3] In 12/12/2010 the ION 7330 supplier (Schneider electric) extended the useful life of the equipment applying a validity control check. The validity report recommended changes the equipment during the year 2013.

<table>
<tr><td>Data / Parameter:</td><td>$NCV_{BR,n,y}$</td></tr>
<tr><td>Unit:</td><td>(GJ/t of dry-basis)</td></tr>
<tr><td>Description:</td><td>Net calorific value of biomass residues of category n in year y (GJ/tonnes of dry-basis).</td></tr>
<tr><td>Measured/ Calculated / Default:</td><td>Measured.</td></tr>
<tr><td>Source of data:</td><td>On-site measured.</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>
<table>
<tr><th>$NCV_{BR,n,y}$ (GJ/t)</th><th>2012</th><th>2013</th></tr>
<tr><td>(B_1) Sludge from industrial operations.</td><td>13.29</td><td>14.19</td></tr>
<tr><td>(B_2+B_3) Sawdust/bark on-site industrial operations.</td><td>18.12</td><td>19.05</td></tr>
<tr><td>(B_4) Sawdust/bark off-site industrial operations.</td><td>18.12</td><td>16.67</td></tr>
<tr><td>(B_5) Sawdust/bark forestry operations.</td><td>16.44</td><td>18.67</td></tr>
</table>
Due to a difference in the monitoring frequency of these parameters, the values applied in the emission reduction calculation were adjusted according section B.2.1 on this MR.
</td></tr>
<tr><td>Monitoring equipment:</td><td>Not applicable.</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>At least every six months, taking at least three samples for each measurement.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures:</td><td>Check consistency of measurements by comparing results with measurements from previous years or relevant data sources. In this case, there are not historical data, then, it’s possible compared with other similar project in the region.
<table>
<tr><td></td><td colspan="2">Nueva Aldea Phase 1 Ref:0258</td><td colspan="2">Trupan Ref:0259</td></tr>
<tr><td></td><td>NCV_{2012}</td><td>NCV_{2013}</td><td>NCV_{2012}</td><td>NCV_{2013}</td></tr>
<tr><td>Biomass from Industrial operations (on-site and of-site)</td><td>17.28</td><td>17.86</td><td>18.87</td><td>18.40</td></tr>
<tr><td>Biomass from forestry operations</td><td>16.44</td><td>18.67</td><td>17.47</td><td>17.35</td></tr>
<tr><td>Sludge</td><td>13.29</td><td>14.19</td><td>--</td><td>--</td></tr>
</table>
The results are similar and acceptable, considering that the procedure take more than three samples in every measurement.
</td></tr>
</table>

Purpose of data:	Baseline and project emissions calculations.
Additional comment:	

Data / Parameter:	**Moisture content of the biomass residues**
Unit:	% Water content in mass basis in wet biomass residues.
Description:	Moisture content of each biomass residues type k.
Measured/ Calculated / Default:	Measured.
Source of data:	On-site measurements.
Value(s) of monitored parameter:	See table below
Monitoring equipment:	Electronic moisture analyser Sartorius AG. Gotingen MA100H-000230V1* Accuracy class: Class I Serial number: 17302238 Calibration frequency: Annual[4] Date of last calibration: 15/07/2011 Validity: 14/07/2012 (estimated) *This equipment was replaced has part of the maintenance program of the Power Plant on 07/12/12. Electronic moisture analyser Mettler Toledo HB43-S Accuracy class: Class II Serial number: B235265966 Calibration frequency: Annual[5] Date of last calibration: 07/12/2012-31/12/2013 Validity: 30/12/2014 (estimated).
Measuring/ Reading/ Recording frequency:	This variable is continuously monitored.
Calculation method (if applicable):	The moisture content will be monitored for each batch of biomass residues category and the weight average will be calculated for each monitoring period and used in the emission reduction calculations.
QA/QC procedures:	--

Moisture content (%)	**2012**	**2013**
(B_1) Sludge from industrial operations.	69.7%	73.8%
(B_2+B_3) Sawdust/bark on-site industrial operations.	51.9%	52.7%
(B_4) Sawdust/bark off-site industrial operations.	54.3%	48.1%
(B_5) Sawdust/bark forestry operations.	--	53.7%

[4] The recommended annual maintenance frequency means once a year, usually during the stopagges, and not necessarily every twelve months.

[5] The recommended annual maintenance frequency means once a year, usually during the stopagges, and not necessarily every twelve months.

