MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 01 - 19/08/2011

Trupan Biomass Power Plant in Chile
UNFCCC 0259
Monitoring Period #5: 01/01/2010 - 30/04/2010

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

The project activity consists in a new 30 MW biomass cogeneration power plant located inside of the Trupan MDF wood panel complex by Arauco: the Trupan Industrial Complex. The Project is designed to use own and third party biomass for electric power generation that would have otherwise been left in piles to natural decay. Approximately 50% of the generated power is destined to serve the internal needs of the Trupan complex, while the remaining 50% is sold mainly in the spot market and to some direct customers of Arauco Bioenergía[1].

The Project is presented by Celulosa Arauco y Constitución S.A. (from now on, Arauco) a leading forestry and pulp-producing company in South America; but the project itself was realized by Paneles Arauco S.A. (Trupan), an MDF / wood panel board producing company in Chile, subsidiary of Arauco.

The new Power Plant was part of the expansion project of the Trupan wood panel mill (Trupan Line Nº 2). Before implementing this project activity, Trupan had steam generation capacity but no electric power generation capacity, so the Complex sourced all its electric power requirements from the grid[2]. However, when the Trupan management evaluated the expansion project, it considered the surplus of biomass available in the region, the environmental benefits associated to the use of a higher-end technology, the possibilities offered by the Kyoto Protocol and decided to build a new on-site biomass Power Plant. This new power plant had enough capacity not only to fulfill the power needs of the Trupan complex, but also to generate a considerable amount of surplus power to the grid.

From a technical perspective, this decision involved installing a high-pressure boiler and a steam turbine, which meant going clearly beyond the common practice of the Panel board Industry in Chile. Given that installing a high-pressure boiler and a condensing turbogenerator implied a higher operational complexity and a higher cost than the more conventional solution (e.g. a saturated-steam boiler with no power generation), the decision of building the Trupan power plant project relied on the possibility of not depending on the SIC grid for electric power, on selling surplus power to the grid and on the benefits from being a CDM project activity.

The proposed project activity assists Chile's sustainable growth by providing electricity to the Trupan Complex and to the SIC through biomass power generation. Without the Trupan Power Plant, not only there would have been no clean energy injection to the SIC, but the Trupan Complex itself would have had to continue sourcing its electric power requirements from the grid. In addition, this Project accomplishes an additional greenhouse (GHG) reduction benefit derived from a reduced disposal or uncontrolled burning of biomass, which results into significantly lower methane emissions[3].

The Project Participant believes 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 Trupan project activity helps to enhance the development of renewable

[1] Arauco Bioenergía S.A. is a subsidiary of Arauco and provides administration services in the power generation business area. During year 2010, Arauco Generación S.A. changed its name to Arauco Bioenergía S.A.

[2] The Trupan Complex had an energy contract with Endesa S.A., one of the largest power companies in Chile.

[3] All the biomass attributable to the project activity is brought from third parties.

energy sources in Chile, in particular the use of biomass generated as a by-product of the forestry industry, which has a significant potential in the country. The proposed project is a good example of demonstrating the viability of electricity generation as a source of revenue not only to the Wood Panel industry, but also to all forest-related industries. It is worthy to highlight, however, that none of the wood panel mills in Chile (and very few in the world) have power generation capacity, making the Trupan Power Plant facility quite unique and particular in its type.

Relevant dates for the project activity:

Date	Key events
2001	Construction start date
January 2002	Commissioning start date
01/05/2003 to 30/09/2006	The 1st monitored period
01/10/2006 to 30/09/2007	The 2nd monitored period
01/10/2007 to 30/09/2008	The 3rd monitored period
01/10/2008 to 31/12/2009	The 4th monitored period
01/01/2010 to 30/04/2010	The 5th monitored period (this report)

Total net emission reductions claimed in the 5th monitored period (from January 1st 2010 to April 30st 2010) are **48,709 tCO_2e.**

A.2. Project Participants

Name of Party involved	Private and / or public entity(ies) Project Participants (*) (as applicable)	Party involved considered as Project Participant
Chile (Host)	Celulosa Arauco y Constitución S.A.	No
United Kingdom	Inversiones Celco SL	No
Switzerland	Cantor Fitzgerald Europe	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

A.3. Location of the project activity:

The Project is located in Chile in the Trupan Industrial Complex site, located 8 km north from Yungay. Yungay is located in the Ñuble Province, in the Bío-Bío Region (VIII Region), about 120 km south east from the Region's Capital city, Concepción. The Bío-Bío Region can be directly accessed from Santiago through the 5 Sur or Panamericana Sur highway. The project site is centered at the geographical coordinates 37° 9'53"S and 72° 4'3"W.

A.4. Technical description of the project

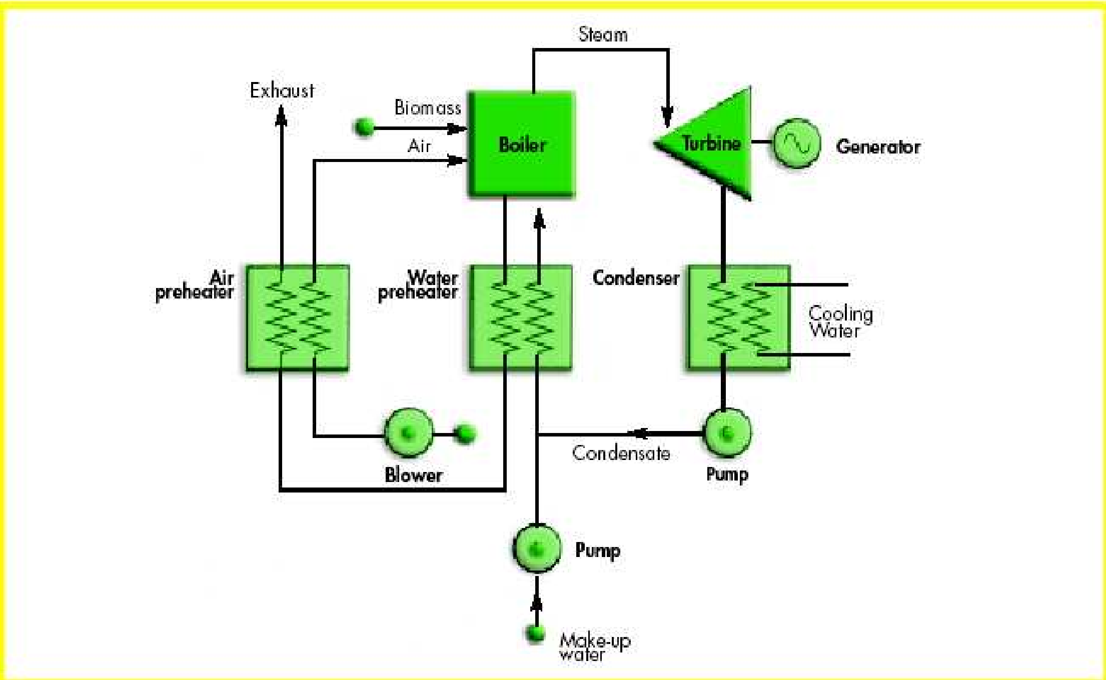
The technology used in this project (which is also the predominant technology everywhere in the world today) for generating megawatt (MW) levels of electricity from biomass is the steam-Rankine cycle, which consists of direct combustion of biomass in a boiler to generate steam, which is then expanded through a turbine. The steam-Rankine technology is a mature technology, having been introduced into commercial use about 100 years ago. Most steam cycle plants are located at industrial sites, where the

waste heat from the steam turbine is recovered and used for meeting industrial-process heat needs. 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 in some cases to recover heat from flue gases to preheat combustion air, and a deaerator must be used 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, wherein steam expands to a pressure that is still substantially above ambient pressure. It leaves the turbine still as a vapor and is sent to satisfy industrial heating needs, where it condenses back to water. It is then partially or fully returned to the boiler. Alternatively, if process steam demands can be met using only a portion of the available steam, a condensing extraction steam turbine (CEST) might be used. This design includes the capability for some steam to be extracted at one or more points along the expansion path for meeting process needs (Figure 1). 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 the backpressure turbine. The non-extracted steam is converted back to liquid water in a condenser that utilizes ambient air and/or a cold water source as the coolant.

Figure 1: Schematic diagram of a biomass-fired steam-Rankine cycle for cogeneration using a condensing-extraction steam turbine.



Source: Williams & Larson, 1993 apud Kartha & Larson, 2000, p. 101.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

Arauco developed the baseline and monitoring methodology originally proposed for the Trupan Power Plant project activity, the NM0081. Though the Executive Board approved this methodology, a new and broader methodology was developed, which was approved and published by the CDM Executive Board. This methodology resulted from a consolidation of the existing approved methodologies for grid-connected biomass CDM project activities, including the one developed by Arauco. This consolidated methodology is the one applied for the Trupan project activity. The name of the baseline methodology applied to the project activity is:

"Consolidated baseline methodology for grid-connected electricity generation from biomass residues", ACM0006. (Version 01)

Applied baseline scenario for the project activity: Nº 3.

