**Monitoring report form**
**(Version 05.1)**

| MONITORING REPORT | | |
|---|---|---|
| **Title of the project activity** | Nueva Aldea Biomass Power Plant Phase 1 | |
| **UNFCCC reference number of the project activity** | 0258 | |
| **Version number of the monitoring report** | 1 | |
| **Completion date of the monitoring report** | 04/04/2017 | |
| **Monitoring period number and duration of this monitoring period** | Monitoring Period #2: 01/01/2014 - 31/12/2015 | |
| **Project participant(s)** | Celulosa Arauco y Constitución S.A. | |
| **Host Party** | Chile | |
| **Sectoral scope(s)** | Sectoral scope 1. | |
| **Selected methodology(ies)** | ACM0006 (Version 12.1.1), "Consolidated methodology for electricity and heat generation from biomass". | |
| **Selected standardized baseline(s)** | Not applicable | |
| **Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD** | 402,331 metric tonnes CO2 equivalent according to PDD. | |
| **Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period** | GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012 | GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards |
| | Not applicable | 309,701 metric tonnes CO2 equivalent. |

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

The project activity consists of a 29.94 MW (app. 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 |
| 01/01/2014 to 31/12/2015 | The 2nd crediting period, 2nd monitoring period |

Total net emission reductions claimed in the 2nd monitoring period (from January 1st 2014 to December 31th 2015) are 309,701 tCO2eq.

## 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:

- Longitude: -72.5564
- Latitude: -36.6574

## 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 whether the Party involved wishes to be considered as project participant (yes/no) |
|---|---|---|
| Chile | Celulosa Arauco y Constitucion S.A. | No |
| United Kingdom of Great Britain and Northern Ireland | Celulosa Arauco y Constitucion S.A. | No |

## A.4. Reference of applied methodology and standardized baseline

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 CO2 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)"
- "Assessment of the validity of the original/current baseline and to update the baseline at the renewal of a crediting period (Version 03.0.1)".
- "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 |

## A.6. Contact information of responsible persons/entities

| | |
|---|---|
| **Contact information** | Mr. Christian Rodriguez |
| **Title** | Head of climate change of Arauco Bioenergia S.A. |
| **Mobile** | 56-9 6832 3737 |
| **Direct tel.** | 56-2 2462 3888 |
| **Personal e-mail** | christian.rodriguez@arauco.cl |

## SECTION B. Implementation of project activity

### B.1. Description of implemented registered project activity

The project activity consists of 29.94 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.

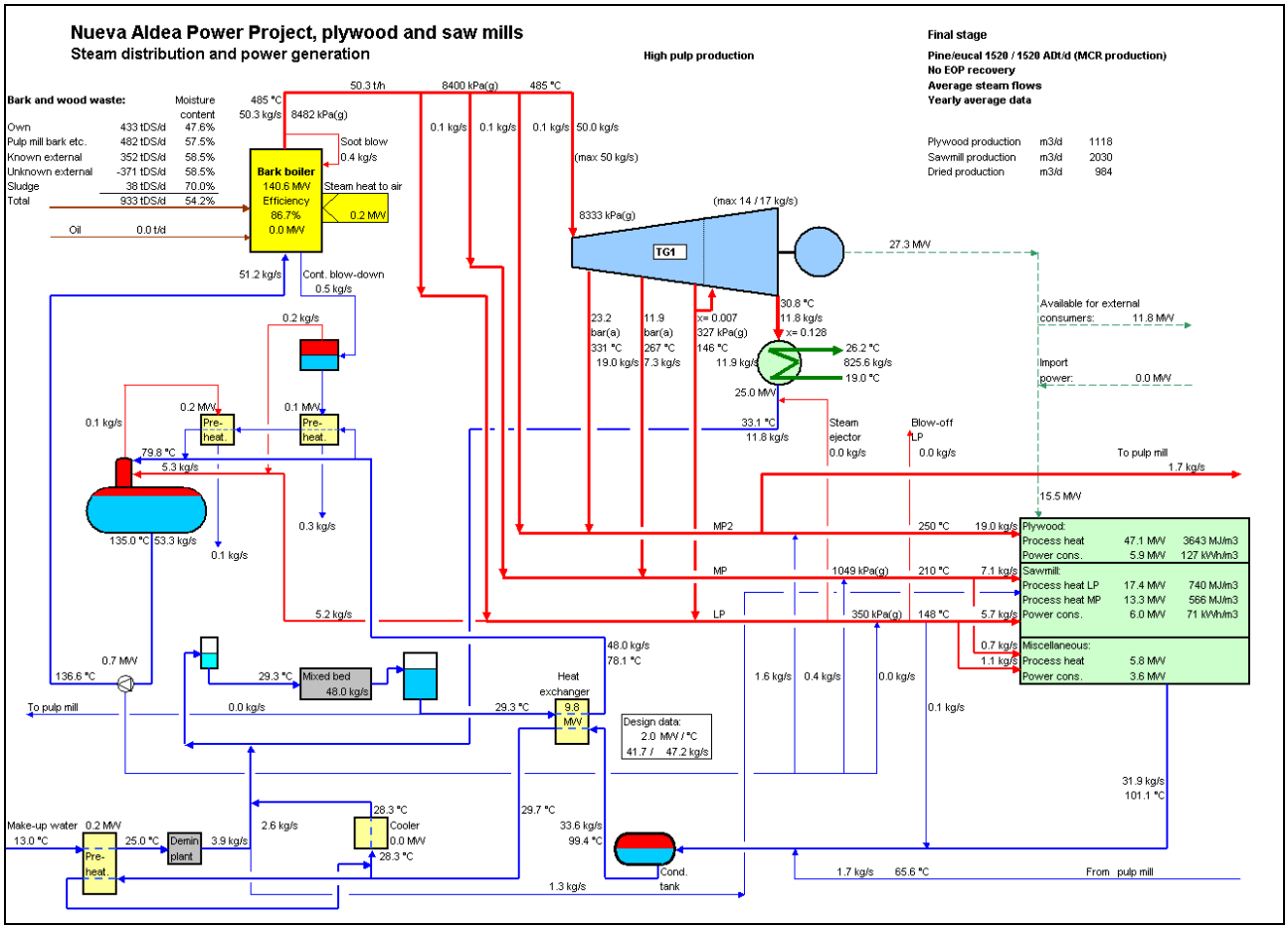
The steam-Rankine cycle involves heating pressurized water, with the resulting steam expanding to drive a turbine-generator, and then condensing back to water for partial or full recycling to the boiler. A heat exchanger is used to recover heat from flue gases to preheat combustion air, and a deaerator 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 the past monitoring period (MP1), a forest fire started on December, 31st, 2011, affects a wide zone in Biobio region, mainly Florida, Quillon, San Rosendo and Ranquil communes. The last one is identified as the Project location commune. The fire damaged the entire Plywood mill and the biomass storage area of the power plant. While the power plant started their operations after 6.8 days of stoppage, the plywood mill was reconstructed till September 2014. Until that date, the power plant had to replace the residues provided by the plywood mill for external biomass residues.

**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.

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

| | | | Power plant | | | |
|---|---|---|---|---|---|---|
| | N° days | Total hrs. | Availability hrs. | Trips hrs. | Comments | Availability per month Power plant (%) |
| Jan-14 | 31 | 744 | 698.1 | 45.90 | Stoppage | 93.83% |
| Feb-14 | 28 | 672 | 644.7 | 27.3 | Stoppage | 95.94% |
| Mar-14 | 31 | 744 | 538.3 | 205.67 | Shutdown | 72.36% |
| Apr-14 | 30 | 720 | 545.9 | 174.15 | Shutdown | 75.81% |
| May-14 | 31 | 744 | 708.4 | 35.58 | Stoppage | 95.22% |
| Jun-14 | 30 | 720 | 711.0 | 8.97 | Stoppage | 98.75% |
| Jul-14 | 31 | 744 | 744.0 | 0.00 | | 100.00% |
| Aug-14 | 31 | 744 | 739.0 | 5.02 | Stoppage | 99.33% |
| Sep-14 | 30 | 720 | 719.2 | 0.80 | Stoppage | 99.89% |
| Oct-14 | 31 | 744 | 563.1 | 180.95 | Stoppage | 75.68% |
| Nov-14 | 30 | 720 | 716.5 | 3.50 | Stoppage | 99.51% |
| Dec-14 | 31 | 744 | 737.2 | 6.78 | Stoppage | 99.09% |
| Jan-15 | 31 | 744 | 744.0 | 0.00 | | 100.00% |
| Feb-15 | 28 | 672 | 672.0 | 0.00 | | 100.00% |
| Mar-15 | 31 | 744 | 744.0 | 0.00 | | 100.00% |
| Apr-15 | 30 | 720 | 720.0 | 0.00 | | 100.00% |
| May-15 | 31 | 744 | 593.0 | 150.98 | Shutdown | 79.71% |
| Jun-15 | 30 | 720 | 189.4 | 530.63 | Shutdown | 26.30% |
| Jul-15 | 31 | 744 | 744.0 | 0.00 | | 100.00% |
| Aug-15 | 31 | 744 | 729.2 | 14.82 | Stoppage | 98.01% |
| Sep-15 | 30 | 720 | 656.2 | 63.83 | Stoppage/Shutdown | 91.13% |
| Oct-15 | 31 | 744 | 699.5 | 44.50 | Shutdown | 94.02% |
| Nov-15 | 30 | 720 | 713.1 | 6.88 | Stoppage | 99.04% |
| Dec-15 | 31 | 744 | 744.0 | 0.00 | | 100.00% |

The table below describe the stoppage/maintenance event occurred during the monitoring period. Is important to highlight that were no stoppages/maintenance events during month of July 2014 and January, February, March, Abril, July and December 2015.

The following equipment was replaced during this monitoring period as a preventive action during programed plant shutdown:

| **Pressure transmitter 11.5 bar (main line)/ TAG 465-PIT-9001B** | |
|---|---|
| Operative until 31/03/2014:<br>Supplier: ABB<br>Model: 264PSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Serial number: 6404008679<br>Accuracy: +/- 0.075% | Replaced in 01/04/2014 by:<br>Supplier: ABB<br>Model: 264DSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Serial number: 6406022864<br>Accuracy: +/- 0.075% |

## B.2. Post-registration changes

### B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

Problems obtaining Moisture content

During the present monitoring period there were some problems to obtain reliable measurements of part of the off-site biomass from forestry operation. As a conservative approach, the Project Participant consider to apply the maximum average value obtained during the current monitoring period.