Purpose of data:	Baseline and Project emissions calculations.
Additional comment:	--

Data / Parameter:	**$EF_{grid,CM,y}$**
Unit:	(tCO_2/MWh)
Description:	CO_2 emission factor for grid electricity during year y.
Measured/ Calculated / Default:	Calculated.
Source of data:	-CDEC-SIC Dispatch Centre reports. - Chilean Ministry of Energy reports. - IPCC lower values.
Value(s) of monitored parameter:	2012: 0.672 (tCO_2/MWh) 2013: 0.714 (tCO_2/MWh)
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Arauco Bioenergia S.A. is responsible for performing the calculations to determine the grid emission factor, according to "Tool to calculate the emission factor for electricity system (Version 03.0.0)".
QA/QC procedures:	--
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$EF_{grid,OM,y}$**
Unit:	(tCO_2/MWh)
Description:	CO_2 Operating Margin emission factor of the grid
Measured/ Calculated / Default:	Calculated.
Source of data:	-CDEC-SIC Dispatch Centre reports. - Chilean Ministry of Energy reports. - IPCC lower values.
Value(s) of monitored parameter:	2012: 0.602 (tCO_2/MWh) 2013:0.771 (tCO_2/MWh)
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.

Calculation method (if applicable):	Arauco Bioenergia S.A. is responsible for performing the calculations to determine the grid emission factor, according to "Tool to calculate the emission factor for electricity system (Version 03.0.0)".
QA/QC procedures:	--
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$FC_{i,m,y}$, $FC_{i,k,y}$**
Unit:	(Mass or volume unit)
Description:	Amount of fossil fuel type i consumed by power plant/unit m and k in year y. In this case, m denotes all grid power units serving the grid in year y except low-cost/must-run power units and k denotes all low-cost/must-run grid power units serving the grid in year y.
Measured/ Calculated / Default:	Measured.
Source of data:	Utility or government records or official publications. In this case, Project Participant used official information from CDEC-SIC Dispatch Centre.
Value(s) of monitored parameter:	Refer to the CO_2 grid emission factor calculation excel sheet.
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	--
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	**$NCV_{i,y}$**
Unit:	(GJ/mass or volume unit)
Description:	Net calorific value (energy content) of fossil fuel type i in year y.
Measured/ Calculated / Default:	Default.
Source of data:	In this case, there exist reliable and documented national energy statistics therefore; the source used for the emission reduction calculation is the Energy Balance for 2012 provided by the National Energy Commission (CNE).

Value(s) of monitored parameter:	Coal: 29.3 (GJ/ton) Petcoke: 29.3 (GJ/ton) Diesel: 45.6 (GJ/ton) Natural Gas: 39.1 (GJ/ton) IFO 180: 44.0 (GJ/ton) Butane Gas: 39.1 (GJ/ton) Propane Gas: 39.1 (GJ/ton)
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	--
QA/QC procedures:	--
Purpose of data:	Baseline emissions calculations.
Additional comment:	The gross calorific value (GCV) of the fuel can be used, if gross calorific values are provided by the data source used. In such cases, also a gross calorific value basis is used for CO_2 emission factor.

Data / Parameter:	**$EF_{CO2,i,y}$, $EF_{co2,m,i,y}$**
Unit:	(tCO_2/GJ)
Description:	CO_2 emission factor of fossil fuel type i used in power unit m in year y.
Measured/ Calculated / Default:	Default.
Source of data:	This factor was calculated using IPCC default values.
Value(s) of monitored parameter:	Coal: 0.0895 (tCO_2/GJ) Petcoke: 0.0829 (tCO_2/GJ) Diesel: 0.0726 (tCO_2/GJ) Natural Gas: 0.0543 (tCO_2/GJ) IFO 180: 0.0722 (tCO_2/GJ) Butane Gas: 0.0616 (tCO_2/GJ) Propane Gas: 0.0616 (tCO_2/GJ)
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	--
QA/QC procedures:	--
Purpose of data:	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	$EG_{m,y}$, $EG_{k,y}$
Unit:	(MWh)
Description:	Net electricity generated by power plant/unit m and k in year y.
Measured/ Calculated / Default:	Measured.
Source of data:	This information was directly obtained by the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	Refer to the CO_2 grid emission factor calculation excel sheet.
Monitoring equipment:	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	--
Purpose of data:	Baseline emission calculations.
Additional comment:	--

D.3. Implementation of sampling plan

Not applicable.