The project activity also relies on the following methodology:

"Consolidated baseline methodology for grid-connected electricity generation from renewable sources", ACM0002 (Version 06):

A.6. Registration date of the project activity:

The project was validated by DNV and registered in June 06, 2006. The Project Design Document, validation report, request for registration and registration approval are available on the UNFCCC website: http://cdm.unfccc.int/Projects/registered.html

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

Starting date of the first crediting period:	01/05/2003
End date of the first crediting period:	30/04/2010
Length of the first crediting period:	Seven (7) years
Maximum length of the crediting period:	3 x Seven (7) years

A.8. Name of responsible person(s)/entity(ies):

Organization:	CELULOSA ARAUCO Y CONSTITUCIÓN S.A.
Street/P.O.Box:	El Golf 150
Building:	--
City:	Santiago
State/Region:	Región Metropolitana
Postfix/ZIP:	
Country:	Chile
Telephone:	56-2- 462 7000
FAX:	56-2-462 7003
E-Mail:	cpatrickson@arauco.cl
URL:	www.arauco.cl

Represented by:	
Title:	Development Manager of Arauco Bioenergía S.A.
Salutation:	Mr.
Last Name:	Patrickson
Middle Name:	Albert
First Name:	Christian
Department:	
Mobile:	56-9158 3483
Direct FAX:	56-2-4623857
Direct tel:	56-2-4623795
Personal E-Mail:	cpatrickson@arauco.cl

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

The project activity has been completed as planned and described in the Project Design Document (PDD). The starting date of the operation of the project activity was 01/05/2003 and it has operated as described in the CDM PDD.

Description of the plant operation during the 5th monitoring period (Jan 01, 2010 – Apr 30, 2010)

An earthquake with an intensity of 8.8° in the Righter scale occurred at 03:34 am, on February 27th of 2010 affecting the central zone and part of the south zone of the country including the project site. As a result, the Trupan Complex shut down its operations. The Plant confronted the emergency adequately, and after a short time (46 days), the operation was restored to normal again.

The following table shows the shut down/stoppages of the project activity due to regular maintenance program during the monitoring period, and also the plant stop caused by the earthquake.

Out of service day	Starting day	Number of hours shut down/stopagges	Comments
27/02/2010	03/04/2010	1104.2	Shutdown

No events or situations occurred during the monitoring period, which may impact the applicability of the baseline methodology.

B.2. Revision of the monitoring plan

The monitoring plan was revised, and approved by the EB in 17/08/2008. It must be noted that the monitoring plan was revised because the Project Participant determined the additional biomass (for electricity generation) by using a specific consumption factor (m^3st of biomass/MWh) calculated directly from the energy / mass balance of the project plan. Since this was not in accordance with the baseline methodology, the EB instructed the Project Participant to change the monitoring plan so as to use equation 24 of the ACM0006 Version 01 to determine the additional biomass used by the project plant.

B.3. Request for deviation applied to this monitoring period

There has not been any request for deviation applied to this monitoring period.

B.4. Notification or request of approval of changes

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

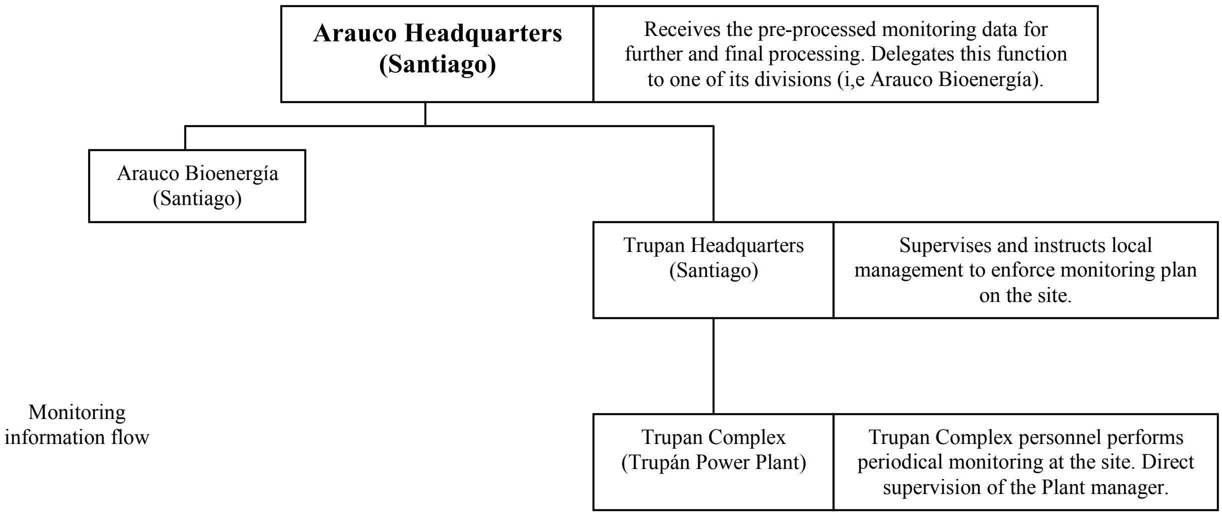
SECTION C. Description of the monitoring system

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.

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. The information is partially processed and stored on-site, and is sent to Arauco Bioenergía in Santiago for further and final processing (table formats, reports, etc.). With the information at this level, Arauco is in condition to verify the emission reduction of the Trupan Biomass Project Plant project activity periodically (i.e. once every year).

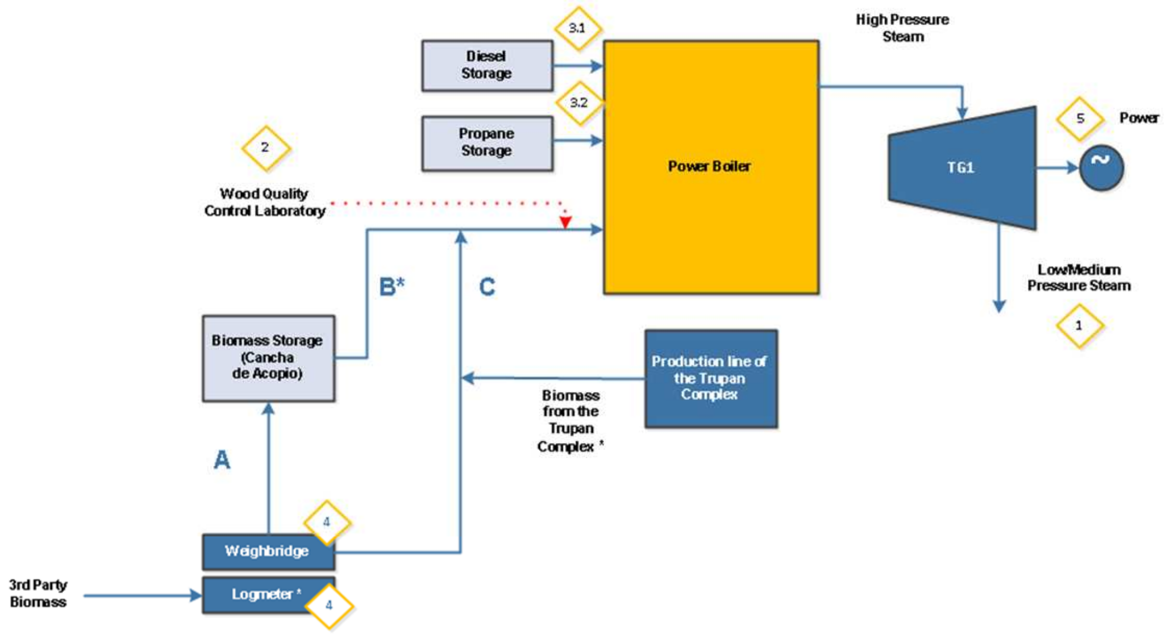
The following table shows the monitoring information flow implemented by Arauco Bioenergía for the project activity.

Monitoring information flow of Trupan 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.

This diagram shows all relevant monitoring points:



(*) Volumetric measurement points

	INSTRUMENT	ID Number	METER LOCATION
1	Steam pressure flowmeter Line 4.5 BAR	Q_y	100 FT-037
	Steam pressure flowmeter Line 15 BAR	Q_y	100 FT-036
	Steam pressure flowmeter Line 15 BAR AASA-HB	Q_y	100 FT- 039
	Steam pressure flowmeter Line 15 BAR AASA	Q_y	100 FT-054
	Steam pressure flowmeter Line 23 BAR	Q_y	110 FT-035
	Steam pressure flowmeter Line 36 BAR	Q_y	100 FT-038
	Deaerator steam pressure flowmeter 4,5 BAR	Q_y	100 FT-040
	Temperature transmitter Line 4,5 BAR	Q_y	110 TT-006
	Pressure transmitter Line 4,5 BAR	Q_y	110 PT-133
	Temperature transmitter Line 15 BAR	Q_y	110 TT-025
	Pressure transmitter Line 15 BAR	Q_y	110 PT-127
	Temperature transmitter Line 36 BAR	Q_y	110 TT-023
	Pressure transmitter Line 36 BAR	Q_y	110 PT-022
	Temperature transmitter Line 23 BAR	Q_y	110 TT-024
	Pressure transmitter Line 23 BAR	Q_y	110 PT-014