Problems obtain $NCV_{BR,n,y}$ parameter

For the presented monitoring period, there are two gaps in the measurement frequency of the parameter NCVBR,n,y that need to be addressed. The Project Participant measure the following NCVBR,n,y during the following dates of the monitoring period CP2-MP2:

| Biomass type | 1st sem. 2014 | 2nd sem. 2014 | 1st sem. 2015 | 2nd sem. 2015 |
|---|---|---|---|---|
| Sludge | Ok | | Ok | |
| On-site industrial | Ok | | Ok | Ok |
| Off-site industrial | Ok | | Ok | Ok |
| Forestry | Ok | | | Ok |

According to the table above, there is a first gap during the second semester, 2014, from 06/2014 to 12/2014. For year 2015, forestry biomass sample was not measured for the first semester, as well the sludge sample for the second semester. PP applies guidelines in a conservative manner as follows:

Equation 14 to estimate the baseline biomass-based heat generation, page 33, ACM0006/Ver12.1.1:

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

To minimize this term, PP uses the lower value of the $NCV_{BR,n,y}$ 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).

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.

Problems to obtain $CH_4$ emission factor for the combustion of biomass residues in the project plant

During 2015, PP could not obtain the parameter $EF_{CH4,BR}$. Based in methodology ACM0006 ver 12.1.1, PP used the default value in table 4, page 50 for wood waste, 30 (kg $CH_4$/TJ) to the entire year.

### B.2.2. Corrections

Not applicable.

### B.2.3. Changes to start date of crediting period

There has not been any permanent change from registered monitoring plan during the current monitoring period.

### B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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

### B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

None.

### B.2.6. Changes to project design of registered project activity

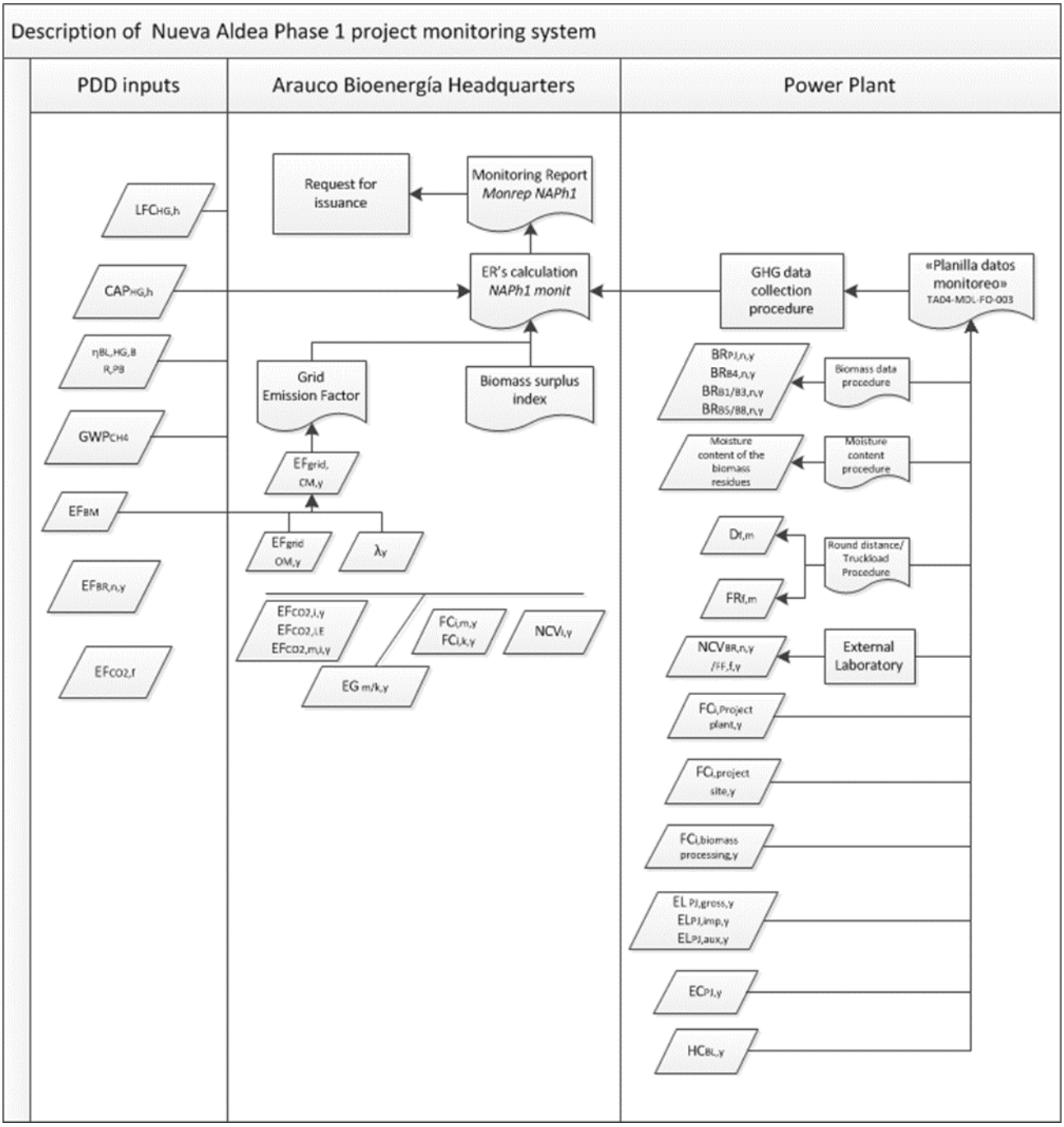
Not applicable.

### B.2.7. 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.



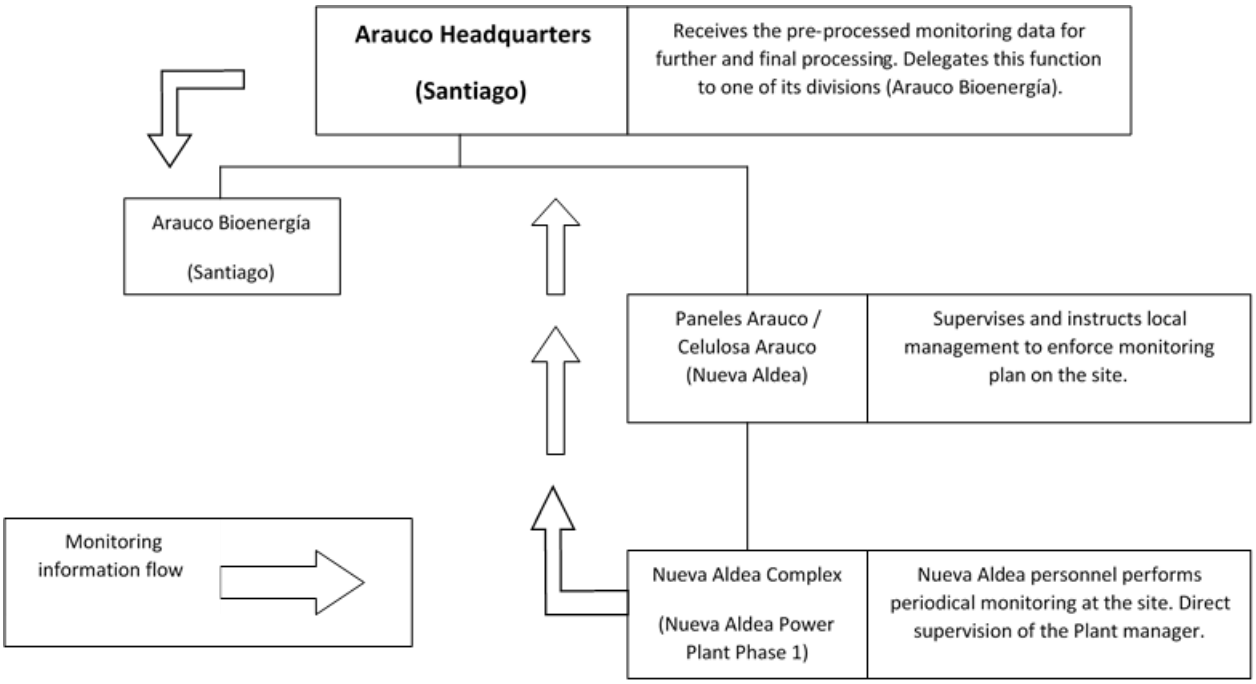

Parameters as $HC_{BL,y}$, $EL_{PJ,gross,y}$, $EL_{PJ,imp,y}$, $EL_{PJ,aux,y}$, $D_{f,m}$, $FC_{project\ plant,y}$, $FC_{project\ site,y}$, $BR_{PJ,n,y}$, $BR_{B4,n,y}$, $BR_{B1/B3,n,y}$ and $BR_{B5/B8,n,y}$ are aggregated in excel files to obtain a monthly value that is reported in the emission reductions 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).

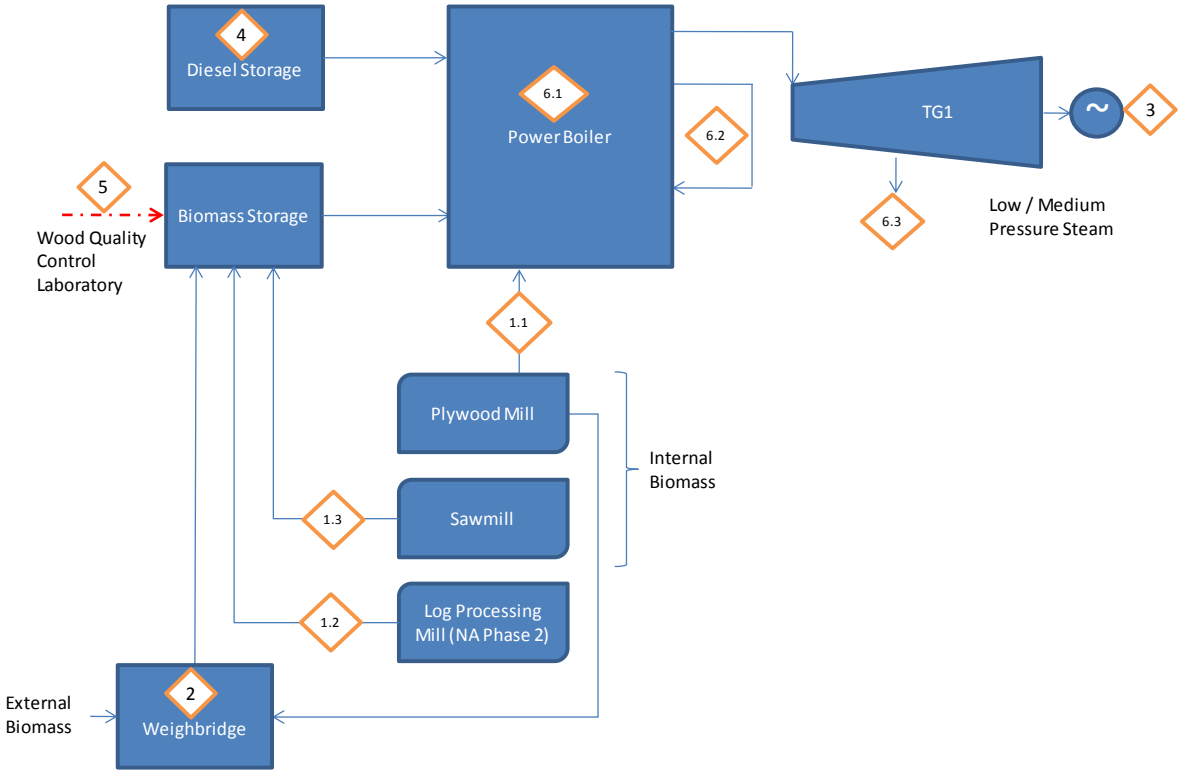
The following table shows the monitoring information flow implemented by Arauco Bioenergía S.A. for the project activity.