SECTION E. Calculation of emission reductions or GHG removals by sinks

Please note the following:

1. Differences in baseline and project emission calculations included in tables below are due to the fact that all calculations are done directly in excel spreadsheets with full decimals (no rounding), this implies a decimal precision that is not carried onto word formatted tables because decimals are shown truncated and rounded down. Exact values can be viewed directly in emission reduction calculation spreadsheet.

2. Since the emission reduction calculation for the project activity was done monthly, in some cases year-averages were employed the calculations presented below.

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

Since the baseline scenario is that the current practice continues, i.e. the biomass related to the project activity would be disposed and not utilized for electricity generation. The emission reductions then, result from the avoidance of biomass open-air burning and the electric power generated with fossil fuels. According to this, the baseline emissions for year y were calculated according to the following formula:

$$BE_y = EL_{BL,GR,y} \cdot EF_{EG,GR,y} + BE_{BR,y}$$

Where:

BE_y	Baseline emissions in year y (tCO_2).
$EL_{BL,GR,y}$	Baseline minimum electricity generation in the grid in year y (MWh).
$EF_{EG,GR,v}$	Grid emission factor in year y (tCO_2/MWh).
$BE_{BR,y}$	Baseline emissions due to disposal of biomass residues in year y (tCO_2e).
y	Year of the crediting period.
f	Fossil fuel type.

1.- Determine emissions due to baseline electricity generation.

To determine the emission due to baseline electricity generation, Project Participant used the following procedure.

a) Using equation 3 of the ACM0006 (Version 12.1.1) the baseline electricity generation in the grid can be calculated as follows:

Data:

		2012	2013
(1) Gross quantity of electricity generated.	$EL_{PJ,gross,y}$	170,723 (MWh)	138,313 (MWh)
(2) Project electricity imports from the grid.	$EL_{PJ,imp,y}$	8,983 (MWh)	15,582 (MWh)
(3) Total auxiliary electricity consumption required for the operation of the power plant.	$EL_{PJ,aux,y}$	33,994 (MWh)	34,982 (MWh)
(4) Auxiliary electricity consumption due to biomass transportation from log-merchandizer and plywood.		15,856 (MWh)	12,856 (MWh)

Calculations:

			2012	2013
(5) Baseline electricity generation capacity in year y.	$EL_{BL,y}$	(1)+(2)-[(3)-(4)]	132,856 (MWh)	106,057 (MWh)

b) Determination of the emission factor of the grid electricity generation:

The parameter $EF_{EG,GR,v}$ should be determined as the combined margin CO_2 emission factor for the grid to which the project activity is connected in year y, calculated according to the "Tool to calculate the emission factor for an electricity system (Version 03.0.0)". This calculation is presented below:

Operating Margin calculations:

In this case the OM; emission factor is calculated using the simple/adjusted method. The Project Participant used ex-post data to calculate this parameter, that is, the coefficient was calculated in year in which the project generation occurs, in this case corresponds to year 2012 and 2013.

The Project Participant used data from 2012 and 2013 to determine the lambda factor that expresses the percentage of the time when low-cost/must-run sources were on the margin:

$$\lambda_y = \lambda_{2012/2013} = 0.0000$$

The rest of the parameters used to calculate the $EF_{EG,GR,v}$ for 2012 and 2013 were obtained from the CDEC-SIC dispatch centre (official and public information). The calculation is as follows:

- CO_2 emission of non-low cost/must-run power sources for 2012 and 2013:

$$\sum_{i,j} F_{i,j,2012} \cdot COEF_{i,j} = 14{,}978{,}145 \;\; tCO_2 \;\; y$$

$$\sum_{i,j} F_{i,j,2013} . COEF_{i,j} = 20{,}520{,}135 \;\; tCO_2 \;\; y$$

- The total power generation in the SIC by non-low-cost/must-run power sources in 2012 and 2013:

$$\sum_{j} GEN_{J,2012} = 24{,}883{,}9367 \;\; Mwh \;\; y$$

$$\sum_{j} GEN_{J,2013} = 26{,}628{,}230 \;\; Mwh \;\; y$$

- The CO_2 emissions of low-cost/must run power sources in 2012 and 2013. Note that since in Chile low-cost/must run power sources include mostly hydro energy, the total emissions for this part of the equation are low:

$$\sum_{i,k} F_{i,k,2012} . COEF_{i,k} = 470{,}463 \;\; tCO_2 \;\; y$$

$$\sum_{i,k} F_{i,k,2013} . COEF_{i,k} = 428{,}411 \;\; tCO_2 \;\; y$$

- Total power generation in the SIC by low-cost/must-run resources for 2012 and 2013:

$$\sum_{j} GEN_{J,2012} = 22{,}646{,}910 \;\; Mwh \;\; y$$

$$\sum_{j} GEN_{J,2013} = 22{,}582{,}322 \;\; Mwh \;\; y$$

Replacing the above values in the equation used to calculate the $EF_{electricity,y}$ for year 2012 and 2013, the operating margin results:

$$EF_{OM,2012} = \; 1 - 0.0000 \; . \frac{14{,}978{,}145}{24{,}883{,}936} \;\; tCO_2 \;\; Mwh \;\; + 0.0000 . \frac{470{,}463}{22{,}646{,}910} \;\; tCO_2 \;\; Mwh$$

$$EF_{OM,2012} = EF_{OM,simple\ adjusted,2011} = 0.602 \;\; tCO_2 \;\; Mwh$$

$$EF_{OM,2013} = \; 1 - 0.0000 \; . \frac{20{,}520{,}135}{26{,}628{,}230} \;\; tCO_2 \;\; Mwh \;\; + 0.0000 . \frac{428{,}411}{22{,}582{,}322} \;\; tCO_2 \;\; Mwh$$

$$EF_{OM,2013} = EF_{OM,simple\ adjusted,2011} = 0.771 \;\; tCO_2 \;\; Mwh$$

Combined Margin calculations

Having obtained the Operating Margin $EF_{grid,OM,y}$ and the fixed Build Margin $EF_{grid,BM,y}$, and assuming the default value of (0.25) for the weights W_{OM} and (0.75) for the W_{BM}, it is possible to calculate $EF_{grid,CM,y}$ for 2012 and 2013. The results obtained were the following:

Data:

		2012	2013
(1) Operating Margin (OM)	$EF_{grid,OM,y}$	0.602 (tCO_2/MWh)	0.771 (tCO_2/MWh)
(2) Build Margin (BM)	$EF_{grid,BM,y}$	0.695 (tCO_2/MWh)	0.695 (tCO_2/MWh)

(3) Weighting of Operating Margin	W_{OM}	25%	25%
(4) Weighting of Build Margin	W_{BM}	75%	75%

Calculations:

			2012	2013
(5) Combined Margin calculation (CM)	$EF_{grid,CM,y}$	(1)*(3)+(2)*(4)	0.672 (tCO_2/MWh)	0.714 (tCO_2/MWh)

c) According to equation 13 of the ACM0006 (Version 12.1.1) baseline minimum electricity generation in the grid can be calculated as follows:

Data:

		2012	2013
(1) Baseline electricity generation.	EL_{BLy}	132,856 (MWh)	106,057 (MWh)
(2) Baseline electricity generation capacity.	$CAP_{EG,total,y}$	0 (MWh)	0 (MWh)

Calculations:

			2012	2013
(3) Minimum baseline electricity generation in the grid	$EL_{BL,GR,y}$	Max[0,(1)-(2)]	132,856 (MWh)	106,057 (MWh)

Then:

		2012	2013
Baseline emissions due to minimum grid electricity displacement.	**$EL_{BLGR,y}$*$EF_{EG,GR}$**	**89,272 (tCO_2)**	**75,737 (tCO_2)**

2.- Determinate baseline emissions due to uncontrolled burning or decay of biomass residues

To determine the baseline emissions due to uncontrolled burning or decay of biomass residues, Project Participant use the following procedure describe in the current PDD.

a) Determine the total heat generated in the power boiler considering all biomass residues types available in the baseline.

Data:

		2012	2013
(1) Baseline biomass-based heat generation of the power boiler in year y (without fossil fuel).	$HG_{PJ,BR,y}$	1,334,797 (GJ)	1,890,482 (GJ)
Biomass-based heat generation per category (GJ)			
(2) Biomass residues (sludge) from off-site industrial operations, heat generation.*		128,496 (GJ)	124,770 (GJ)
(3) Biomass residues (mix of sawdust and bark) from on-site industrial operations, heat generation.		260,970 (GJ)	918,441 (GJ)

*According equation 14 of ACM0006 (Version 12.1.1)

Calculations:

			2012	2013
(4) Biomass residues (sludge) from off-site industrial operations, heat generation.	$BR_{B4,1,y}$		11,747 (BDt)	12,481 (BDt)

(5) Biomass residues (mix of sawdust and bark) from on-site industrial operations, heat generation.	$BR_{B4,2,y}$		17,753 (BDt)	70,648 (BDt)
Biomass-based heat generation		[(4)+(5)]	29,500 (BDt)	83,489 (BDt)
Baseline biomass-based heat generation efficiency of heat generator	$\eta_{PJ,HG,BR,h}$		85%	85%

The following calculation is divided according the temporary deviation in section B.2.1 NCV_k adjust due to gaps in frequency of sampling.