	INSTRUMENT	ID Number	METER LOCATION
2	Laboratory Oven	Biomass Moisture	397HCA001
	Backup Laboratory Oven	Biomass Moisture	397HCA002
	Laboratory scale	Biomass Moisture	397BAL001
	Wood control Laboratory scale	Biomass Moisture	397BAL002
3.1	Fossil fuel tank level transmitter 30M3	$FF_{project\ plant,\ i,y}$	100LT423
	Fossil fuel tank level transmitter160M3	$FF_{project\ plant,\ i,y}$	100LT422
3.2	Propane tank level transmiter*	$FF_{project\ plant,\ i,y}$	100FT165
4	Weighbridge South gate trucks	$BF_{i,y}$, TL_y	412ROM002
	Weighbridge North gate trucks	$BF_{i,y}$, TL_y	412ROM001
	3D laser measurement system for wood loads Logmeter 3000	$BF_{i,y}$	412LM001
5	Power plant own consumption Energy meter 52-11	$EG_{project\ plant,\ y}$	174REP5211
	Gross energy generation Electric meter	$EG_{project\ plant,\ y}$	174REP5214

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
Data / Parameter:	ε_{boiler}
Data unit:	%
Description:	Boiler energy efficiency in the absence of the project activity.
Source of data used:	This is the energy efficiency of the boiler that would be used in the absence of the project activity. This parameter is used in equation 24 of the ACM0006 (Version 01). The efficiency of the boiler that would have been installed in the absence of the project activity is 85%. This efficiency value was determined based on the efficiency calculation of a real low-pressure boiler installed in one of the Arauco industrial facilities. The efficiency was calculated in accordance with the ASME PTC 4.1 standard and was further validated by an expert opinion from a highly reputed consulting company, in the field of heat and power generation.
Value(s) :	85%
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	CH_4 emission factor for uncontrolled burning of biomass.
Data unit:	Kg CH_4/TJ
Description:	CH_4 emission factor for uncontrolled burning of biomass.
Source of data used:	According to the baseline methodology ACM0006 (Version 01), page 33, the Project Participant may undertake measurements or use referenced default values to calculate the CH_4 baseline emissions from uncontrolled burning of biomass. Given that by the time the PDD was written there were no local measurements available, the validator indicated the Project Participant to use the IPCC default factor corrected by the lowest conservativeness factor (Table Nº4, page 34 of the ACM0006 Version 01). This generated extremely conservative CH_4 baseline emissions for the project activity, since when the biomass residues are burned in piles in the open air, the combustion occurs under very low oxygen presence conditions and therefore is very inefficient. Inefficient combustion leads to high CH_4 emissions. As a result, the Project Participant explicitly mentioned in page 67 of the registered PDD and in page A39 of the validation report that a local CH_4 measurement would be attempted in the future in order to have a more accurate and fair estimation of the baseline emissions from this source. During September 2006, the Project Participant hired the U.S. Forest Service of Missoula, USA to conduct a local measurement of the CH_4 emission factor for uncontrolled burning of biomass in the nearby area of the Power Plant. The result of this measurement indicated a CH_4 emission factor for uncontrolled burning of the same type of biomass used in the Trupan Power Plant of 740.5 (Kg CH_4/TJ), with an associated standard deviation of 162.2 (Kg CH_4/TJ). According to

	Table 4 of the ACM0006 (Version 01) baseline methodology, this led to a conservativeness factor of 0.94[4], resulting in an adjusted CH_4 baseline emission factor for uncontrolled burning of biomass of 696.1 (Kg CH_4/TJ). The CH_4 emission factor was measured again during March 2009, during summer time in the vicinity of the plant. The result of this measurement indicated a CH_4 emission factor for uncontrolled burning of 930 (Kg CH_4/TJ), with an associated standard deviation of 173 (Kg CH_4/TJ). Considering that the 2009 measurement was carried out under very conservative conditions (summer season, when the biomass residues are drier), the lower methane emissions factor used for the emission reduction calculation in this case is certainly conservative.
Value(s) :	696.1 (Kg CH_4/TJ).
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations.
Additional comment:	--

Data / Parameter:	EF_{CH4}
Data unit:	(Kg CH_4/TJ)
Description:	Methane emission factor for combustion of biomass in the project plant.
Source of data used:	The Project Participant chose the default emission factor for controlled burning of biomass residues provided by the ACM0006 (Version 01). The reasons for which the 1.02 conservativeness factor was chosen can be found in page N° 58, section E.11 of the registered PDD. For further details about this emission factor see the “Additional data” section of this Monitoring Report.
Value(s) :	15 (Kg CH_4/TJ) (unadjusted factor). 15.3 (Kg CH_4/TJ), considering a conservativeness factor of 1.02.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Additional comment:	--

[4] A 95% confidence interval was calculated to determine the corresponding uncertainty range for the sample mean.

D.2. Data and parameters monitored	
Data / Parameter:	$BF_{i,y}$
Data unit:	Bone dry tonnes
Description:	Quantity of biomass type i combusted in the project plant.
Measured /Calculated /Default:	Measured.
Source of data:	Biomass residues transported to the power plant by trucks are duly measured (weight and volume) at the entrance of the power plant. Biomass residues generated internally are also measured (weight and volume) using containers of known (measured) volumetric capacity.
Value(s) of monitored parameter:	66,672 BDt
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions and project emissions calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	412ROM001 Type: Weightbridge. TRANSCELL TECHNOLOGY INC. TI-500 E Accuracy class: +/- 10 kg Serial number: 419008021557 Calibration frequency: 8 months Calibration Dates:09/2009 – 02/2010 – 03/2010 Date of last calibration: 08/2010 Validity: 04/2011 412ROM002 Type: Weightbridge. TRANSCELL TECHNOLOGY INC. TI-500 E Accuracy class: +/- 10 kg Serial number: 419008019239 Calibration frequency: 8 months Calibration Dates:09/2009 – 02/2010 – 03/2010 Date of last calibration: 08/2010 Validity: 04/2011 412LM001 Type: 3D laser measurement system for wood loads. WOODTECH LOG3000 Accuracy class: +/-1% Serial number: N/A Calibration frequency: 6 months Calibration Dates:09/2009 – 02/2010 – 03/2010 Date of last calibration: 09/2010 Validity: 03/2011
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	All instruments involved in the measurement of biomass flows received maintenance and calibration according to the manufacturer's manual and / or proper industry standards. Since the Trupan plant (as well as most of Arauco subsidiaries) uses the SAP systems, there are periodic and continuous consistency checks between the information that is loaded in SAP and the receipts from all suppliers including biomass. This is necessary not only to ensure the accuracy of the

	information used to calculate the Trupan net emission reductions, but also to ensure the good quality of the information used for accounting and tax-reporting purposes. This further ensures the good quality of the information used to calculate the emission reductions of the Trupan project. In addition to the above, the Project Participant carried out energy balances on a periodic basis as a consistency crosschecking measure. All biomass values were consistent with the efficiency of the power plant. The Project Participant also crosschecked the measurements through stock variations (i.e. topographic variations) and purchases, which was found to be consistent.

Data / Parameter:	NCV_i
Data unit:	GJ/ton
Description:	Net calorific value of biomass fuel type i.
Measured /Calculated /Default:	Measured
Source of data:	The net calorific value of the biomass residues used in the power plant is measured in reputed external laboratories and according to proper industry standards.
Value(s) of monitored parameter:	17.86 (GJ/ton)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	This variable is monitored once a year.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	During the monitored period, the NCV of the biomass per type combusted in the Power Boiler was measured each year, presenting minimum differences from one year to another. Comparisons with corresponding IPCC default values also validated and confirmed the measured values.

Data / Parameter:	AVD_y
Data unit:	(km)
Description:	Average return trip distance between biomass fuel supply sites and the project site.
Measured /Calculated /Default:	Measured.
Source of data:	Distances from biomass suppliers to the Plant were continuously monitored and recorded.
Value(s) of monitored parameter:	130 (km)
Indicate what the data are used for (Baseline/ Project/	Project emission calculations.

Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	This variable is reported on a monthly basis for the calculation of the project activity emission reductions.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Since the location of each biomass supplier is known (i.e. 100% of the biomass comes from permanent type sawmills in the nearby area), distances were obtained from the transportation subcontractors and verified with regional roadmaps.

Data / Parameter:	TL_y
Data unit:	(ton/truck)
Description:	Average truck load of the trucks used for transportation of biomass.
Measured /Calculated /Default:	Measured.
Source of data:	Truck loads from transport subcontractors were continuously monitored and recorded by the Procurement Department of the Trupan Complex.
Value(s) of monitored parameter:	16.3 (ton/truck)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	412ROM001 Type: Weightbridge. TRANSCELL TECHNOLOGY INC. TI-500 E Accuracy class: +/- 10 kg Serial number: 419008021557 Calibration frequency: 8 months Calibration Dates:09/2009 – 02/2010 – 03/2010 Date of last calibration: 08/2010 Validity: 04/2011 412ROM002 Type: Weightbridge. TRANSCELL TECHNOLOGY INC. TI-500 E Accuracy class: +/- 10 kg Serial number: 419008019239 Calibration frequency: 8 months Calibration Dates:09/2009 – 02/2010 – 03/2010 Date of last calibration: 08/2010 Validity: 04/2011
Measuring/ Reading/ Recording frequency:	This variable is reported on a monthly basis for the calculation of the emission reductions.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Trucks that transport the biomass are all of known (recorded) sizes. This variable was obtained from measured data (weight and volume of the cargo). Electronic weighbridges in which the measurements were performed receive periodic calibration and maintenance.