**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 Belt scale |
| 1.2 | 531-WI-5518A | Pulp mill bark belt scale |
| 1.3 | 431-FIQ-502 | Log processing bark belt scale |
| 2 | N/A | Weighbridge 1/North entrance |
| | N/A | Weighbridge 2/South entrance |
| | N/A | Weighbridge 3/Truck exit |
| 3 | 468-PM-003 | Energy Meter Switchgear 1-3 |
| | 468-PM-006 | Energy Meter Switchgear 1-6 |
| | 468-PM-008 | Energy Meter Switchgear 1-8 |
| 4 | 461-LT-0460 | Level Transmitter |
| 5 | N/A | Electronic Moisture Analyzer |
| 6.1 | 463-PT-0106 | Pressure Transmiter Feed Water |
| | 463-TT-0110 | Temperature Transmiter Feed Water |
| 6.2 | 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) |
| 6.3 | 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 |

Note:

Internal and external biomass (excluding sander dust, for security reasons) is deposited and mixed in the zone called "Biomass storage". The average residence time of the biomass in the storage is one week.

## 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. Second assessment report (1995), EB 69 (annex 3) and Fourth Assessment Report (2007). |
| Value(s) applied) | 21 for the first commitment period.<br>25 for the second commitment period.<br>Shall be updated according to any future COP/MOP decisions. |
| Choice of data or measurement methods and procedures | |
| Purpose of data | Baseline and project emissions calculations. |
| Additional comments | -- |

| **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). |
| Choice of data or measurement methods and procedures | |
| Purpose of data | -- |
| Additional comments | Refer to registered and revised 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 |
| Choice of data or measurement methods and procedures | 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. |
| Purpose of data | -- |
| Additional comments | -- |

| **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.<br>- Chilean Ministry of Energy reports.<br>- IPCC 2006 guidelines, lower calorific values. |
| Value(s) applied) | 0.695 |
| Choice of data or measurement methods and procedures | The Build Margin (BM) was calculated for the second crediting period and remain fixed for all second and third crediting periods. |
| Purpose of data | Baseline and project emissions calculation. |
| Additional comments | -- |

| **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) | |

| 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 |

| | |
|---|---|
| Choice of data or measurement methods and procedures | |
| Purpose of data | Baseline emissions calculation. |
| Additional comments | The Project Participant would like to note that differences between IPCC Guideline (2006) default values and measurements conducted are mainly due to the compactness level of the biomass residues burned.<br>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.<br>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.<br>(For additional information see Appendix 5 of the registered PDD, page 138, and revised PDD, page 127.)<br>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> |
| Choice of data or measurement methods and procedures | Applicable to Option B of the Tool “Project and leakage emissions from transportation of freight” (Version 01.1.0). |
| Purpose of data | Project emissions calculation from transportation of freight. |
| Additional comments | -- |

### D.2. Data and parameters monitored

| | |
|---|---|
| **Data/parameter:** | **Biomass residues categories and quantities used in the project activity.** |
| 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 | Measured |
| Source of data | On-site measurements. |
| Value(s) of monitored parameter | <table><tr><th>Biomass residues category k</th><th>Biomass residues type</th><th>Biomass residues source</th><th>Biomass residues use in project scenario</th><th>2014 [BDt]</th><th>2015 [BDt]</th></tr><tr><td>1</td><td>Sludge from industrial operations</td><td>Off-site production</td><td>Attributable to heat generation</td><td>11,339</td><td>12,471</td></tr><tr><td>2 and 3</td><td>Mix of sawdust and bark from industrial operations</td><td>On-site production</td><td>Attributable to heat and power generation</td><td>85,767</td><td>94,438</td></tr><tr><td>4</td><td>Mix of sawdust and bark from industrial operations</td><td>Off-site production</td><td>Attributable to power generation</td><td>279,435</td><td>205,927</td></tr><tr><td>5</td><td>Sawdust/bark forestry operations</td><td>Off-site production</td><td>Attributable to power generation</td><td>7,765</td><td>17,332</td></tr></table> |

| | |
|---|---|
| Monitoring equipment | 463-FIQ-174<br>Type: Sander dust Conveyor Belt weight meter KCM/SWB-600<br>Accuracy class: +/- 1%<br>Serial number: 965691<br>Calibration frequency: 6 months<br>Dates of calibration: 13/12/2011-11/11/2015<br>Validity: 10/05/2016<br><br>531-WI-5518A<br>Type: Pulp mill bark Conveyor Belt weight meter KEPRO 2200<br>Accuracy class: +/- 1.5%<br>Serial number: 38711<br>Calibration frequency: Annual<br>Dates of calibration: 05/09/2013-11/12/2014-29/11/2015<br>Validity: 28/11/2016<br><br>431-FIQ-502<br>Type: Log processing bark Conveyor Belt weigh meter BW500<br>Accuracy class: +/- 1%<br>Serial number: PBD/W 1020545PJ<br>Calibration frequency: Annual<br>Dates of calibration: 04/06/2013-13/08/2015-10/11/2015<br>Validity: 03/06/2014<br><br>Type: Weighbridge 1: North entrance Rice Lake IQ+355<br>Accuracy class: Class III (+/- 30 kg).<br>Serial number: 325078<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 2: South entrance JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5429421-5EF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 3: Truck exit JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5437969-5GF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>** 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 appropriate. 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 was determinate adjusting for the corresponding moisture content by each type of biomass.<br><br>Dry biomass (BDt) = Wet biomass (t) x (1 - % moisture)<br><br>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 was given by the total measurement of biomass residues (category 2 and 3) minus the amount of biomass residue category 2 which was 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.<br>The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 67% in 2014 and 87% in 2015 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.<br>The Project Participant carried out a cross check between the combusted biomass and the purchased quantities and stock changes. The differences between them were -6.3% for 2014 and -4.9% for 2015 with a control range of [-30%; 30%].<br>The both indicators were in the defined QA/QC ranges. |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comments: | -- |

| **Data/parameter:** | **For biomass residues categories for which scenarios B1, B2 or B3 is deemed a plausible baseline alternative, project participants shall demonstrate that is a realistic and credible alternative scenario.** |
|---|---|
| Unit | Tonnes on dry-basis (BDt) |
| Description | - Quantity of available biomass residues type n in the region.<br>- Quantity of biomass residues of type n that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region.<br>- Availability of a surplus of biomass residues type n (which cannot be sold or utilized) at the ultimate supplier to the project and a representative sample of other suppliers in the defined geographical region. |
| Measured/calculated/default | Statistics. |
| Source of data | The Project Participant used the first procedure described in the methodology (Refer to ACM0006 Version 12.1.1. page 14) to demonstrate the selection of the baseline scenario B1/B3 for the additional biomass residues attributable to the project activity. |
| Value(s) of monitored parameter | -- |
| Monitoring equipment | -- |
| Measuring/reading/recording frequency: | -- |
| Calculation method (if applicable): | -- |
| QA/QC procedures: | -- |
| Purpose of data: | Leakage emissions calculations. |
| Additional comments: | This parameter was audited during Validation process. |

| **Data/parameter:** | **$BR_{PJ,n,y}$** |
|---|---|
| Unit | Tonnes on dry-basis (BDt) |
| Description | Quantity of Biomass residues of category n used in the project activity in year y (tonnes on dry-basis). |
| Measured/calculated/default | On-site measurements. |
| Source of data | Power Plant's procurement department. The biomass residues quantities used was monitored separately for each type and source of production, as it is shown in registered PDD table, page 100-102, and revised PDD table, page 94-97. |

Value(s) of monitored parameter

| **Biomass residues category k** | **Biomass residues type** | **Biomass residues source** | **Biomass residues use in project scenario** | **2014 [BDt]** | **2015 [BDt]** |
|---|---|---|---|---|---|
| $BR_{PJ,1,y}$ | Sludge from industrial operations | Off-site production | Attributable to heat generation | 11,339 | 12,471 |
| $BR_{PJ,2+3,y}$ | Mix of sawdust and bark from industrial operations | On-site production | Attributable to heat and power generation | 85,767 | 94,438 |
| $BR_{PJ,4,y}$ | Mix of sawdust and bark from industrial operations | Off-site production | Attributable to power generation | 279,435 | 205,927 |
| $BR_{PJ,5,y}$ | Sawdust/bark forestry operations | Off-site production | Attributable to power generation | 7,765 | 17,332 |

| | |
|---|---|
| Monitoring equipment | 463-FIQ-174<br>Type: Sander dust Conveyor Belt weight meter KCM/SWB-600<br>Accuracy class: +/- 1%<br>Serial number: 965691<br>Calibration frequency: 6 months<br>Dates of calibration: 13/12/2011-11/11/2015<br>Validity: 10/05/2016<br><br>531-WI-5518A<br>Type: Pulp mill bark Conveyor Belt weight meter KEPRO 2200<br>Accuracy class: +/- 1.5%<br>Serial number: 38711<br>Calibration frequency: Annual<br>Dates of calibration: 05/09/2013-11/12/2014-29/11/2015<br>Validity: 28/11/2016<br><br>431-FIQ-502<br>Type: Log processing bark Conveyor Belt weigh meter BW500<br>Accuracy class: +/- 1%<br>Serial number: PBD/W 1020545PJ<br>Calibration frequency: Annual<br>Dates of calibration: 04/06/2013-13/08/2015-10/11/2015<br>Validity: 03/06/2014<br><br>Type: Weighbridge 1: North entrance Rice Lake IQ+355<br>Accuracy class: Class III (+/- 30 kg).<br>Serial number: 325078<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 2: South entrance JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5429421-5EF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 3: Truck exit JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5437969-5GF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>** 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 appropriate. 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.<br><br>Dry biomass (BDt) = Wet biomass (t) x (1 - % moisture)<br><br>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 was given by the total measurement of biomass residues (category 2 and 3) minus the amount of biomass residue category 2 which was 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.<br>The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 67% in 2014 and 87% in 2015 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.<br>The Project Participant carried out a cross check between the combusted biomass and the purchased quantities and stock changes. The differences between them were -6.3% for 2014 and -4.9% for 2015 with a control range of [-30%; 30%].<br>The both indicators were in the defined QA/QC ranges. |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comments: | -- |

| | |
|---|---|
| **Data/parameter:** | **$BR_{B4,n,y}$** |
| Unit | Tonnes on dry-basis (BDt) |
| Description | Quantity of Biomass residues of category k used in the project activity in year y for which the baseline scenario is B4 (tonnes on dry-basis). |
| Measured/calculated/default | On-site measurements. |
| Source of data | Power Plant's procurement department. The biomass residues quantities used was monitored separately for each type and source of production, as it is shown in registered PDD table, page 100-102, and revised PDD table, page 97-98. |