Data:

Biomass attributable to Project Activity 2012	**(1)+(2)+(3)**	**106,729 (BDt)**	
		01/12-11/12	12/12
(1) Biomass residues (mix of sawdust and bark) from on-site industrial operations, electricity generation.	$BR_{PJ,3,y}$	0 (BDt)	0 (BDt)
(2) Biomass residues (mix of sawdust and bark) from off-site industrial operations, electricity generation.	$BR_{PJ,4,y}$	106,729 (BDt)	0 (BDt)
(3) Biomass residues (mix of sawdust and bark) from forestry operations, electricity generation.	$BR_{PJ,5,y}$	0 (BDt)	0 (BDt)
(4) NCV of biomass residues (mix if sawdust and bark from on-site industrial op.	$NCV_{BR,3,y}$	18.12 (Kg/TJ)	7.90 (Kg/TJ)
(5) NCV of biomass residues (mix if sawdust and bark from off-site industrial op.	$NCV_{BR,4,y}$	16.44 (Kg/TJ)	7.90 (Kg/TJ)
(6) NCV of biomass residues (mix if sawdust and bark from forestry op.	$NCV_{BR,5,y}$	0.00 (Kg/TJ)	0.00 (Kg/TJ)
(7) Adjusted CH_4 factor for uncontrolled burning, biomass residues (mix of sawdust and bark) from industrial operations.	$EF_{BR,3,y}$ $EF_{BR,4,y}$	874.20 (GJ/ton)	874.20 (GJ/ton)
(8) Adjusted CH_4 factor for uncontrolled burning, biomass residues (mix of sawdust and bark) from forestry operations.	$EF_{BR,5,y}$	93.48 (GJ/ton)	93.48 (GJ/ton)
(9) CH_4 Global Warming Potential		21	21

Biomass attributable to Project Activity 2013	**(1)+(2)+(3)**	**112,618 (BDt)**		
		01/13-06/13	07/13-10/13	11/13-12/13
(1) Biomass residues (mix of sawdust and bark) from on-site industrial operations, electricity generation.	$BR_{PJ,3,y}$	0 (BDt)	0 (BDt)	0 (BDt)
(2) Biomass residues (mix of sawdust and bark) from off-site industrial operations, electricity generation.	$BR_{PJ,4,y}$	64,196 (BDt)	0 (BDt)	41,668 (BDt)
(3) Biomass residues (mix of sawdust and bark) from forestry operations, electricity generation.	$BR_{PJ,5,y}$	1,171 (BDt)	0 (BDt)	5,583 (BDt)
(4) NCV of biomass residues (mix if sawdust and bark from on-site industrial op.	$NCV_{BR,3,y}$	18.73 (Kg/TJ)	7.90 (Kg/TJ)	19.38 (Kg/TJ)
(5) NCV of biomass residues (mix if sawdust and bark from off-site industrial op.	$NCV_{BR,4,y}$	16.56 (Kg/TJ)	7.90 (Kg/TJ)	16.78 (Kg/TJ)
(6) NCV of biomass residues (mix if sawdust and bark from forestry op.	$NCV_{BR,5,y}$	0.00 (Kg/TJ)	7.90 (Kg/TJ)	18.67 (Kg/TJ)
(7) Adjusted CH_4 factor for uncontrolled burning, biomass residues (mix of sawdust and bark) from industrial operations.	$EF_{BR,3,y}$ $EF_{BR,4,y}$	874.20 (GJ/ton)	874.20 (GJ/ton)	874.20 (GJ/ton)
(8) Adjusted CH_4 factor for uncontrolled burning, biomass residues (mix of sawdust	$EF_{BR,5,y}$	93.48 (GJ/ton)	93.48 (GJ/ton)	93.48 (GJ/ton)

and bark) from forestry operations.				
(9) CH_4 Global Warming Potential		21	21	21

Calculations:

		2012	2013
(10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,3,y}$).	[(1)*(4)*(7)*(9)]/1000000	0 (tCO_2)	0 (tCO_2)
(10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,4,y}$).	[(2)*(5)*(7)*(9)]/1000000	32,213 (tCO_2)	32,354 (tCO_2)
(10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,5,y)}$.	[(3)*(6)*(8)*(9)]/1000000	0 (tCO_2)	205 (tCO_2)

Total Baseline emissions

			2012	2013
Baseline emissions due to minimum grid electricity displacement.	$EL_{BL,GR,y}$*$EF_{EG,GR}$	(tCO_2)	89,272	75,737
Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues.	Σ $BR_{B1/B3,i}$	(tCO_2)	32,213	32,558
TOTAL BASELINE EMISSIONS		(tCO_2eq)	121,485	108,296

E.2. Calculation of project emissions or actual net GHG removals by sinks

The anthropogenic emissions by sources of GHGs of the project activity in year *y* (PE_y) can be determined as follows:

$$PE_y = PE_{FF,y} + PE_{GR1,y} + PE_{TR,y} + PE_{BR,y}$$

Where:

PE_y	Total project activity emissions (tCO_2eq/yr).
$PE_{FF,y}$	Project emissions due to fossil fuel consumption at the project site (tCO_2eq/yr).
$PE_{GR1,y}$	Project emissions due to electricity imports from the grid to the project site (tCO_2/yr).
$PE_{TR,y}$	Project emissions due to transport of the biomass residues to the project plant (tCO_2/yr).
$PE_{BR,y}$	Project emissions from the combustion of biomass residues (tCO_2/yr).

1.- Determination of $PE_{FF,y}$
The project activity implies additional fossil fuel consumption due to:

- Operational reasons associated to additional biomass consumption (e.g. biomass too wet in winter, etc.).
- on-site additional biomass transportation.

According the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", CO_2 emissions from fossil fuel combustion in process j are calculated based on the quantity of fuels combusted and the CO_2 emission coefficient of those fuels, as follows:

$$PE_{FF,y} = \sum_i FC_{i,j,y} \cdot COEF_{i,y}$$

Where:

$FC_{i,j,y}$ Quantity of fuel type i combusted in process j during the year y (mass or volume unit/yr); (.
$COEF_{i,y}$ CO_2 emission factor for the fossil fuel of type i used in the power boiler (tCO_2/k).

a) Fossil Fuel consumption in the power boiler

Data:

		2012	2013
(1) Fossil fuel used in the power boiler due to operational reasons.	$FC_{diesel,poject\ plant,y}$	1,434 (t/y)	247 (t/y)
(2) Fossil fuel net calorific value	$NCV_{FF,diesel,y}$	43.30 (GJ/t)	43.30 (GJ/t)
(3) Fossil fuel CO_2 emission factor	$EF_{FF,y,diesel}$	0.0741 (tCO_2/GJ)	0.0741 (tCO2/GJ)

Calculations:

		2012	2013
(4) Emissions due to fossil fuel consumption in the power boiler	**(1)*(2)*(3)**	**4,598 (tCO_2/y)**	**791 (tCO_2/y)**

b) Fossil fuel consumption due to on-site transportation of biomass residues

Data:

		2012	2013
(1) Fossil fuel used for on-site biomass transportation due to the project activity	$FC_{diesel,poject\ site,y}$	78 (t/y)	64 (t/y)
(2) Fossil fuel net calorific value	$NCV_{FF,diesel,y}$	43.30 (GJ/t)	43.30 (GJ/t)
(3) Fossil fuel CO_2 emission factor	$EF_{FF,y,diesel}$	0.0741 (tCO_2/GJ)	0.0741 (tCO2/GJ)

Calculations:

		2012	2013
(4) Emissions due to fossil fuel consumption for on-site transportation.	**(1)*(2)*(3)**	**252 (tCO_2/y)**	**206 (tCO_2/y)**

c) Fossil fuel consumption for processing biomass residues from forest operations

Data:

		2012	2013
(1) Fossil fuel used for processing biomass from forestry operations	$FC_{diesel,biomass\ processing,y}$	0 (t/y)	69 (t/y)
(2) Fossil fuel net calorific value	$NCV_{FF,diesel,y}$	43.30 (GJ/t)	43.30 (GJ/t)
(3) Fossil fuel CO_2 emission factor	$EF_{FF,y,diesel}$	0.0741 (tCO_2/GJ)	0.0741 (tCO2/GJ)