Data / Parameter:	$EF_{km,CO2}$
Data unit:	($kgCO_2$/km)
Description:	Average CO_2 emission factor for transportation of biomass with trucks.
Measured /Calculated /Default:	Calculated.
Source of data:	Average fuel consumption was obtained from the transportation subcontractors, which was then used to calculate the corresponding CO_2 emission factor. For net calorific values and CO_2 emission factors: reliable national default values or, if not available, (country-specific) IPCC default values.
Value(s) of monitored parameter:	1.116 ($kgCO_2$/km)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	$EF_{km,diesel}$= NCV_{diesel} *Carbon content of diesel* Fraction of carbon oxidized* CO_2 / C conversion factor * Diesel Fuel density /Average fuel performance of trucks.
QA/QC procedures applied:	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.

Data / Parameter:	$F_{Trans,i,y}$ (in the PDD, this variable appears as $OF_{i,y}$)
Data unit:	(l) of diesel.
Description:	Fuel consumption of fuel type i used for transportation of biomass.
Measured /Calculated /Default:	Measured.
Source of data:	This variable is obtained from the transportation subcontractors.
Value(s) of monitored parameter:	43,653 (l) of diesel.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	This variable is monitored continuously.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Fuel meters received periodic maintenance and calibration and the consistency of metered fuel consumption was checked with purchase dispatch bills.

	Front loaders fuel consumption was crosschecked against hourly fuel consumption rates.

Data / Parameter:	$COEF_{CO2,i}$
Data unit:	(tCO_2/ton)
Description:	CO_2 emission factor for the fuel type i.
Measured /Calculated /Default:	Calculated.
Source of data:	These emission factors were determined using the net calorific values, carbon content and fraction of carbon oxidized of the corresponding fossil fuels.
Value(s) of monitored parameter:	Diesel: 3.176 (tCO_2/ton) LPG: 2.920 (tCO_2/ton)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Anually.
Calculation method (if applicable):	$COEF_{CO2,diesel}$= NCV_{diesel} *Carbon content of diesel* Fraction of carbon oxidized* CO_2 / C conversion factor. $COEF_{CO2,fuel\ oil}$ = $NCV_{fuel\ oil}$ *Carbon content of fuel oil * Fraction of carbon oxidized* CO_2 / C conversion factor.
QA/QC procedures applied:	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.

Data / Parameter:	$FF_{project\ plant,i,y}$ (in the PDD, this variable appears as FF_y)
Data unit:	(l)
Description:	On-site fossil fuel consumption of fuel type i for co-firing in the project plant.
Measured /Calculated /Default:	Measured.
Source of data:	Fossil fuel consumption in the power boiler is measured by dedicated meters. Note that only the fossil fuel attributed to the project activity is reported here.
Value(s) of monitored parameter:	Diesel consumption: 16,593 (l). LPG consumption: 279 (l).
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	100LT422 Type: Fossil fuel tank level transmitter160M3. YOKOGAWA EJA 110A EHS4B-22NC/D4 Accuracy class: +/- 0.065% of span Serial number: 27D217975 405 Calibration frequency: 18 months Date of last calibration: 12/2009

	Validity: 06/2011 100LT423 Type: Fossil fuel tank level transmitter 30M3. YOKOGAWA EJA 110A EHS4B-22NC/D4 Accuracy class: +/- 0.065% of span Serial number: 27D217977 405 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100FT165 Type: Propane tank level transmitter ROCHESTER GAUGES 6283-J21-41-J01 Serial number: Not Available. Calibration: Though this instrument does not belong to the Project Participant, it is property of the propane supplier, calibrations must be done in order to cumply with the chilean law "Reglamento de servicio de gas de red"
Measuring/ Reading/ Recording frequency:	This variable is continuously monitored.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Fuel meters received periodic maintenance and calibration and the consistency of metered fuel consumption was checked with purchase dispatch bills.

Data / Parameter:	$EG_{project\ plant,y}$
Data unit:	(GWh)
Description:	Net quantity of electricity generated in the project plant during the year y.
Measured /Calculated /Default:	Measured.
Source of data:	The electricity generated by the project plant is continuously measured using dedicated meters.
Value(s) of monitored parameter:	52.0 (GWh)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	174REP5214 Type: Gross energy generation Electric meter GENERAL ELECTRIC MULTILIN G60-G03-HCH-F8L-H6N-M8N-P5C-UXX-WXX Accuracy class: +/-2% of reading. Serial number: AALC07000369 Calibration frequency: 3 years Date of last calibration: 12/2009 Validity: 12/2012 174REP5211 Type: Power plant own consumption Energy meter 52-11SEG CSP2-F5CCPWE Accuracy class: <3% of Pn Serial number: 80140044-018 Calibration frequency: 2 years

	Date of last calibration: 12/2009 Validity: 12/2011
Measuring/ Reading/ Recording frequency:	This variable is continuously monitored.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Electricity meters received periodic maintenance and calibration as per instructed by the equipment manufacturer. In addition, the Trupan administration performed periodic (monthly) consistency checks in the Trupan substation electric bus where the Trupan Power Plant connects to the SIC grid. The consistency of metered net electricity generation was also crosschecked with receipts from electricity. Finally, the plant manager also performed consistency checks between the net electricity generated by the cogeneration plant and the amount of fuels combusted in the power plant during the monitored period (e.g. check whether the electricity generation divided by the quantity of biomass fired results in a reasonable efficiency that is comparable to previous years). All values were comparable to previous years.

Data / Parameter:	Q_y
Data unit:	(GJ)
Description:	Net quantity of heat generated from firing biomass in the project plant.
Measured /Calculated /Default:	Measured.
Source of data:	The net quantity of heat generated from firing biomass residues in the project plant is measured using dedicated meters.
Value(s) of monitored parameter:	470,095 (GJ)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and Project emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	100 FT-037 Type: Steam pressure flowmeter Line 4.5 BAR YOKOGAWA EJA110A - EHS4B-22NC/D4 Accuracy class: +/-0.065% of span Serial number: 27D217976 405 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100 FT-036 Type: Steam pressure flowmeter Line 15 BAR YOKOGAWA EJA110A - EMS4B-22NC/D1 Accuracy class: +/-0.065% of span Serial number: 27D217971 405 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100 FT- 039 Type: Steam pressure flowmeter Line 15 BAR AASA-HB YOKOGAWA EJA110A - EMS4B-22NC/D1 Accuracy class: +/-0.065% of span Serial number: 12B212825 207

	Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100 FT-054 Type: Steam pressure flowmeter Line 15 BAR AASA YOKOGAWA EJA110A EHS4B-22NC/D4 27D217978 405 Accuracy class: +/-0.065% of span Serial number: 27D217978 405 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 FT-035 Type: Steam pressure flowmeter Line 23 BAR YOKOGAWA EJA110A - EMS4B-22NC/D1 Accuracy class: +/-0.065% of span Serial number: 12B212823 207 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100 FT-038 Type: Steam pressure flowmeter Line 36 BAR YOKOGAWA EJA110A - EMS4B-22NC/D1 Accuracy class: : +/-0.065% of span Serial number: 12B212826 207 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 100 FT-040 Type: Deaerator steam pressure flowmeter 4,5 BAR YOKOGAWA EJA110A - EMS4B-92EA Accuracy class: +/-0.065% of span Serial number: 12B705507 226 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 TT-006 Type: Temperature transmitter Line 4,5 BAR YOKOGAWA YTA110 - EA2NB/FU1 Accuracy class: +/-1,2°C Serial number: 11AB16328 145 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 PT-133 Type: Pressure transmitter Line 4,5 BAR SMAR LD301 Accuracy class: +/-0.02 bar Serial number: 137616 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011

	110 TT-025 Type: Temperature transmitter Line 15 BAR YOKOGAWA YTA110 - EA2DB Accuracy class: +/-0.3 °C Serial number: 11B704011 225 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 PT-127 Type: Pressure transmitter Line 15 BAR SMAR LD301 Accuracy class: +/-0.05bar Serial number: 137614 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 TT-023 Type: Temperature transmitter Line 36 BAR YOKOGAWA YTA110 - EA2NB/FU1 Accuracy class: +/-0.4°C Serial number: 11AB16330 145 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 PT-022 Type: Pressure transmitter Line 36 BAR YOKOGAWA EJA 530A ECS4N-02NE/D3/FU1 Accuracy class: +/-0.16bar Serial number: 12AB16634 146 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 TT-024 Type: Temperature transmitter Line 23 BAR YOKOGAWA YTA110 - EA2NB/FU1 Accuracy class: +/-0.4°C Serial number: 11AB16331 145 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011 110 PT-014 Type: Pressure transmitter Line 23 BAR YOKOGAWA EJA530A - ECS4N-02EE/D3/FU1 Accuracy class: +/-0.06bar Serial number: 12AB16633 146 Calibration frequency: 18 months Date of last calibration: 12/2009 Validity: 06/2011
Measuring/ Reading/ Recording frequency:	This variable is continuously monitored.
Calculation method (if applicable):	Not applicable.