Value(s) of monitored parameter

| Biomass residues category k | Biomass residues type | Biomass residues source | Biomass residues in Project scenario | 2014 [BDt] | 2015 [BDt] |
|---|---|---|---|---|---|
| $BR_{B4,1,y}$ | Sludge from industrial operations | Off-site production | Attributable to heat generation | 11,339 | 12,471 |
| $BR_{B4,2,3,y}$ | Mix of Sawdust/bark from industrial operations. | On-site production | Attributable to heat generation. | 85,767 | 91,116 |
| $BR_{B4,4,y}$ | Mix of sawdust/bark from industrial operations | Off-site production | Attributable to heat generation | 106,444 | 5,933 |

| | |
|---|---|
| Monitoring equipment | 463-FIQ-174<br>Type: Sander dust Conveyor Belt weight meter KCM/SWB-600<br>Accuracy class: +/- 1%<br>Serial number: 965691<br>Calibration frequency: 6 months<br>Dates of calibration: 13/12/2011-11/11/2015<br>Validity: 10/05/2016<br><br>531-WI-5518A<br>Type: Pulp mill bark Conveyor Belt weight meter KEPRO 2200<br>Accuracy class: +/- 1.5%<br>Serial number: 38711<br>Calibration frequency: Annual<br>Dates of calibration: 05/09/2013-11/12/2014-29/11/2015<br>Validity: 28/11/2016<br><br>431-FIQ-502<br>Type: Log processing bark Conveyor Belt weigh meter BW500<br>Accuracy class: +/- 1%<br>Serial number: PBD/W 1020545PJ<br>Calibration frequency: Annual<br>Dates of calibration: 04/06/2013-13/08/2015-10/11/2015<br>Validity: 03/06/2014<br><br>Type: Weighbridge 1: North entrance Rice Lake IQ+355<br>Accuracy class: Class III (+/- 30 kg).<br>Serial number: 325078<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 2: South entrance JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5429421-5EF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 3: Truck exit JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5437969-5GF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>** 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 appropriate. Sawdust and bark from on-site industrial operations are measured by weight meters installed in the feed conveyors belt. Sander dust is a highly flammable material and must be transported separately for safety reasons.<br>Biomass residues type of category 2 was determined from heat demanded by the facility process using equation 14 of the ACM0006 Version 12.1.1. |

| | |
|---|---|
| Calculation method (if applicable): | The amount of dry biomass residues is determinate adjusting for the corresponding moisture content by each type of biomass.<br><br>Dry biomass (BDt) = Wet biomass (t) x (1 - % moisture)<br><br>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 was given by the total measurement of biomass residues (category 2 and 3) minus the amount of biomass residue category 2 which was 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.<br>The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 67% in 2014 and 87% in 2015 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.<br>The Project Participant carried out a cross check between the combusted biomass and the purchased quantities and stock changes. The differences between them were -6.3% for 2014 and -4.9% for 2015 with a control range of [-30%; 30%].<br>The both indicators were in the defined QA/QC ranges. |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comments: | -- |

| **Data/parameter:** | **$BR_{B1/B3,n,y}$** |
|---|---|
| Unit | Tonnes on dry-basis (BDt) |
| Description | Quantity of Biomass residues of category n used in the project activity in year y for which the baseline scenario is B1 or B3 (tonnes on dry-basis). |
| Measured/calculated/default | On-site measurements. |
| Source of data | Power Plant's procurement department. The biomass residues quantities used was monitored separately for each type and source of production, as it is shown in current PDD table, page 100-102, and revised PDD table, page 98-99. |

Value(s) of monitored parameter

| **Biomass residues category k** | **Biomass residues type** | **Biomass residues source** | **Biomass residues use in project scenario** | **2014 [BDt]** | **2015 [BDt]** |
|---|---|---|---|---|---|
| $BR_{B1/B3,2,3,y}$ | Sawdust/bark on-site industrial operations. | On-site production | Attributable to power generation. | 0 | 3,322 |
| $BR_{B1/B3,4,y}$ | Sawdust/bark off-site industrial operations | Off-site production | Attributable to power generation | 172,991 | 199,993 |
| $BR_{B1/B3,5,y}$ | Sawdust/bark forestry operations | Off-site production | Attributable to power generation | 7,765 | 17,332 |

| | |
|---|---|
| Monitoring equipment | 531-WI-5518A<br>Type: Pulp mill bark Conveyor Belt weight meter KEPRO 2200<br>Accuracy class: +/- 1.5%<br>Serial number: 38711<br>Calibration frequency: Annual<br>Dates of calibration: 05/09/2013-11/12/2014-29/11/2015<br>Validity: 28/11/2016<br><br>431-FIQ-502<br>Type: Log processing bark Conveyor Belt weigh meter BW500<br>Accuracy class: +/- 1%<br>Serial number: PBD/W 1020545PJ<br>Calibration frequency: Annual<br>Dates of calibration: 04/06/2013-13/08/2015-10/11/2015<br>Validity: 03/06/2014<br><br>Type: Weighbridge 1: North entrance Rice Lake IQ+355<br>Accuracy class: Class III (+/- 30 kg).<br>Serial number: 325078<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 2: South entrance JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5429421-5EF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 3: Truck exit JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5437969-5GF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>** 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 appropriate. The off-site industrial operations biomass is measured in weighbridge at the entrance of Complex Nueva Aldea. |
| Calculation method (if applicable): | The amount of dry biomass residues is determinated adjusting for the corresponding moisture content by each type of biomass.<br><br>Dry biomass (BDt) = Wet biomass (t) x (1 - % moisture)<br><br>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 was given by the total measurement of biomass residues (category 2 and 3) minus the amount of biomass residue category 2 which was 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 annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 67% in 2014 and 87% in 2015 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate. The Project Participant carried out a cross check between the combusted biomass and the purchased quantities and stock changes. The differences between them were -6.3% for 2014 and -4.9% for 2015 with a control range of [-30%; 30%]. |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comments: | -- |

| **Data/parameter:** | **$BR_{B5/B8,n,y}$** |
|---|---|
| Unit | Tonnes on dry-basis (BDt) |
| Description | Quantity of Biomass residues of category n used in the project activity in year y for which the baseline scenario is B5:, B6:, B7 or B8 (tonnes on dry-basis). |
| Measured/calculated/default | On-site measurements. |
| Source of data | Power Plant's procurement department. The biomass residues quantities used was monitored separately for each type and source of production, as it is shown in registered PDD table, page 100-102, and revised PDD table, page 99. |
| Value(s) of monitored parameter | 0 (tonnes)<br>It is not foreseen that these biomass residues type will be used in the project activity in the future. However, the Project Participant included this parameter in the monitoring plan, in case the situation changes in the future. |
| Monitoring equipment | -- |
| Measuring/reading/recording frequency: | Continuously and aggregated as appropriate. |
| Calculation method (if applicable): | -- |
| QA/QC procedures: | -- |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comments: | -- |

| **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 | 2014: 112,200 (BDt)<br>2015: 129,843 (BDt) |

| | |
|---|---|
| Monitoring equipment | Type: Weighbridge 1: North entrance Rice Lake IQ+355<br>Accuracy class: Class III (+/- 30 kg).<br>Serial number: 325078<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 2: South entrance JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5429421-5EF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>Type: Weighbridge 3: Truck exit JAGXTREME<br>Accuracy class: Class III (+/- 30 kg)<br>Serial number: 5437969-5GF<br>Calibration frequency: Biannual**<br>Dates of calibration: 31/07/2013-30/01/2014-18/07/2014-27/01/2015-23/07/2015<br>Validity: As reference 22/01/2016<br><br>** 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 appropriate. |
| Calculation method (if applicable): | Not applicable. |
| QA/QC procedures: | Crosscheck with an energy balance based on purchased quantities and stock changes.<br>The annual energy balance to assure the quality of the biomass measure is consistent with the expected efficiency of the power boiler: 67% in 2014 and 87% in 2015 (compared in a range of 66%-90%). Then the Project Participant can assure that the biomass mix measurement was accurate.<br>The Project Participant carried out a cross check between the combusted biomass and the purchased quantities and stock changes. The differences between them were -6.3% for 2014 and -4.9% for 2015 with a control range of [-30%; 30%].<br>The both indicators were in the defined QA/QC ranges. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | This parameter is applicable to Option B of the "Project and leakage emissions from transportation of freight".<br>Only biomass coming from outside the complex and attributable to the project activity was 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. Road distance were obtained from the Geographic information system ArcGIS 10, based on roads maps and communes locations. Please refer to http://www.vialidad.cl/productosyservicios/paginas/distancias.aspx |

| | |
|---|---|
| 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 | Sludge | 1.62 |

| | |
|---|---|
| Monitoring equipment | Not applicable. |
| Measuring/reading/recording frequency: | Determinate using road maps and update whenever the road distance changes. |
| Calculation method (if applicable): | Not applicable. |
| QA/QC procedures: | -- |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | 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 | ($tCO_2/GJ$) |
| Description | Weight average $CO^2$ emission factor of fuel type i in year y. |
| Measured/calculated/default | Default. |
| Source of data | 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:<br>0.0748 ($tCO_2/GJ$) for Diesel<br>0.0788 ($tCO_2/GJ$) for Fuel Oil<br>0.0656 ($tCO_2/GJ$) for LPG |

| | |
|---|---|
| Monitoring equipment | Not applicable. |
| Measuring/reading/recording frequency: | Annually |
| Calculation method (if applicable): | Not applicable. |
| QA/QC procedures: | Not applicable since a default factor was used in this case. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | -- |

| **Data/parameter:** | **$FC_{i,Project\ plant,y}$** |
|---|---|
| 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)** / **2014** / **2015**<br>**Diesel** / 575.06 / 398.36<br>**LPG** / 0 / 0<br>**Fuel Oil** / 0.101 / 0.122 |
| Monitoring equipment | 461-LT-0460<br>Type: Level transmitter 264HCHRBEFSSA1/E6/L1/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404010868<br>Calibration frequency: 12 months<br>Dates of calibration: 22/08/2013*<br>Validity: 21/08/2014<br>*Gap in calibration frequency applied from 08/2014 to 12/2015<br><br>Type: Propane tank level transmitter ROCHESTER GAUGES 6283-J21-41-J01<br>Serial number: Not Available.<br>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". |
| Measuring/reading/recording frequency: | Continuously. |
| Calculation method (if applicable): | As is mentioned in registered PDD, page 109, and revised PDD, page 102, Project Participant would like to inform the following:<br><br>- Annual verification of calibrations was conducted according to the manufacture recommendations.<br>- 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.<br><br>Measurement of this parameter was performed in accordance with the procedure established hereby:<br><br>Fossil fuel consumption in the Power Boiler:<br><br>Dedicated fuel tank level meter with accuracy of +/- 0.075% was used to monitor Diesel and Fuel Oil consumption.<br><br>Since the instrument (s) used to measure the LPG consumption is property of the LPG´s supplier, all information related to the instrument (s) was managed externally to the plant. |