Calculations:

		2012	2013
(4) Emissions due to fossil fuel consumption for processing forestry biomass residues.	(1)*(2)*(3)	0 (tCO_2/y)	222 (tCO_2/y)

d) Carbon dioxide emissions from on-site consumption of fossil fuel

		2012	2013
Emissions due to fossil fuel consumption in the	$FC_{diesel,poject\ site,y}$	4,598	791

power boiler.		(tCO_2/y)	(tCO_2/y)
Emissions due to fossil fuel consumption for on-site transportation	$FC_{diesel,poject\ site,y}$	252 (tCO_2/y)	206 (tCO_2/y)
Emissions due to fossil fuel consumption for processing forestry biomass residues.	$FC_{diesel,biomass\ processing,y}$	0 (tCO_2/y)	222 (tCO_2/y)
Total emissions.	**$PE_{FF,y}$**	**4,849 (tCO_2/y)**	**1,219 (tCO_2/y)**

2.- Determination of $PE_{GR1,v}$

Data:

		2012	2013
(1) Project electricity imports from the grid.	$EL_{PJ,imp,y}$	8,983 (MWh)	15,582 (MWh)
(2) Grid emission factor	$EF_{EG,GR,y}$	0.672 (tCO_2/MWh)	0.714 (tCO_2/MWh)

Calculations:

			2012	2013
Total emissions.	(1)*(2)	$PE_{GR1,y}$	6,036 (tCO_2/y)	11,128 (tCO_2/y)

3.- Determination of $PE_{TR,v}$

Data:

		2012	2013
(1) Biomass residues (mix of sawdust and bark) from off-site industrial operations, electricity generation.	$BR_{PJ,4,y}$	175,867 (BDt/y)	155,404 (BDt/y)
(2) Biomass residues (mainly bark) from off-site industrial operations, electricity generation.		7,973 (BDt/y)	16,305 (BDt/y)
(3) Biomass residues (mix of sawdust and bark) from off-site industrial operations (without bark from pulp mill operations).	[(1)-(2)]	167,894 (BDt/y)	139,099 (BDt/y)
(4) Biomass residues (mix of sawdust and bark) from forestry operation, electricity generation.	$BR_{PJ,5,y}$	0 (BDt/y)	10,091 (BDt/y)
(5) Total mass of freight transported in freight transportation activity f.	$FR_{f,m}$: [(3)+(4)]	167,894 (BDt/y)	149,190 (BDt/y)
(6) Weight average calculation	$\Sigma[D_{f,m}*FR_{f,m}]$	5,700,820	5,832,240
(7) Default CO_2 emission factor for freight transportation activity f.	EF_{CO2}	129	129

Calculations:

			2012	2013
Total emissions.	$[(7)*(8)]/10^6$	$PE_{TR,y}$	735 (tCO_2/y)	752 (tCO_2/y)

4.- Determination of $PE_{BR,v}$

Data:

		2012	2013
(1) Biomass residues (sludge) from off-site industrial operations, heat generation.	$BR_{PJ,1,y}$	11,747 (BDt/y)	12,841 (BDt/y)
(2) Biomass residues (sawdust and bark) from off-site industrial operations, heat generation.	$BR_{PJ,2.y}+BR_{PJ,3,y}$	17,753 (BDt/y)	70,648 (BDt/y)

(3) Biomass residues (mix of sawdust and bark) from on-site industrial operations, electricity generation.	$BR_{PJ,3,y}$	0 (BDt/y)	0 (BDt/y)
(4) Biomass residues (sawdust and bark) from off-site industrial operations, electricity generation.	$BR_{PJ,4,y}$	106,729 (BDt/y)	105,864 (BDt/y)
(5) Biomass residues (mix of sawdust and bark) from forestry operation, electricity generation.	$BR_{PJ,5,y}$	0 (BDt/y)	6,754 (BDt/y)
(6) Net calorific value of biomass residues (sludge) from off-site industrial ops.*	$NCV_{BR,1,y}$	13.29 (GJ/t)	14.19 (GJ/t)
(7) Net calorific value of biomass residues (sawdust and bark) from on-site industrial ops.*	$NCV_{BR,2,y}$	18.12 (GJ/t)	19.05 (GJ/t)
(8) Net calorific value of biomass residues (mix of sawdust and bark) from on-site industrial op.*	$NCV_{BR,3,y}$	18.12 (GJ/t)	19.05 (GJ/t)
(9) Net calorific value of biomass residues (mix of sawdust and bark) from off-site industrial op.*	$NCV_{BR,4,y}$	16.44 (GJ/t)	16.67 (GJ/t)
(10) Net calorific value of biomass residues (mix of sawdust and bark) from forestry op.*	$NCV_{BR,5,y}$	0.00 (GJ/t)	18.67 (GJ/t)
(11) Adjusted CH_4 emission factor for controlled burning, biomass residues.	$EF_{CH4,BR}$	0.00 ($kgCH_4/TJ$)	0.00 ($KgCH_4/TJ$)
(12) Conservativeness factor.		1.02	1.02
(13) CH_4 Global Warming Potential.	GWP	21	21