QA/QC procedures applied:	Heat quantities are directly measured by dedicated steam flow meters and pressure / temperature meters. The associated uncertainty is very low, since these parameters are key to the production processes of the Trupan plant and therefore, receive periodic maintenance according to proper industry standards. The consistency of metered net heat generation was crosschecked with receipts from electricity sales (if available). In addition, the plant manager also performed consistency checks between the net heat generated by the power boiler and the amount of fuels combusted in the power plant during the monitored period (e.g. check whether the heat generation divided by the quantity of biomass fired results in a reasonable efficiency that is comparable to previous years). All values were comparable to previous years.

Data / Parameter:	EF_y
Data unit:	(tCO_2/GWh)
Description:	CO_2 emission factor of the grid.
Measured /Calculated /Default:	Calculated.
Source of data:	Relevant dispatch center, electric power companies' public information, host country government official information and IPCC values.
Value(s) of monitored parameter:	775.68 (tCO_2/GWh)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	This emission factor is calculated using equation N° 10 of the ACM0002 (Version 06), as the average of the OM and BM emission factors. The calculation of this emission factor is in the Annex of this Monitoring Report.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project operator. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$EF_{OM,y}$
Data unit:	(tCO_2/GWh)
Description:	CO_2 Operating Margin emission factor of the grid.
Measured /Calculated /Default:	Calculated.
Source of data:	Relevant dispatch center, electric power companies' public information, host country government official information and IPCC values.
Value(s) of monitored	809.00 (tCO_2/GWh)

parameter:	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	This emission factor is calculated using equation N° 4 of the ACM0002 (Version 06), according the simple adjusted OM method. Full year data was used to calculate each emission factor. The calculation of this emission factor is in the Annex of this Monitoring Report.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project operator. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$EF_{BM,y}$
Data unit:	(tCO_2/GWh)
Description:	CO_2 Build Margin emission factor of the grid.
Measured /Calculated /Default:	Calculated.
Source of data:	Relevant dispatch center, electric power companies' public information, host country government official information and IPCC.
Value(s) of monitored parameter:	742.37 (tCO_2/GWh)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	This emission factor is calculated using equation N° 9 of the ACM0002 (Version 06). In this case, the BM was calculated for each year (ex-post) and in each case, the weighted average of the emission coefficients of the most recent power plants responsible for 20% of the total power generation each year was used. Full year data was used to calculate each emission factor. The calculation of this emission factor is in the Annex of this Monitoring Report.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project operator. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$F_{i,y}$
Data unit:	See the Annex at the end of this Monitoring Report.
Description:	Amount of each fossil fuel consumed by each power source / plant.
Measured /Calculated /Default:	Measured.
Source of data:	Relevant dispatch center, electric power companies' public information and host country government official information.
Value(s) of monitored parameter:	See the Annex at the end of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project operator. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$COEF_i$
Data unit:	Units in (tCO_2/000ton) except Natural Gas, propane and butane (tCO_2/MMm^3)
Description:	CO_2 emission coefficient of each fuel type i consumed by the electric power generators in the relevant grid.
Measured /Calculated /Default:	Measured.
Source of data:	This factor was determined using IPCC default values (Carbon content and fraction of carbon oxidized) and local national data (Net calorific values of the corresponding fossil fuels).
Value(s) of monitored parameter:	Coal: 2,814 (tCO_2/000ton) Petcoke: 2,857 (tCO_2/000ton) Diesel: 3,378 (tCO_2/000ton) Nat. Gas: 2,193 (tCO_2/MMm^3) IFO 180: 3,401 (tCO_2/000ton) Butane: 3,249 (tCO_2/MMm^3) Propane: 3,249 (tCO_2/MMm^3) Natural Gas Liquid: 3,249 (tCO_2/MMm^3)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/	Annually.

Recording frequency:	
Calculation method (if applicable):	$COEF_{CO2,i}$= NCV_i *Carbon content of fuel type i * CO_2 / C conversion factor.
QA/QC procedures applied:	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.

Data / Parameter:	$GEN_{j/k/n,y}$
Data unit:	See the Annex at the end of this Monitoring Report.
Description:	Electricity generation of each power source / plant j/k or n.
Measured /Calculated /Default:	Measured.
Source of data:	This information was directly obtained by the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	See the Annex at the end of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the Project Participant. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	--
Data unit:	(Text)
Description:	Identification of power source / plant for the OM calculation.
Measured /Calculated /Default:	Estimated.
Source of data:	This information was directly obtained by the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	See the Annex at the end of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the

	control of the project participant. However, the project participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	**--**
Data unit:	(Text)
Description:	Identification of power source / plant for the BM calculation.
Measured /Calculated /Default:	Estimated.
Source of data:	This information was directly obtained from the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	See the Annex at the end of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project participant. However, the project participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	λ_y
Data unit:	(Number)
Description:	Fraction of time during which low-cost / must-run sources are on the margin.
Measured /Calculated /Default:	Calculated.
Source of data:	This factor was calculated from information directly obtained from the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	0.006506849
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	As per the corresponding methodology (ACM0002).
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the project participant. However, the project participant

	calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$GEN_{j/k/ll,y\ IMPORTS}$
Data unit:	(KWh)
Description:	Electricity imports to the project electricity system.
Measured /Calculated /Default:	Not applicable.
Source of data:	This information was directly obtained from the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	Does not apply, since there is no interconnection with other transmission systems.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	As mentioned in the PDD, the quality control of this data is beyond the control of the Project Participant. However, the Project Participant calculated this emission coefficient from official and publicly available data from the CDEC-SIC Dispatch Center.

Data / Parameter:	$COEF_{i,j,y\ IMPORTS}$
Data unit:	(tCO_2/ton) or (tCO_2/m^3)
Description:	CO_2 emission coefficient of fuels used in connected electricity systems (if imports occur).
Measured /Calculated /Default:	Not applicable.
Source of data:	This information was directly obtained from the CDEC-SIC Dispatch Center.
Value(s) of monitored parameter:	Does not apply, since there is no interconnection with other transmission systems.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.

Data / Parameter:	$BF_{i,y}$
Data unit:	(BDt)
Description:	Amount of biomass type i for which leakage could not ruled out using one of the approaches in the baseline methodology.
Measured /Calculated /Default:	Measured.
Source of data:	The biomass surplus index was determined using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating). The project did not cause any leakage effect during the monitored period.
Value(s) of monitored parameter:	0 (BDt)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	The biomass surplus index was calculated using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating).

Data / Parameter:	**--**
Data unit:	See table on the leakage section of this Monitoring Report.
Description:	Amount of biomass of type i fired in all grid-connected power plants in the region / country.
Measured /Calculated /Default:	Calculated.
Source of data:	The biomass surplus index was calculated using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating).
Value(s) of monitored parameter:	See table on the leakage section of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last	Not applicable.

calibration, validity)	
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Leakage effects were duly considered following the L2 criteria of the ACM0006 (Version 01).
QA/QC procedures applied:	The biomass surplus index was calculated using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating).

Data / Parameter:	--
Data unit:	See table on the leakage section of this Monitoring Report.
Description:	Amount of biomass of type i that is available in surplus in the region / country.
Measured /Calculated /Default:	Calculated.
Source of data:	The biomass surplus index was calculated using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating).
Value(s) of monitored parameter:	See table on the leakage section of this Monitoring Report.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	L2 criteria of the ACM0006 (Version 01).
QA/QC procedures applied:	The biomass surplus index was calculated using as much official information as possible. Consistency checks were performed whenever it was feasible (i.e. low-cost biomass power plants in the influence area continue being low-cost/must-run power units after the Trupan Power Plant started operating).

Data / Parameter:	$COEF_{CO2,j}$
Data unit:	(tCO_2/000ton)
Description:	CO_2 emission factor of the most carbon intensive fuel in the calculation of the combined margin with methodology ACM0002.
Measured /Calculated /Default:	Measured or calculated.
Source of data:	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.
Value(s) of monitored parameter:	Since leakage was 0 during the monitored period, this parameter was not considered in the corresponding emission reduction calculation.
Indicate what the data are used for (Baseline/ Project/ Leakage emission	Leakage emission calculations.

calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Annually.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	The Project Participant had no need to use this variable, since it was possible to show that the project activity did not cause leakage in the influence area of the power plant.

Data / Parameter:	Biomass moisture
Data unit:	(%) of water content (humid basis).
Description:	Biomass moisture.
Measured /Calculated /Default:	Measured.
Source of data:	Biomass moisture is constantly measured at the Trupan Complex, using proper and calibrated meters.
Value(s) of monitored parameter:	45.2%
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions and project emissions calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	397HCA001 Type: Laboratory Oven MEMMERT ULM-400 Accuracy class: +/- 3°C Serial number: F494.0877 Calibration frequency: 1 year Date of penultimate calibration: 08/2009 Date of last calibration: 08/2010 Validity: 08/2011 397HCA002 Type: Backup Laboratory Oven MEMMERT U-50 Accuracy class: +/- 2°C Serial number: 880 224 Calibration frequency: 1 year Date of penultimate calibration: 08/2009 Date of last calibration: 08/2010 Validity: 08/2011 397BAL001 Type: Laboratory scale PRECISA INSTRUMENT AG BJ 610C Accuracy class: +/- 0.01g Serial number: U29579 Calibration frequency: 2 years. Date of penultimate calibration: 06/2009 Date of last calibration: 06/2010 Validity: 06/2011 3397BAL002 Type: Wood control Laboratory scale PRECISA INSTRUMENT AG

	BJ 6100D Accuracy class: +/- 0.1g Serial number: U34585 Calibration frequency: 2 years. Date of last calibration: 06/2009 Validity: 06/2010
Measuring/ Reading/ Recording frequency:	Continuously.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	The measured data is constantly compared with historic data in order to avoid or minimize errors. Scales used to determine the biomass moisture received proper calibration according to the user manual.