| | |
|---|---|
| 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 2014 and 2015 are 67% and 87%. Both values are between the defined range [66%-90%].<br>The both indicators were in the defined QA/QC range. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | There exist gaps in calibration frequency for equipment:<br>• 461-LT-0460 between 22/08/2014 and 31/12/2015<br>According VVS version 07, Project Participant applied the maximum permissible error, in a conservative manner, to the measured values taken during the period between the scheduled calibration date and the last calibration date.<br>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)** / **2014** / **2015**<br>**Diesel** / 105.21 / 97.37 |
| Monitoring equipment | Not applicable. |
| Measuring/reading/recording frequency: | Continuously. |
| Calculation method (if applicable): | The Diesel consumption was determined by monitoring the fuel consumption of trucks, diesel-fuelled bulldozers and/or front loaders that transported the biomass to the power boiler biomass feeding lines. |
| 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 12.7 for 2014 and 13.4 for 2015 respectively. Both values are according the quality assurance range: [10.77-18.13 l/h].<br>The Project Participant would like to note that the transportation subcontractors did not inform the purchase fuel invoices to the plant, consequently the former of the QA/QC procedures above described was used to check consistency of measurements obtained. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | 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:** | **$FC_{i,Biomass\ processing,y}$** |
|---|---|
| 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)** / **2014** / **2015**<br>**Diesel** / 137.67 / 138.08 |

| | |
|---|---|
| Monitoring equipment | Not applicable. |
| Measuring/reading/recording frequency: | Continuously. |
| Calculation method (if applicable): | Measurement of this parameter was performed in accordance with the procedure established hereby:<br>Fuel consumption records, from subcontractors that process the biomass residues from forest operations consumed in the project activity.<br>The Project Participant would like to note that the monitored fuel consumption was 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 0.4% and 4.5% for 2014 and 2015 respectively are according the expected difference defined as quality assurance range of [-20%; 20%].<br>The Project Participant would like to note that the transportation subcontractors did not inform the purchase fuel invoices to the plant, consequently the former QA/QC procedure above described was used to cross-check this parameter. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | -- |

| **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 | Measured by supplier. |
| Source of data | Project Participant selected default values from the 2006 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 | Diesel.- 2014: 42.87(GJ/ton) 2015:42.80(GJ/ton)<br>41.7(GJ/ton) for Fuel Oil<br>LPG.- 2014: 46.31 (GJ/ton) 2015: 46.25 (GJ/ton) |
| Monitoring equipment | Not applicable. |
| Measuring/reading/recording frequency: | Continuously. |
| Calculation method (if applicable): | Any future revision of the considered default values should be taken into account. |
| QA/QC procedures: | Not applicable since a default factor was used in this case. |
| Purpose of data: | Project emissions calculations. |
| Additional comments: | The monitoring of this variable applies, since according to the "Tool to calculate projector leakage $CO_2$ emissions from fossil fuel combustion (Version 02)", 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 for year 2014. Default value for 2015 |
| Source of data | On site measurement. |

| | |
|---|---|
| Value(s) of monitored parameter | <table><tr><th>Date</th><th>Combustion of biomass $CH_4$ emission factor 2014 ($tCH_4/GJ$)</th><th>Date</th><th>Combustion of biomass $CH_4$ emission factor 2015 ($tCH_4/GJ$)</th></tr><tr><td>30.03.2012</td><td>0.000000</td><td>-</td><td>-</td></tr><tr><td>28.06.2012</td><td>0.000000</td><td>-</td><td>-</td></tr><tr><td>28.09.2012</td><td>0.000000</td><td>-</td><td>-</td></tr><tr><td>28.12.2012</td><td>0.000000</td><td>-</td><td>-</td></tr></table> |
| 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 was 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 performed with measurements obtained in previous monitoring periods in similar projects:<br><table><tr><th>Year</th><th>Nueva Aldea Biomass Power Plant Phase 1, Ref:0258</th><th>Trupan Biomass Power Plant, Ref:0259</th></tr><tr><td>2015</td><td>-</td><td>-</td></tr><tr><td>2014</td><td>0.000000</td><td>0.000047</td></tr><tr><td>2013</td><td>0.000000</td><td>0.000000</td></tr><tr><td>2012</td><td>0.000000</td><td>0.000000</td></tr><tr><td>2011</td><td>-</td><td>0.000000</td></tr></table><br>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 comments: | 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. As is specified in the baseline methodology, a conservative factor of 1.02 was applied in Project emission from the combustion of biomass residues. A temporary deviation during 2015 was raised during the current monitoring period for $EF_{CH4,BR}$ applying default value provide in ACM0006 ver12.1.1, Table 4, page 50. |

| **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 was reviewed annually. |
| QA/QC procedures: | -- |
| Purpose of data: | Leakage emissions calculations. |
| Additional comments: | Note that this parameter is required for a period in which leakage for a biomass type i, could not be ruled out, otherwise, it is 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 | 2014: 1,824,774 (GJ)<br>2015: 1,622,426 (GJ) |
| Monitoring equipment | 462-FT-9150<br>Type: Steam flow meter 5.5 bar (Deaerator) ABB<br>264DSGSSB2A3/V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404006181<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015<br><br>463-FT-0402<br>Type: Steam flow meter 85 bar (Soot blower) ABB<br>264DSHSSB2A3/V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6403015454<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015<br><br>463-PT-0106<br>Type: Pressure Transmitter Feed water ABB<br>264PSSSSB2A3V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6403015456<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015<br><br>463-PT-0403<br>Type: Pressure Transmitter 85 bar (Soot blower) ABB<br>264PSQSSB2A3V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6403015460<br>Calibration frequency: 18 months<br>Date of calibration: 21/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>* Gap from 21/02/2015 to 30/06/2015<br><br>463-TT-0110<br>Type: Temperature Transmitter Feed water Rosemount<br>3244MVF1NAA01B4C2C4Q4<br>Accuracy class: +/- 0.10 °C<br>Serial number: 458205<br>Calibration frequency: 5 years<br>Date of calibration: 23/08/2013-30/06/2015<br>Validity: 29/06/2020 |

| | |
|---|---|
| | 463-TT-0406<br>Type: Temperature Transmitter 85 bar (Soot blower) Rosemount 3244MVF1NAA01B4C2C4Q4<br>Accuracy class: +/- 0.10 °C<br>Serial number: 458156<br>Calibration frequency: 5 years<br>Date of calibration: 22/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-FT-9019<br>Type: Steam flow meter 5.5 bar (AASA) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2<br>Accuracy class: +/- 0.025%<br>Serial number: 34310<br>Calibration frequency: 5 years<br>Date of last calibration: 23/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-FT-9023<br>Type: Steam flow meter 5.5 bar (Boiler) Rosemount 3051SFADS180ZCHPS52T1000<br>Accuracy class: +/- 0.025%<br>Serial number: 24439<br>Calibration frequency: 5 years<br>Date of calibration: 23/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-FT-9025<br>Type: Steam flow meter 11.5 bar (AASA) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2<br>Accuracy class: +/- 0.025%<br>Serial number: 8808<br>Calibration frequency: 5 years<br>Date of calibration: 22/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-FT-9027<br>Type: Steam flow meter 19 bar (Plywood mill) Rosemount 3051SFADS120DCHPS2T100072AF1A2G2Q4F2<br>Accuracy class: +/- 0.025%<br>Serial number: 8809<br>Calibration frequency: 5 years<br>Date of calibration: 22/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-PIT-9000-A<br>Type: Pressure Transmitter 19 bar (Main line) ABB 264PSQSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404008677<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015 |

| | |
|---|---|
| | 465-PIT-9000-B<br>Type: Pressure Transmitter 19 bar (Main line) ABB<br>264PSQSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404008676<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015<br><br>465-PIT-9001-A<br>Type: Pressure Transmitter 11.5 bar (Main line) ABB<br>264PSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404008680<br>Calibration frequency: 18 months<br>Date of calibration: 21/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 21/02/2015 to 30/06/2015<br><br>465-PIT-9001-B<br>Type: Pressure Transmitter 11.5 bar (Main line) ABB<br>264PSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404008679<br>Calibration frequency: 18 months<br>Date of calibration: 22/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 21/02/2015 to 30/06/2015<br><br>465-PIT-9002-A<br>Type: Pressure Transmitter 5.5 bar (Main line) ABB<br>264PSPSSB2A1/V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6408023636<br>Calibration frequency: 18 months<br>Date of calibration:<br>Validity:<br><br>465-PIT-9002-B<br>Type: Pressure Transmitter 5.5 bar (Main line) ABB<br>264PSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404027440<br>Calibration frequency: 18 months<br>Date of calibration: 22/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 22/02/2015 to 30/06/2015<br><br>465-PIT-9002-C<br>Type: Pressure Transmitter 5.5 bar (Main line) ABB<br>264PSPSSB2A3/V1/L1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6404008681<br>Calibration frequency: 18 months<br>Date of calibration: 20/08/2013*-30/06/2015<br>Validity: 29/12/2016<br>*Gap from 20/02/2015 to 30/06/2015 |

| | |
|---|---|
| | 465-TT-9024<br>Type: Temperature Transmitter 5.5 bar Rosemount<br>3244MVF1NAA01B4C2C4Q4<br>Accuracy class: +/- 0.10 °C<br>Serial number: 456395<br>Calibration frequency: 5 years<br>Date of calibration: 22/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-TT-9026<br>Type: Temperature Transmitter 11.5 bar Rosemount<br>3244MVF1NAA01B4C2C4Q4<br>Accuracy class: +/- 0.10 °C<br>Serial number: 456304<br>Calibration frequency: 5 years<br>Date of calibration: 21/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>465-TT-9028<br>Type: Temperature Transmitter 19 bar Rosemount<br>3244MVF1NAA01B4C2C4Q4<br>Accuracy class: +/- 0.10 °C<br>Serial number: 456397<br>Calibration frequency: 5 years<br>Date of calibration: 22/08/2013-30/06/2015<br>Validity: 29/06/2020<br><br>565-FT-0965<br>Type: Steam flow meter 19 bar (Pulp mill) ABB<br>264DSMSSA2A3/V1/B2/I2/N6/C1<br>Accuracy class: +/- 0.075%<br>Serial number: 6406022860<br>Calibration frequency: 18 months<br>Date of calibration: 22/08/2013*<br>Validity: 21/02/2015<br>**Gap from 21/02/2015 to 31/12/2015 |
| Measuring/reading/recording frequency: | This parameter was monitored continuously and aggregated monthly, to calculate the emission reductions. |
| Calculation method (if applicable): | This parameter was 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.<br>The respective enthalpies was 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.<br>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: | All meters received properly calibration and maintenance according the frequencies recommended by suppliers.<br>An internal control indicator is calculated monthly: Heat quantity per Combusted biomass quantity, with a control range of [1.5-3.7] Steam ton/biomass ton.<br>The obtained indicators were 1.95 for 2014 and 2.27 for 2015. Both results were in the accepted control range. |
| Purpose of data: | Baseline and project emissions calculations. |