* Values in NCV cells are only a reference. The real values used for the calculation are according the temporary deviation described in section B.2.1 of this document.

Calculations:

			2012	2013
Total emissions.	[(1)*(6)+(2)*(7)+(3)*(8)+(4)*(9)+(5*(10)]*[(11)*(12)*(13)]	$PE_{BR,y}$	0.00 (tCO_2/y)	0.00 (tCO_2/y)

Total project emissions

Project emission sources.		**2012**	**2013**
Emissions due to fossil fuel consumption at the project site.	$PE_{FF,y}$	4,849 (tCO_2eq)	1,219 (tCO_2eq)
Emissions due to grid electricity imports to the project site.	$PE_{GR1,y}$	6,036 (tCO_2eq)	11,128 (tCO_2eq)
Emissions due to transport of the biomass residues to the project plant.	$PE_{TR,y}$	735 (tCO_2eq)	752 (tCO_2eq)
Emissions from the combustion of biomass residues.	$PE_{BR,y}$	0 (tCO_2eq)	0 (tCO_2eq)
Total project activity emissions.	**PE_y**	**11,621 (tCO_2eq)**	**13,099 (tCO_2eq)**

E.3. Calculation of leakage

According to the detailed Excel spreadsheet presented during the revalidation process of this project, the supply/demand indexes for each of the biomass types consumed by the project activity are clearly higher than 1.25 as is established by the criteria of the ACM0006 (Version12.1.1). This clearly indicates that the proposed project activity counts with enough biomass locally, and therefore, is not causing other biomass plants in the area to switch to fossil fuels.

As described section B.6.3 of the registered PDD, page 99, the supply/demand indexes that Project Participant has performed in a detailed research, is anticipated that there are no leakage from the implementation of the project activity.

$$L_y = 0$$

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
2012	121,485	11,621	0	109,864
2013	108,296	13,099	0	95,197
Total	**229,781**	**229,781**	**0**	**205,061**

Note that the baseline and project emissions calculations above may present some minor imprecision due to some decimal rounding. This decimal rounding is merely cosmetic, since the excel spreadsheet used for the actual emission reduction calculation, works with all the decimals.

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	387,816	205,061

E.6. Remarks on difference from estimated value in registered PDD

The emission reductions for the monitoring period were 205,061 CERs. This amount is 47% lower than the emission reductions of 387,816 CERs estimated in the PDD. This difference can be explained by the following reasons:

1. Fire event in the monitoring period beginning: The fire described in section B.1 impacts hardly in the regular operation of the project activity. Even though the power plant did not result damage, 99% of the critical equipment were not affect by fire and the monitoring plan was strictly applied, the destruction of the Plywood mill, Sander dust weigh meter and Cellulose mill conveyor belt, decrease the quantity of biomass taken from the Nueva Aldea complex. This situation affects reducing the Baseline emissions and increasing the Project emissions.
2. From November 13th, 2012 to March 30th, 2013, the power plant was out of service due to a failure in the turbine lubrication system. Meanwhile, the complex needed to buy energy from the grid to continue the normal operation. The reparation of the equipment took four months because it was necessary to import the replacement supplies. This event decreases the baseline emission reduction, owing to the energy that was not generated, and increases the Project emissions because of the imported energy form the grid in this period.
3. Temporary deviations applied to internal biomass, external biomass and adjustment to the biomass NCV_k. As is explained in section B.2.3 the adjustments applied to the monitored parameters have conservative criteria and reduce the quantity of baseline emissions.

The combined effect of the reasons mentioned above resulted in lower emission reductions than the ones estimated in the PDD.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	109,864	95,197

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Document information

Version	*Date*	*Description*
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: issuance
Keywords: monitoring report, performance monitoring