Data / Parameter:	**--**
Data unit:	(Text)
Description:	Biomass origin.
Measured /Calculated /Default:	Not applicable.
Source of data:	All biomass fuels used in the Trupan power plant fully comply with the Chilean law. This ensures the renewable origin of the biomass. For more details, please see Annex Nº 4 or the registered PDD.
Value(s) of monitored parameter:	Not applicable.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not applicable.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable.
Measuring/ Reading/ Recording frequency:	Not applicable.
Calculation method (if applicable):	Continuously.
QA/QC procedures applied:	The Trupan Power Plant sources a significant portion of its biomass fuels from nearby sawmills. As established in the registered PDD, the monitoring plan includes the monitoring of variable Nº 27, which establishes that the biomass that is being used in the Trupan Power Plant comes from sustainable sources. Each time a biomass supplier delivers biomass fuels to the Trupan Power Plant, the supplier must sign a reception bill in which the supplier declares to know and comply with the outstanding Chilean forest law. This law mandates that all harvested forest plantations must be replanted; therefore it guarantees the sustainable source of the biomass fuels (as well as the source of any other products from the forest industry). The law also establishes that the purchase of products that come from illegally managed forestlands is also considered illegal in Chile. The Chilean forest law is stringent and effectively monitored by the

	corresponding authority. Failing to comply with the law may imply hefty penalties for the transgressors in some cases. For these reasons all the Arauco industrial facilities tend to be very selective in choosing their suppliers and have tight quality controls in the reception of the raw-materials. Annex 4 of the registered PDD provides more official information and evidence that further confirms the sustainable origin of the biomass type generated in the region (and country) used in this project activity.

SECTION E. Emission reductions calculation

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 over onto word formatted tables because decimals are shown truncated and rounded down. Exact values can be viewed directly in emission reduction calculation spreadsheet.

2. Since some parameters are reported monthly, quarterly and each six months, in some cases year-averages were employed in calculations cited below.

E.1. Baseline emissions calculation

The baseline emissions for year *y* are calculated according to the following formula:

$$BL_{E,y} = BL_{E1,y} + BL_{E2,y}$$

Where:

$BL_{E,y}$:	Total baseline emissions (tCO_2eq/yr).
$BL_{E1,y}$	Baseline emissions from avoided biomass disposal (tCO_2eq/yr).
$BL_{E2,y}$:	Baseline emissions from grid electricity displacement (tCO_2/yr).

1. Baseline emissions from avoided biomass disposal

To calculate this emission source, it is necessary first to calculate the quantity of biomass residues used as a result of the project activity. In this case, this is done using equation N° 24 of the ACM0006 (Version 01).

$$BL_{E1,y} = GWP_{CH4} \cdot \left[\sum_i BF_{i,y} * NCV_{Biomass,i} - \frac{Q_y}{\varepsilon_{Boiler}} \right] \cdot EF_{burning,CH4,i}$$

Where:

$BL_{E1,y}$:	Emissions due to natural decay or burning of anthropogenic sources of biomass during the year y (tCO_2eq/yr).
GWP_{CH4} :	Global Warming Potential of methane (21 tCO_2eq/tCH_4).
$BF_{i,y}$:	Biomass of type *i* used by the project activity (BDt/yr).
$NCV_{Biomass,i}$:	Net calorific value of biomass fuel type i (GJ/mass or volume of biomass).
Q_y :	Net quantity of heat generated in the cogeneration project plant during the year y (GJ).
ε_{Boiler}	Energy efficiency of the boiler that would be used in the absence of the project activity.
$EF_{CH4burning,i}$	CH_4 emission factor for uncontrolled burning of biomass type i (tCH_4/GJ).

According to the above, the net electricity displaced by the project activity is calculated as follows:

Data:

	Units	2010
(1) Total biomass residues combusted.	(BDt)	66,672
(2) Net calorific value of biomass (dry basis).	(GJ/ton)	17.86
(3) Quantity of heat generated in the cogen. plant.	(GJ)	470,095
(4) Energy efficiency of the baseline boiler.	(%)	85%
(5) EF_{CH4} for uncontrolled biomass burning.	(Kg CH_4/TJ)	696.1
(6) CH_4 global warming potential.	(number)	21

Calculations:

(7) Biomass combusted in the baseline.	(3)/[(2)*(4)]	30,963 (BDt)
(8) Incremental biomass use.	(1)-(7)	35,708 (BDt)
(9) CH_4 avoidance baseline emissions.	**[(8)*(2)/ 1,000,000]* (5)*(6)**	**9,323 (tCO_2)**

2. Baseline emissions from grid-electricity displacement

In this case, the electricity displaced from the grid corresponds to the net quantity of electricity generation in the project plant (EG_y = $EG_{projectplant}$). The baseline emissions due to electricity displacement are calculated using equation N° 8 of the ACM0006 (Version 01).

$$BL_{E2,y} = BE_{electricity,y} = EF_{electricity,y} * EG_y$$

Where:

$BE_{electricity,y}$: Baseline emissions due to displacement of electricity during the year y (tCO_2/yr).

$EF_{electricity,y}$: CO_2 baseline emission factor for the electricity displaced due to the project activity in during the year *y* (tCO_2/MWh).

EG_y: Net quantity of electricity generated in the power plant during the year *y* (MWh/yr).

According to the above, the net electricity displaced by the project activity is calculated as follows:

Data:

	Units	2010
(1) Combined margin for the SIC grid.	(tCO_2/GWh)	775.68
(2) Net quantity of electricity displaced by the project activity.	(GWh)	52.0

Calculations:

(3) Total grid emission savings.	**(1)*(2)**	**40,329 (tCO_2)**

Total baseline emissions:

Baseline emission sources	2010
Baseline emissions due to electricity displacement.	40,329 (tCO_2)
Baseline emissions due to methane avoidance.	9,323 (tCO_2eq)
Total baseline emissions.	**49,652 (tCO_2eq)**

E.2. Project emissions calculation

The anthropogenic emissions by sources of GHGs of the project activity in year *y* ($EM_{P,y}$) can be determined as follows:

$$EM_{P,y} = P_{E1,y} + P_{E2,y} + P_{E3,y} + P_{E4,y}$$

Where:

$EM_{P,y}$: Total project activity emissions (tCO_2eq/yr).
$P_{E1,y}$: Project emissions from biomass controlled burning in the Power Plant (tCO_2eq/yr).
$P_{E2,y}$: Project emissions from biomass transportation to the biomass Power Plant (tCO_2/yr).
$P_{E3,y}$: Project emissions from biomass transportation within the Power Plant site (tCO_2/yr).
$P_{E4,y}$: Project emissions from fossil fuel consumption in the Plant's power boiler (tCO_2/yr).

1. Methane emissions from combustion of biomass residues

This emission source is calculated using equation N° 7 of the ACM0006 (Version 01). Since the project activity implies additional biomass from forest operations consumption in the power boiler, the only source of methane emissions attributed to the project activity is the one related to this additional consumption under controlled burning conditions.

$$P_{E1,y} = GWP_{CH4} \cdot EF_{Biomass,CH4} \cdot \sum_i BF_{i,y} \cdot NCV_{Biomass,i}$$

Where:

P_{E1} : Project emissions from biomass controlled burning (tCO_2eq/yr).
GWP_{CH4} : Global Warming Potential of methane (21 tCO_2eq/tCH_4).
$EF_{Biomass,CH4}$: Biomass methane emission factor (tCH_4/TJ).
$BF_{i,y}$: Biomass of type *i* used by the project activity (BDt/yr).
$NCV_{Biomass,i}$: Net calorific value of biomass of type *i* (TJ/BDt).

Data:

	Units	2010
(1) Biomass related to project activity.	(BDt)	35,708
(2) Net calorific value of biomass (dry basis).	(GJ/ton)	17.86
(3) EF_{CH4} for controlled biomass burning.	(Kg CH_4/TJ)	15.30
(4) CH_4 global warming potential.	(number)	21

Calculations:

(5) CH_4 emissions	**[(1)*(2)*(3) /1,000,000]*(4)**	**205 (tCO_2)**

2. Carbon dioxide emissions from biomass residues transportation to the power plant

This emission source is calculated using equation N° 4 of the ACM0006 (Version 01).

$$P_{E2,y} = \frac{\sum_i BF_{T,i,y}}{TL_y} * AVD_y * EF_{km,CO2}$$

Where:

$P_{E2,y}$:	Project emissions from biomass transportation to the biomass Power Plant (tCO_2/yr).
$BF_{T,i,y}$:	Biomass of type *i* (wet) transported by trucks used by the project activity (wet ton/yr).
TL_y :	Average truck load of the trucks used (ton).
AVD_y :	Average return trip distance between the biomass fuel supply sites and the site of the project plant (km).
$EF_{km,CO2}$:	Average CO_2 emission factor for the transportation fuel (tCO_2/km).