| | |
|---|---|
| Additional comments: | In detail above, it was identified gaps in calibration frequency for equipment. According VVS version 07, Project Participant applied the maximum permissible error, in a conservative manner, to the measured values taken during the period for what the gap affected the related parameter. In this equipment affected are related to enthalpy used to calculate parameter $HC_{BL,y}$, then correction is applied monthly. |

| **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 | 2014: 202,064 (MWh)<br>2015: 197,064 (MWh) |
| Monitoring equipment | 468-PM-008<br>Type: Energy Meter Switchgear (1-8) Power Measurement ION 7330 V277 C/ETH<br>Accuracy class: +/- 0.3%<br>Serial number: PB-1210A067-11<br>Calibration frequency: 7 years<br>Date of last calibration: 05/10/2012<br>Validity: 04/10/2019 |
| 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.<br>The consistency of metered electricity generation was crosschecked with receipts from electricity sales and purchases from the grid.<br>In this case, $EL_{PJ,gross,y}$ must be cross checked against the imports and exports to the grid. It was considered the following equation:<br><br>$EL_{PJ,gross,y} + EL_{PJ,imp,y} - EL_{PJ,aux,y} - EL_{int,y} = EL_{surplus,y}$<br><br>*Where:*<br>$EL_{PJ,gross,y}$ *is the Gross electricity energy generated by Power plant in year y.*<br>$EL_{PJ,imp,y}$ *is the electricity energy purchased from the grid in year y*<br>$EL_{PJ,aux,y}$ *is the electricity energy consumed by the Power plant (Own consumption).*<br>$EL_{int,y}$ *is the internal electricity energy consumed in Nueva Aldea complex.*<br>$EL_{surplus,y}$ *is the available electricity energy to sale to the grid.*<br>Then $EL_{surplus,y}$ had to be similar to the value registered in the electricity sale invoice<br>Considering the loss of energy in transmission line, this difference is considering acceptable and in the defined control range of [-10%;10%]. |
| Purpose of data: | Baseline emissions calculations. |
| Additional comments: | Is important to highlight that from May 2013, due to an administrative change, Nueva Aldea complex unified the electricity importation invoices of the entire complex and started to emit only one importation invoice. To complement the invoices information PP includes monthly electricity balances provided by Arauco Bioenergia commercial area, which included the transfers of electricity within the complex Nueva Aldea. |

| Data / Parameter: | $EL_{PJ,imp,y}$ |
|---|---|
| Unit: | (MWh) |
| Description: | Project electricity imports from the grid 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: | 2014: 4,562 (MWh)<br>2015: 6,297 (MWh) |
| Monitoring equipment: | 468-PM-003<br>Type: Energy Meter Switchgear (1-6 ) Power Measurement ION 7330 V277 C/ETH<br>Accuracy class: +/- 0.3%<br>Serial number: PB-1210A504-11<br>Calibration frequency: 7 years<br>Date of last calibration: 01/11/2012<br>Validity: 31/10/2019 |
| 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.<br>The consistency of metered electricity generation was crosschecked with receipts from electricity sales and purchases from the grid with an acceptable range defined as [-10%;10%]. |
| Purpose of data: | Baseline and project emissions calculations. |
| Additional comment: | Is important to highlight that from May 2013, due to an administrative change, Nueva Aldea complex unified the electricity importation invoices of the entire complex and started to emit only one importation invoice. To complement the invoices information PP includes monthly electricity balances provided by Arauco Bioenergia commercial area, which included the transfers of electricity within the complex Nueva Aldea. |

| 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) |
| 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: 56,018 (MWh)<br>2013: 56,788 (MWh) |

| | |
|---|---|
| Monitoring equipment: | 468-PM-006<br>Type: Energy Meter Switchgear (1-6 ) Power Measurement ION 7330 V277 C/ETH<br>Accuracy class: +/- 0.3%<br>Serial number: PB-1210A467-11<br>Calibration frequency: 7 years<br>Date of last calibration: 31/10/2012<br>Validity: 30/10/2019 |
| 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. During the validity control check both equipment approve all the measurements validations. |
| Purpose of data: | Baseline emissions calculations. |
| Additional comment: | Is important to highlight that from May 2013, due to an administrative change, Nueva Aldea complex unified the electricity importation invoices of the entire complex and started to emit only one importation invoice. To complement the invoices information PP includes monthly electricity balances provided by Arauco Bioenergia commercial area, which included the transfers of electricity within the complex Nueva Aldea. |

| **Data / Parameter:** | **$NCV_{BR,n,y}$** |
|---|---|
| Unit: | (GJ/t of dry-basis) |
| Description: | Net calorific value of biomass residues of category n in year y (GJ/tonnes of dry-basis). |
| Measured/ Calculated / Default: | Measured. |
| Source of data: | Third party Laboratory. |
| Value(s) of monitored parameter: | |

| **$NCV_{BR,n,y}$ (GJ/t)** | **2014** | |
|---|---|---|
| | **1st semester** | **2nd semester** |
| Sludge from industrial operations. | 13.43 | - |
| Sawdust/bark on-site industrial operations. | 19.36 | - |
| Sawdust/bark off-site industrial operations. | 12.76 | - |
| Sawdust/bark forestry operations. | 19.05 | - |

| **$NCV_{BR,n,y}$ (GJ/t)** | **2015** | |
|---|---|---|
| | **1st semester** | **2nd semester** |
| Sludge from industrial operations. | 14.49 | - |
| Sawdust/bark on-site industrial operations. | 18.64 | 18.56 |
| Sawdust/bark off-site industrial operations. | 16.57 | 15.79 |
| Sawdust/bark forestry operations. | - | 18.78 |

*During 2nd semester moisture content samples were not conducted. The values applied in the emission reduction calculation were adjusted according section B.2.1 on this MR.

<table>
<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>In registered and revised PDD, QA/QC described to check consistency of measurements by comparing results with measurements from previous years or relevant data sources. In this case, due to the update of methodology, historical data corresponded to the mix of biomass NCV, then, to compare the obtained results PP considered the results of 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>$NCV_{2014}$</td><td>$NCV_{2015}$</td><td>$NCV_{2013}$</td><td>$NCV_{2014}$</td></tr>
<tr><td>Biomass from Industrial operations (on-site)</td><td>19.36</td><td>18.60</td><td rowspan="2">18.40</td><td rowspan="2">18.61</td></tr>
<tr><td>Biomass from Industrial operations (off-site)</td><td>12.76</td><td>16.18</td></tr>
<tr><td>Biomass from forestry operations</td><td>19.05</td><td>18.78</td><td>17.35</td><td>18.06</td></tr>
<tr><td>Sludge</td><td>13.43</td><td>14.49</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>
<tr><td>Purpose of data:</td><td>Baseline and project emissions calculations.</td></tr>
<tr><td>Additional comment:</td><td>Due to differences in the monitoring frequency according the defined in registered and revised PDD, PP applied a temporary deviation to this parameter, described in section B.2.1.</td></tr>
</table>

<table>
<tr><td>Data / Parameter:</td><td>Moisture content of the biomass residues</td></tr>
<tr><td>Unit:</td><td>% Water content in mass basis in wet biomass residues.</td></tr>
<tr><td>Description:</td><td>Moisture content of each biomass residues type k.</td></tr>
<tr><td>Measured/ Calculated / Default:</td><td>Measured.</td></tr>
<tr><td>Source of data:</td><td>On-site measurements.</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>
<table>
<tr><th>Moisture content (%)</th><th>2014</th><th>2015</th></tr>
<tr><td>Sludge from industrial operations.</td><td>76.9%</td><td>76.8%</td></tr>
<tr><td>Sawdust/bark on-site industrial operations.</td><td>47.3%</td><td>49.3%</td></tr>
<tr><td>Sawdust/bark off-site industrial operations.</td><td>52.0%</td><td>52.1%</td></tr>
<tr><td>Sawdust/bark forestry operations.</td><td>42.5%</td><td>52.9%</td></tr>
</table>
</td></tr>
</table>

| | |
|---|---|
| Monitoring equipment: | Electronic moisture analyser Mettler Toledo HB43-S<br>Accuracy class: Class I/+/-0.001 gr.<br>Serial number: B235265966<br>Calibration frequency: Annual<br>Date of last calibration: 31/12/2013*-21/07/2015<br>Validity: 20/07/2016<br>*Gap from 01/01/2015 to 20/07/2015 |
| Measuring/ Reading/ Recording frequency: | This variable is daily monitored, obtaining a monthly average value and a representative annual average. |
| Calculation method (if applicable): | The moisture content was monitored for each batch of biomass residues category and the weight average was calculated for each monitoring period and used in the emission reduction calculations. |
| QA/QC procedures: | -- |
| 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.<br>- Chilean Ministry of Energy reports.<br>- IPCC 2006 guideline lower values. |
| Value(s) of monitored parameter: | 2014: 0.704 ($tCO_2$/MWh)<br>2015: 0.711 ($tCO_2$/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 and project 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.<br>- Chilean Ministry of Energy reports.<br>- IPCC 2006 guideline lower values. |
| Value(s) of monitored parameter: | 2014: 0.729 ($tCO_2$/MWh)<br>2015: 0.758 ($tCO_2$/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 and project 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 2013 provided by the National Energy Commission (CNE). |