Data:

	Units	2010
(1) Biomass brought from 3rd parties related to the p. plant (dry).	(BDt)	35,708
(2) Biomass average humidity (wet basis) (See note).	(%)	45%
(3) Approximate load for 1 trip (See note).	(ton)	16
(4) Average trip (See note).	(km)	65.0
(5) Emission factor for heavy truck transportation (See note)	($kgCO_2$/km)	1.12
Note: Since these parameters are reported monthly, an average was used for the yearly emission reduction calculation simplicity.		

Calculations:

(6) Biomass transported (wet)	(1)/[1 – (2)]	65,211 (wet ton)
(7) Number of trips needed	(6) / (3)	3,993 (trips)
(8) Total distance traveled	(4)*(7)	518,857 (km)
(9) Total emissions	**(5)*(8)* (1ton/1,000kg)**	**579 (tCO_2)**

3. Carbon dioxide emissions from on-site consumption of fossil fuels

3.1. The project activity implies additional fossil fuel consumption due to biomass transportation in the plant site. This emission source is calculated using equation N° 6 of the ACM0006 (Version 01).

$$P_{E3,y} = \sum_i OF_{i,y} \cdot COEF_{CO2,i}$$

Where:

$P_{E3,y}$:	Project emissions from biomass transportation within the Power Plant site (tCO_2/yr).
$OF_{i,y}$:	Fossil fuel of type *i* used for on-site transportation of biomass (kg/yr).
$COEF_{CO2,i}$:	CO_2 emission factor for the transportation fuel of type *i* (tCO_2/kg).

Data:

	Units	2010
(1) On-site fossil fuel consumption of diesel for biomass transportation in the project site.	(l)	43,653
(2) Diesel density.	(kg/l)	0.83
(3) Diesel CO_2 emission factor.	(tCO_2/ton)	3,176

Calculations:

(4) Diesel in on-site biomass transport.	[(1)*(2)/ 1,000,000]*(3)	**115 (tCO_2)**
(5) Total emissions	**(4)**	**115 (tCO_2)**

3.2. The project activity implies additional fossil fuel consumption for operational reasons due to additional biomass consumption (e.g. biomass too wet in winter, etc.). This emission source is calculated using equation N° 6 of the ACM0006 (Version 01).

$$P_{E4,y} = \sum_i FF_{i,y} \cdot COEF_{CO2,i}$$

Where:

$P_{E4,y}$:	Project emissions from fossil fuel consumption in the Plant's power boiler (tCO_2/yr).
$FF_{i,y}$:	On-site fossil fuel consumption of type *i* for co-firing in the project plant (kg/yr).
$COEF_{CO2,i}$:	CO_2 emission factor for the fossil fuel of type *i* used in the power boiler (tCO_2/kg).

Data:

	Units	2010
(1) On-site fossil fuel consumption of diesel for co-firing in the project plant.	(l)	16,593
(2) On-site fossil fuel consumption of LPG for co-firing in the project plant.	(l)	279
(3) Diesel density.	(kg/l)	0.83
(4) LPG density.	(kg/m^3)	0.508
(5) Diesel CO_2 emission factor.	(tCO_2/ton)	3,176
(6) LPG CO_2 emission factor.	(tCO_2/ton)	2,920

Calculations:

(7) Diesel in Power Boiler.	[(1)*(3)/ 1,000,000]*(5)	**44 (tCO_2)**
(8) LPG in Power Boiler.	{[(2)*(4)/ 1,000,000]/ 1,000}*(6)	**0.0 (tCO_2)**
(9) Total emissions.	**(7)+(8)**	**44 (tCO_2)**

Total project emissions:

Project emission sources	**2010**
Project emissions from biomass controlled burning in the Power Plant.	205 (tCO_2)
Project emissions from biomass transportation to the biomass Power Plant.	579 (tCO_2)
Project emissions from biomass transportation within the Power Plant site.	115 (tCO_2)
Project emissions from fossil fuel consumption in the Plant's power boiler.	44 (tCO_2)
Total project emissions	**943 (tCO_2)**

E.3. Leakage calculation

Though there are no official studies in the country about the supply / demand situation of forest biomass in the relevant area, the Project Participant performed annual studies for 2010 using official bulletins from INFOR[5] as well as other (whenever available) official sources to calculate the biomass supply and demand in the Trupan Power Plant influence area[6]. This study was part of the monitoring plan of the Trupan project activity and was carried out according approach L2 of the baseline methodology.

A detailed Excel spreadsheet with the monitored data and the calculation of the forest biomass supply / demand situation each year was provided to the DOE to establish the quality and validity of the data sources and the accuracy of the calculated numbers. The following table provides the final results of such study:

SUPPLY/DEMAND SITUATION

(According to the "L2" criteria to establish leakage in the ACM0006 baseline methodology)

NUEVA ALDEA PHASE 1 INFLUENCE AREA SUPPLY/DEMAND SITUATION

Biomass supply

		2010
Total supply	(m^3st/yr)	5,193,557

Biomass demand

		2010
Total demand	(m^3st/yr)	3,365,501

Total supply/total demand	(number)	1.5432

According to the table above, it is clear that the quantity of available biomass in the influence area of the project activity is greater than the 25% threshold established in option L2 of the consolidated baseline methodology. This is consistent with the fact that in the last years the existing biomass power plant in

[5] INFOR stands for "Instituto Nacional Forestal" or "National Forestry Institute" in English.

[6] The Trupan influence area is clearly defined in page 65 of the registered PDD.

the Trupan influence area continue to function without restriction and that new biomass based projects are currently being considered in the area.

From the analysis above, it is possible to conclude that the Trupan biomass Power Plant has not caused a biomass supply shortage in its influence area and therefore has not caused other biomass consumers to switch from biomass fuels to fossil fuel sources. For these reasons, the associated leakage to the Trupan project activity is considered to be zero.

$$L_y = 0$$

E.4. Emission reductions calculation / table

As presented in the PDD and according to the baseline methodology, the net emission reduction calculation formula for the Trupan project is:

Project Activity Net Emission savings = Baseline Emissions – Project Activity Emissions – Leakage

or

$$PNE_y = BL_{E,y} - EM_{P,y} - L_y$$

Where:

PNE_y: Project Activity Net Emission savings (tCO_2/yr).
$BL_{E,y}$: Baseline emissions (tCO_2/yr).
$EM_{P,y}$: Project Activity Emissions (tCO_2/yr).
L_y: Leakage (tCO_2/yr).

Net emission reductions for the monitored period

	2010
Baseline emissions.	49,652 (tCO_2eq)
Project emissions.	943 (tCO_2)
Leakage.	0 (tCO_2)
Net emission reductions.	**48,709 (tCO_2eq)**

For the calculation of the net emission reductions of the Trupan biomass power plant project activity, an Excel spreadsheet with the monitored data and the monthly calculation of the net emission reductions was provided to the DOE for the verification of the calculated numbers. For informative purposes, this monitoring report provides a table that shows the net emission reduction of the project activity:

Net emission savings

		Baseline emissions		Project activity emissions				
	Net emission savings	Grid emissions	Methane emissions	Methane in P.B.	Fossil fuel in P.B.	Transport onsite	Transport to P. Plant	Leakage
	(tCO_2eq)	(tCO_2)	(tCO_2eq)	(tCO_2eq)	(tCO_2)	(tCO_2)	(tCO_2)	(tCO_2)
Year 2010 (Jan 1st 2010 -Apr 30th 2010)	48,709	40,329	9,323	205	44	115	579	0
5th verif (Jan 1st 2010 -Apr 30th 2010)	**48,709.4**	**40,329.3**	**9,323.0**	**204.9**	**43.7**	**115.1**	**579.3**	**0.0**
Total emissions claimed	**48,709**	**40,329**	**9,323**	**205**	**44**	**115**	**579**	**0**

Note: Net emission savings = Baseline emissions - Project activity emissions - Leakage.

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**34,483**	**48,709**

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

According to the project PDD, the estimated emission reductions for the period covered by this monitoring report should have been 34,483 CERs. The monitored emissions are 41.3% % higher than the estimated emissions in the PDD. This difference can be explained by the following reasons:

1. A higher grid emission factor in year 2010 than the one originally estimated in the PDD. The monitored grid emission factor for 2010 was 775.68 (tCO_2/GWh), while the estimated grid emission factor was 664.09 (tCO_2/GWh). The reason for the higher grid emission factors in both years was the replacement of natural gas[7] used for power generation for more carbon-intensive fossil-fuels, such as coal and diesel. This increased the overall GHG emissions in the SIC grid.

2. The hydrological situation of year 2010 is another reason to explain a higher grid emission factor for the year 2010 than originally estimated in the PDD. Very dry weather (droughts) in the last years have caused the new entrance and replacement of hydro power plants for more carbon-intensive fossil-fuels power generation sources, mainly coal, increasing the overall GHG emissions in the SIC grid.

3. A higher CH_4 emission factor for uncontrolled burning of biomass residues than the one originally used in the PDD: 740.5 (Kg CH4/TJ) monitored factor instead of 300 (Kg CH_4/TJ) used in the PDD. Given that by the time the PDD was written there were no local measurements available, the validator indicated the Project Participant to use the IPCC default factor corrected by the lowest conservativeness factor (Table Nº4, page 34 of the ACM0006 Version 01). This generated extremely conservative CH_4 baseline emissions for the project activity, since when the biomass residues are burned in piles in the open air, the combustion occurs under very low oxygen presence conditions and therefore is very inefficient. Inefficient combustion leads to high CH_4 emissions. As a result, the Project Participant explicitly mentioned in page 67 of the registered PDD and in page A39 of the validation report that a local CH_4 measurement would be attempted in the future in order to have a more accurate and fair estimation of the baseline emissions from this source. The higher CH_4 emission factor was directly measured by the Project Participant.