| | |
|---|---|
| Value(s) of monitored parameter: | Coal: 27.8 (GJ/ton)<br>Petcoke: 27.8 (GJ/ton)<br>Diesel: 43.3 (GJ/ton)<br>Natural Gas: 35.2 (GJ/1000 $m^3$)<br>IFO 180: 41.8 (GJ/ton)<br>Butane Gas: 45.6 (GJ/ton)<br>Propane Gas: 45.6 (GJ/ton)<br>Liquid Natural gas (after regasification): 35.2 (GJ/1000 $m^3$) |
| Monitoring equipment: | Not applicable. |
| Measuring/ Reading/ Recording frequency: | Annually. |
| Calculation method (if applicable): | -- |
| QA/QC procedures: | -- |
| Purpose of data: | Baseline emissions calculations. |
| Additional comment: | It is not clear if the values used in the National Energy Balance 2012 are gross or net calorific value. As is indicated in IPCC 2006 Guideline (Volume 2, Chapter 1, page 1-16), the difference between NCV and GCV is the latent heat of vaporisation of the water produced during combustion of the fuel. As a consequence for coal and oil, the NCV is about 5 percent less than the GCV for most forms of natural and manufactured gas, the NCV is about 10 percent less.<br>To be conservative, PP suppose that the values are gross calorific values and applied a factor according IPCC 2006 guideline. 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 default values indicated in IPCC 2006 Guideline (Volume 2, Chapter 1, page 1-16). |
| Value(s) of monitored parameter: | Coal: 0.0928 ($tCO_2/GJ$)<br>Petcoke: 0.0829 ($tCO_2/GJ$)<br>Diesel: 0.0726 ($tCO_2/GJ$)<br>Natural Gas: 0.0543 ($tCO_2/GJ$)<br>IFO 180: 0.0755 ($tCO_2/GJ$)<br>Butane Gas: 0.0616 ($tCO_2/GJ$)<br>Propane Gas: 0.0616 ($tCO_2/GJ$)<br>Liquid Natural Gas (After regasification): 0.0543 ($tCO_2/GJ$) |
| 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. - In emission reduction calculation spreadsheet (Version 1), sheet "Summary" the final result of Baseline and Project activity emissions (rows 46 and 47) are truncated and rounded in a conservative way.
3. - 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). |
| $EF_{EG,GR,y}$ | 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:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Gross quantity of electricity generated. | $EL_{PJ,gross,y}$ | 202,064 (MWh) | 197,938 (MWh) |
| (2) Project electricity imports from the grid. | $EL_{PJ,imp,y}$ | 4,562 (MWh) | 6,297 (MWh) |
| (3) Total auxiliary electricity consumption required for the operation of the power plant. | $EL_{PJ,aux,y}$ | 43,162 (MWh) | 43,932 (MWh) |
| (4) Auxiliary electricity consumption due to biomass transportation from log-merchandizer and plywood. | | 12,856 (MWh) | 12,856 (MWh) |

Calculations:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| (5) Baseline electricity generation capacity in year y. | $EL_{BL,y}$ | (1)+(2)-[(3)-(4)] | 150,608 (MWh) | 147,446 (MWh) |

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

The parameter $EF_{EG,GR,y}$ 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 2014 and 2015.

The Project Participant used data from 2014 and 2015 to determine the lambda factor that expresses the percentage of the time when low-cost/must-run sources were on the margin:

$$\lambda_y = \lambda_{2014/2015} = 0.0000$$

The rest of the parameters used to calculate the $EF_{EG,GR,y}$ for 2014 and 2015 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 2014 and 2015:

$$\sum_{i,j} F_{i,j,2014} . COEF_{i,j} = 16{,}552{,}152\ (tCO_2/y)$$

$$\sum_{i,j} F_{i,j,2015} . COEF_{i,j} = 17{,}752{,}776\ (tCO_2/y)$$

- The total power generation in the SIC by non-low-cost/must-run power sources in 2014 and 2015:

$$\sum_{j} GEN_{J,2014} = 22{,}699{,}977 (Mwh/y)$$

$$\sum_{j} GEN_{J,2015} = 23{,}405{,}444 (Mwh/y)$$

- The $CO_2$ emissions of low-cost/must run power sources in 2014 and 2015. 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:

$$\sum_{i,k} F_{i,k,2014} . COEF_{i,k} = 466{,}627\ (tCO_2/y)$$

$$\sum_{i,k} F_{i,k,2015}.COEF_{i,k} = 440{,}090\ (tCO_2/y)$$

- Total power generation in the SIC by low-cost/must-run resources for 2014 and 2015:

$$\sum_{j} GEN_{J,2014} = 28{,}082{,}121\ (Mwh/y)$$

$$\sum_{j} GEN_{J,2015} = 29{,}581{,}772\ (Mwh/y)$$

Replacing the above values in the equation used to calculate the $EF_{electricity,y}$ for year 2014 and 2015, the operating margin results:

$$EF_{OM,2014} = (1 - 0.0000).\frac{16{,}552{,}152}{22{,}699{,}977}(tCO_2/Mwh) + 0.0000.\frac{466{,}627}{28{,}082{,}121}(tCO_2/Mwh)$$

$$EF_{OM,2014} = EF_{OM,simple\ adjusted,2014} = 0.729(tCO_2/Mwh)$$

$$EF_{OM,2015} = (1 - 0.0000).\frac{17{,}752{,}776}{23{,}405{,}444}(tCO_2/Mwh) + 0.0000.\frac{440{,}090}{29{,}581{,}772}(tCO_2/Mwh)$$

$$EF_{OM,2015} = EF_{OM,simple\ adjusted,2015} = 0.758(tCO_2/Mwh)$$

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 2014 and 2015. The results obtained were the following:

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Operating Margin (OM). | $EF_{grid,OM,y}$ | 0.729 ($tCO_2$/MWh) | 0.758 ($tCO_2$/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:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| (5) Combined Margin calculation (CM). | $EF_{grid,CM,y}$ | (1)*(3)+(2)*(4) | 0.704 ($tCO_2$/MWh) | 0.711 ($tCO_2$/MWh) |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Baseline electricity generation. | $EL_{BLy}$ | 150,608 (MWh) | 147,446 (MWh) |
| (2) Baseline electricity generation capacity. | $CAP_{EG,total,y}$ | 0 (MWh) | 0 (MWh) |

Calculations:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| (3) Minimum baseline electricity generation in the grid | $EL_{BL,GR,y}$ | Max[0,(1)-(2)] | 150,608 (MWh) | 147,446 (MWh) |

Then:

| | | 2014 | 2015 |
|---|---|---|---|
| **Baseline emissions due to minimum grid electricity displacement.** | **$EL_{BLGR,y}$*$EF_{EG,GR}$** | **105,992 ($tCO_2$)** | **104,848 ($tCO_2$)** |

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 registered an revised PDD.

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Baseline biomass-based heat generation of the power boiler in year y (without fossil fuel). | $HG_{PJ,BR,y}$ | 1,824,774 (GJ) | 1,622,426 (GJ) |
| Biomass-based heat generation per category (GJ) | | | |
| (2) Biomass residues (sludge) from off-site industrial operations, heat generation.* | | 93,233 (GJ) | 102,517 (GJ) |
| (3) Biomass residues (mix of sawdust and bark) from on-site industrial operations, heat generation. | | 970,938 (GJ) | 1,440,252 (GJ) |

*According equation 14 of ACM0006 (Version 12.1.1)

Calculations:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| (4) Biomass residues (sludge) from off-site industrial operations, heat generation. | $BR_{B4,1,y}$ | | 11,339 (BDt) | 12,471 (BDt) |
| (5) Biomass residues (mix of sawdust and bark) from on-site industrial operations, heat generation. | $BR_{B4,2,y}$ | | 85,767 (BDt) | 91,116 (BDt) |
| Biomass-based heat generation | | [(4)+(5)] | 97,106 (BDt) | 103,587 (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 2014** | **(1)+(2)+(3)** | **180,757 (BDt)** | |
|---|---|---|---|
| | | 01/14-06/14 | 07/14-12/14 |
| (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. | $BR_{PJ,4,y}$ | 148,686 (BDt) | 24,305 (BDt) |
| (3) Biomass residues (mix of sawdust and bark) from forestry operations, electricity generation. | $BR_{PJ,5,y}$ | 1,468 (BDt) | 6,297 (BDt) |
| (4) NCV of biomass residues (mix if sawdust and bark from on-site industrial op. | $NCV_{BR,3,y}$ | 19.36 (Kg/TJ) | 7.90 (Kg/TJ) |
| (5) NCV of biomass residues (mix if sawdust and bark from off-site industrial op. | $NCV_{BR,4,y}$ | 12.76 (Kg/TJ) | 7.90 (Kg/TJ) |
| (6) NCV of biomass residues (mix if sawdust and bark from forestry op. | $NCV_{BR,5,y}$ | 19.05 (Kg/TJ) | 7.90 (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 | | 25 | 25 |

| **Biomass attributable to Project Activity 2015** | **(1)+(2)+(3)** | 220,647 | |
|---|---|---|---|
| | | 01/15-06/15 | 07/15-10/15 |
| (1) Biomass residues (mix of sawdust and bark) from on-site industrial operations, electricity generation. | $BR_{PJ,3,y}$ | 3,322 (BDt) | 0 (BDt) |
| (2) Biomass residues (mix of sawdust and bark) from off-site industrial operations, electricity generation. | $BR_{PJ,4,y}$ | 89,432 (BDt) | 110,561 (BDt) |
| (3) Biomass residues (mix of sawdust and bark) from forestry operations, electricity generation. | $BR_{PJ,5,y}$ | 6,878 (BDt) | 10,454 (BDt) |
| (4) NCV of biomass residues (mix if sawdust and bark from on-site industrial op. | $NCV_{BR,3,y}$ | 18.64 (Kg/TJ) | 18.56 (Kg/TJ) |
| (5) NCV of biomass residues (mix if sawdust and bark from off-site industrial op. | $NCV_{BR,4,y}$ | 16.57 (Kg/TJ) | 15.79 (Kg/TJ) |
| (6) NCV of biomass residues (mix if sawdust and bark from forestry op. | $NCV_{BR,5,y}$ | 7.9 (Kg/TJ) | 18.78 (Kg/TJ) |
| (7) Adjusted $CH_4$ factor for uncontrolled burning, biomass residues (mix of sawdust and bark) from industrial | $EF_{BR,3,y}$ $EF_{BR,4,y}$ | 874.20 (GJ/ton) | 874.20 (GJ/ton) |

| | | | |
|---|---|---|---|
| operations. | | | |
| (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. | | 25 | 25 |

Calculations:

| | | 2014 | 2015 |
|---|---|---|---|
| (10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,3,y}$). | [(1)*(4)*(7)*(9)]/1000000 | 0 ($tCO_2$) | 1,353 ($tCO_2$) |
| (10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,4,y}$). | [(2)*(5)*(7)*(9)]/1000000 | 45,651 ($tCO_2$) | 70,557 ($tCO_2$) |
| (10) Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues ($BR_{B1/B3,5,y}$). | [(3)*(6)*(8)*(9)]/1000000 | 182 ($tCO_2$) | 586 ($tCO_2$) |

Total Baseline emissions

| | | | 2014 | 2015 |
|---|---|---|---|---|
| Baseline emissions due to minimum grid electricity displacement. | $EL_{BL,GR,y}$*$EF_{EG,GR}$ | ($tCO_2$) | 105,992 | 104,848 |
| Baseline emissions due to aerobic decay or uncontrolled burning of biomass residues. | $\Sigma$ $BR_{B1/B3,i}$ | ($tCO_2$) | 45,832 | 72,496 |
| TOTAL BASELINE EMISSIONS. | | ($tCO_2eq$) | 151,823 | 177,343 |

## 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 ($tCO_2/kg$).

a) Fossil Fuel consumption in the power boiler

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Diesel used in the power boiler due to operational reasons. | $FC_{diesel,poject\ plant,y}$ | 575 (t/y) | 398 (t/y) |
| (2) Diesel net calorific value. | $NCV_{FF,diesel,y}$ | 42.87 (GJ/t) | 42.80 (GJ/t) |
| (3) Diesel $CO_2$ emission factor. | $EF_{FF,y,diesel}$ | 0.0748 ($tCO_2/GJ$) | 0.0748 ($tCO_2/GJ$) |

| | | 2014 | 2015 |
|---|---|---|---|
| (4) LPG used in the power boiler due to operational reasons. | $FC_{LPG,poject\ plant,y}$ | 0.10 (t/y) | 0.12 (t/y) |
| (5) LPG net calorific value. | $NCV_{FF,LPG,y}$ | 46.31 (GJ/t) | 46.25 (GJ/t) |
| (6) LPG $CO_2$ emission factor. | $EF_{FF,y,LPG}$ | 0.0656 ($tCO_2/GJ$) | 0.0656 ($tCO_2/GJ$) |

Calculations:

| | | 2014 | 2015 |
|---|---|---|---|
| **(4) Emissions due to fossil fuel consumption in the power boiler.** | **(1)*(2)*(3)+(4)*(5)*(6)** | **1,844 ($tCO_2/y$)** | **1,276 ($tCO_2/y$)** |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Fossil fuel used for on-site biomass transportation due to the project activity. | $FC_{diesel,poject\ site,y}$ | 105 (t/y) | 97 (t/y) |
| (2) Fossil fuel net calorific value. | $NCV_{FF,diesel,y}$ | 42.87 (GJ/t) | 42.80 (GJ/t) |
| (3) Fossil fuel $CO_2$ emission factor. | $EF_{FF,y,diesel}$ | 0.0748 ($tCO_2/GJ$) | 0.0748 (tCO2/GJ) |

Calculations:

| | | 2014 | 2015 |
|---|---|---|---|
| **(4) Emissions due to fossil fuel consumption for on-site transportation.** | **(1)*(2)*(3)** | **337 ($tCO_2/y$)** | **312 ($tCO_2/y$)** |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Fossil fuel used for processing biomass from forestry operations. | $FC_{diesel,biomass\ processing,y}$ | 138 (t/y) | 138 (t/y) |
| (2) Fossil fuel net calorific value. | $NCV_{FF,diesel,y}$ | 42.87 (GJ/t) | 42.80 (GJ/t) |
| (3) Fossil fuel $CO_2$ emission factor. | $EF_{FF,y,diesel}$ | 0.0748 ($tCO_2$/GJ) | 0.0748 (tCO2/GJ) |

Calculations:

| | | 2014 | 2015 |
|---|---|---|---|
| (4) Emissions due to fossil fuel consumption for processing forestry biomass residues. | (1)*(2)*(3) | 441 ($tCO_2$/y) | 442 ($tCO_2$/y) |

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

| | | 2014 | 2015 |
|---|---|---|---|
| Emissions due to fossil fuel consumption in the power boiler. | $FC_{diesel,poject\ site,y}$ | 1,844 ($tCO_2$/y) | 1,276 ($tCO_2$/y) |
| Emissions due to fossil fuel consumption for on-site transportation | $FC_{diesel,poject\ site,y}$ | 337 ($tCO_2$/y) | 312 ($tCO_2$/y) |
| Emissions due to fossil fuel consumption for processing forestry biomass residues. | $FC_{diesel,biomass\ processing,y}$ | 441 ($tCO_2$/y) | 442 ($tCO_2$/y) |
| **Total emissions.** | **$PE_{FF,y}$** | **2,623 ($tCO_2$/y)** | **2,030 ($tCO_2$/y)** |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Project electricity imports from the grid. | $EL_{PJ,imp,y}$ | 4,562 (MWh) | 6,297 (MWh) |
| (2) Grid emission factor. | $EF_{EG,GR,y}$ | 0,704 ($tCO_2$/MWh) | 0,711 ($tCO_2$/MWh) |

Calculations:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| Total emissions. | (1)*(2) | $PE_{GR1,y}$ | 3,211 ($tCO_2$/y) | 4,477 ($tCO_2$/y) |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Total mass of freight transported in freight transportation activity f. | $FR_{f,m}$ : [(3)+(4)] | 112,200 (BDt/y) | 129,843 (BDt/y) |
| (2) Weight average calculation. | $\Sigma[D_{f,m}*FR_{f,m}]$ | 5,084,984 | 6,749,766 |
| (3) Default $CO_2$ emission factor for freight transportation activity f. | $EF_{CO2}$ | 129 | 129 |

Calculations:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| Total emissions. | [(7)*(8)]/$10^6$ | $PE_{TR,y}$ | 652 ($tCO_2$/y) | 871 ($tCO_2$/y) |

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

Data:

| | | 2014 | 2015 |
|---|---|---|---|
| (1) Biomass residues (sludge) from off-site industrial operations, heat generation. | $BR_{PJ,1,y}$ | 11,339 (BDt/y) | 12,471 (BDt/y) |
| (2) Biomass residues (sawdust and bark) from off-site industrial operations, heat generation. | $BR_{PJ,2.y}$+$BR_{PJ,3,y}$ | 85,767 (BDt/y) | 91,116 (BDt/y) |
| (3) Biomass residues (mix of sawdust and bark) from on-site industrial operations, electricity generation. | $BR_{PJ,3,y}$ | 0 (BDt/y) | 3,322 (BDt/y) |
| (4) Biomass residues (sawdust and bark) from off-site industrial operations, electricity generation. | $BR_{PJ,4,y}$ | 172,991 (BDt/y) | 199,993 (BDt/y) |
| (5) Biomass residues (mix of sawdust and bark) from forestry operation, electricity generation. | $BR_{PJ,5,y}$ | 7,765 (BDt/y) | 17,332 (BDt/y) |
| (6) Net calorific value of biomass residues (sludge) from off-site industrial ops.* | $NCV_{BR,1,y}$ | 9.67 (GJ/t) | 10.20 (GJ/t) |
| (7) Net calorific value of biomass residues (sawdust and bark) from on-site industrial ops.* | $NCV_{BR,2,y}$ | 13.63 (GJ/t) | 18.60 (GJ/t) |
| (8) Net calorific value of biomass residues (mix of sawdust and bark) from on-site industrial op.* | $NCV_{BR,3,y}$ | 13.63 (GJ/t) | 18.60 (GJ/t) |
| (9) Net calorific value of biomass residues (mix of sawdust and bark) from off-site industrial op.* | $NCV_{BR,4,y}$ | 10.33 (GJ/t) | 16.18 (GJ/t) |
| (10) Net calorific value of biomass residues (mix of sawdust and bark) from forestry op.* | $NCV_{BR,5,y}$ | 10.33 (GJ/t) | 9.39 (GJ/t) |
| (11) Adjusted $CH_4$ emission factor for controlled burning, biomass residues. | $EF_{CH4,BR}$ | 0.00 ($kgCH_4$/TJ) | 41.1 ($KgCH_4$/TJ) |
| (12) Conservativeness factor. | | 1.37 | 1.37 |
| (13) $CH_4$ Global Warming Potential. | GWP | 25 | 25 |

* 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:

| | | | 2014 | 2015 |
|---|---|---|---|---|
| Total emissions. | [(1)*(6)+(2)*(7)+(3)*(8)+(4)*(9)+(5*(10)] *[(11)*(12)*(13)] | $PE_{BR,y}$ | 0 ($tCO_2$/y) | 5,600 ($tCO_2$/y) |

Total project emissions

| **Project emission sources.** | | **2014** | **2015** |
|---|---|---|---|
| Emissions due to fossil fuel consumption at the project site. | $PE_{FF,y}$ | 2,623 ($tCO_2$eq) | 2,030 ($tCO_2$eq) |
| Emissions due to grid electricity imports to the project site. | $PE_{GR1,y}$ | 3,211 ($tCO_2$eq) | 4,477 ($tCO_2$eq) |
| Emissions due to transport of the biomass residues to the project plant. | $PE_{TR,y}$ | 652 ($tCO_2$eq) | 871 ($tCO_2$eq) |
| Emissions from the combustion of biomass residues. | $PE_{BR,y}$ | 0 ($tCO_2$eq) | 5,600 ($tCO_2$eq) |
| **Total project activity emissions (*).** | **$PE_y$** | **6,487 ($tCO_2$eq)** | **12,978 ($tCO_2$eq)** |

(*) 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 up. Exact values can be viewed directly in emission reduction calculation spreadsheet

### 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 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, and revised PDD, page 93, 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 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 $CO_2e$) | GHG emission reductions or net GHG removals by sinks (t $CO_2e$) achieved in the monitoring period | | |
|---|---|---|---|---|---|---|
| | | | | Up to 31/12/2012 | From 01/01/2013 | Total amount |
| **Total** | 329,166 | 19,465 | 0 | | 309,701 | 309,701 |

## E.5. Comparison of actual emission reductions or net 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 $CO_2e$) | 402,331 | 309,701 |

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

The emission reductions for the monitoring period were 309,701 CERs. This amount is 23% lower than the emission reductions of 402,331 CERs estimated in revised PDD. This last difference can be explained by the following reasons:

1. Temporary deviations applied to internal biomass, external biomass, adjustment to the biomass $NCV_{BR,n,y}$ and $EF_{CH4,BR}$
2. Conservative adjustment due to gaps in calibration frequencies in measurements of parameters $FC_{i,project\ plant,y}$ , Moisture content and $HC_{BL,y}$ of the biomass residues explained in section D.2.

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

# Appendix 1. Contact information of project participants and responsible persons/entities

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☒ Person/entity responsible for completing the CDM-MR-FORM |
| **Organization name** | Celulosa Arauco y Constitucion S.A. |
| **Street/P.O. Box** | El Golf 150 |
| **Building** | -- |
| **City** | Santiago |
| **State/region** | Region Metropolitana |
| **Postcode** | |
| **Country** | Chile |
| **Telephone** | 56-2-2462 7000 |
| **Fax** | 56-2-2462 7003 |
| **E-mail** | christian.rodriguez@arauco.cl |
| **Website** | www.arauco.cl |
| **Contact person** | Christian Rodriguez |
| **Title** | Head of climate change |
| **Salutation** | Mr. |
| **Last name** | Rodriguez |
| **Middle name** | |
| **First name** | Christian |
| **Department** | |
| **Mobile** | 56-9-6832 3737 |
| **Direct fax** | 56-2-2462 3857 |
| **Direct tel.** | 56-2-2462 3888 |
| **Personal e-mail** | christian.rodriguez@arauco.cl |

- - - - -

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to:<br>• Include provisions related to delayed submission of a monitoring plan;<br>• Provisions related to the Host Party;<br>• Remove reference to programme of activities;<br>• Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to:<br>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));<br>• Include provisions related to standardized baselines;<br>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;<br>• Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*;<br>• Editorial improvement. |
| 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 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