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

[7] Argentina stopped sending natural gas in 2004.

- - - - -

History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Guideline, Form **Business Function**: Issuance		

ANNEX

POWER GENERATION IN 2010

	POWER PLANT	POWER OUTPUT (MW)	PLANT TYPE	FUEL TYPE	LOW COST / MUST RUN	TOTAL ENERGY GEN (GWh/yr)	UNIT	FUEL OIL CONSUMPTION (Unit)
1	Los Molles	18	Run of the river	Hydro	Yes	28.3	N.C.	0.00
2	Sauce Andes	1.1	Run of the river	Hydro	Yes	6.3	N.C.	0.00
3	Aconcagua	74	Run of the river	Hydro	Yes	368.0	N.C.	0.00
4	Los Quilos	39.3	Run of the river	Hydro	Yes	213.6	N.C.	0.00
5	Florida	28.5	Run of the river	Hydro	Yes	118.7	N.C.	0.00
6	Maitenes	31	Run of the river	Hydro	Yes	129.7	N.C.	0.00
7	Alfalfal	178	Run of the river	Hydro	Yes	845.5	N.C.	0.00
8	Queltehues	49	Run of the river	Hydro	Yes	357.7	N.C.	0.00
9	Puntilla	22	Run of the river	Hydro	Yes	146.9	N.C.	0.00
10	Volcan	13	Run of the river	Hydro	Yes	107.7	N.C.	0.00
11	Los Morros	3.1	Run of the river	Hydro	Yes	17.4	N.C.	0.00
12	Sauzal 50Hz	76.8	Run of the river	Hydro	Yes	423.9	N.C.	0.00
13	Sauzal 60Hz	76.8	Run of the river	Hydro	Yes	0.0	N.C.	0.00
14	Sauzalito	12	Run of the river	Hydro	Yes	72.4	N.C.	0.00
15	Curillinque	89	Run of the river	Hydro	Yes	621.4	N.C.	0.00
16	San Ignacio	37	Run of the river	Hydro	Yes	122.2	N.C.	0.00
17	Loma Alta	40	Run of the river	Hydro	Yes	270.3	N.C.	0.00
18	Rucue	178.4	Run of the river	Hydro	Yes	943.2	N.C.	0.00
19	Pullinque	51.4	Run of the river	Hydro	Yes	209.8	N.C.	0.00
20	Pilmaiquén	39	Run of the river	Hydro	Yes	263.1	N.C.	0.00
21	Capullo	11	Run of the river	Hydro	Yes	72.7	N.C.	0.00
22	Peuchén	80	Run of the river	Hydro	Yes	166.5	N.C.	0.00
23	Mampil	49	Run of the river	Hydro	Yes	106.5	N.C.	0.00
24	Chacabuquito	25.5	Run of the river	Hydro	Yes	136.6	N.C.	0.00
25	Antuco	320	Run of the river	Hydro	Yes	1,448.3	N.C.	0.00
26	Abanico	136	Run of the river	Hydro	Yes	315.1	N.C.	0.00
27	Isla	68	Run of the river	Hydro	Yes	488.2	N.C.	0.00
28	Machicura	95	Run of the river	Hydro	Yes	340.6	N.C.	0.00
29	Eyzaguirre	2.1	Run of the river	Hydro	Yes	6.7	N.C.	0.00
30	Quilleco	70.8	Run of the river	Hydro	Yes	387.2	N.C.	0.00
31	El Rincón	0.28	Run of the river	Hydro	Yes	2.4	N.C.	0.00
32	Chiburgo	19.4	Run of the river	Hydro	Yes	75.8	N.C.	0.00
33	Palmucho	32	Run of the river	Hydro	Yes	232.4	N.C.	0.00
34	Hornitos	55	Run of the river	Hydro	Yes	195.6	N.C.	0.00
35	Puclaro	6	Run of the river	Hydro	Yes	24.4	N.C.	0.00
36	Ojos de Agua	9	Run of the river	Hydro	Yes	49.8	N.C.	0.00
37	Coya	10.8	Run of the river	Hydro	Yes	83.3	N.C.	0.00
38	Lircay	19	Run of the river	Hydro	Yes	121.8	N.C.	0.00
39	El Manzano	4.85	Run of the river	Hydro	Yes	27.5	N.C.	0.00
40	Pehui	1.1	Run of the river	Hydro	Yes	7.1	N.C.	0.00
41	Truful Truful	0.5	Run of the river	Hydro	Yes	0.0	N.C.	0.00
42	La Paloma	5.4	Run of the river	Hydro	Yes	4.0	N.C.	0.00
43	Trueno	5.6	Run of the river	Hydro	Yes	19.7	N.C.	0.00
44	San Clemente	5.5	Run of the river	Hydro	Yes	5.9	N.C.	0.00
45	Carbomet	0	Run of the river	Hydro	Yes	20.7	N.C.	0.00
46	La Higuera	154.7	Run of the river	Hydro	Yes	168.8	N.C.	0.00
47	Juncalito	1.5	Run of the river	Hydro	Yes	1.3	N.C.	0.00
48	El Tártaro	0	Run of the river	Hydro	Yes	0.1	N.C.	0.00
49	Guayacán	12	Run of the river	Hydro	Yes	20.8	N.C.	0.00
50	Confluencia	155	Run of the river	Hydro	Yes	3.9	N.C.	0.00
51	Mariposas	6	Run of the river	Hydro	Yes	0.0	N.C.	0.00
52	Los Corrales	0.8	Run of the river	Hydro	Yes	0.2	N.C.	0.00
53	Taltal 2 GNL	122.45	Open Cycle	LNG	No	0.0	(MM m^3-std/yr)	0.01
54	Taltal 1 GNL	122.45	Open Cycle	LNG	No	1.7	(MM m^3-std/yr)	0.50
55	Taltal 2	122.45	Open Cycle	Natural Gas	No	36.5	(MM m^3-std/yr)	11.06
56	Taltal 1	122.45	Open Cycle	Natural Gas	No	19.3	(MM m^3-std/yr)	5.84
57	Taltal	244.9	Open Cycle	Diesel	No	90.6	(000' ton/yr)	23.01
58	D. Almagro	23.8	Open Cycle	Diesel	No	0.4	(000' ton/yr)	0.19
59	El Salvador	23.8	Open Cycle	Diesel	No	0.3	(000' ton/yr)	0.10
60	Guacolda 1	152	Coal/Steam	Coal	No	1,138.2	(000' ton/yr)	438.91
61	Guacolda 2	152	Coal/Steam	Coal	No	1,109.1	(000' ton/yr)	423.28
62	Guacolda 3	152	Coal/Steam	Coal	No	1,199.1	(000' ton/yr)	437.80
63	Guacolda 4	152	Coal/Steam	Coal	No	1,036.6	(000' ton/yr)	326.27
64	Huasco TV	16	Coal/Steam	Coal	No	0.0	(000' ton/yr)	0.00
65	Huasco TG	64.23	Open Cycle	Diesel	No	0.9	(000' ton/yr)	0.62
66	Huasco TG IFO	64.23	Open Cycle	IFO 180	No	0.1	(000' ton/yr)	0.05
67	L.Verde TG	18.8	Open Cycle	Diesel	No	4.2	(000' ton/yr)	1.03
68	Los Vientos TG	132	Open Cycle	Diesel	No	49.2	(000' ton/yr)	14.01
69	Nehuenco	368.4	Combined Cycle	Natural Gas	No	3.3	(MM m^3-std/yr)	39.75
70	Nehuenco Diesel	368.4	Combined Cycle	Diesel	No	673.5	(000' ton/yr)	111.17
71	Nehuenco GNL	368.4	Combined Cycle	LNG	No	196.5	(MM m^3-std/yr)	38.71
72	Nehuenco TG 9B	108	Open Cycle	Natural Gas	No	2.9	(MM m^3-std/yr)	1.58
73	Nehuenco TG 9B Diesel	108	Open Cycle	Diesel	No	0.6	(000' ton/yr)	0.18
74	Nehuenco TG 9B GNL	108	Open Cycle	LNG	No	3.7	(MM m^3-std/yr)	1.17
75	Nehuenco II	398.3	Combined Cycle	Natural Gas	No	213.2	(MM m^3-std/yr)	139.76
76	Nehuenco II Diesel	398.3	Combined Cycle	Diesel	No	1,547.6	(000' ton/yr)	252.94
77	Nehuenco II GNL	398.3	Combined Cycle	LNG	No	765.9	(MM m^3-std/yr)	138.62
78	San Isidro	379	Combined Cycle	Natural Gas	No	31.3	(MM m^3-std/yr)	6.35
79	San Isidro Diesel	379	Combined Cycle	Diesel	No	43.6	(000' ton/yr)	7.87
80	San Isidro GNL	379	Combined Cycle	LNG	No	2,161.3	(MM m^3-std/yr)	437.27
81	San Isidro II	353	Combined Cycle	Natural Gas	No	16.9	(MM m^3-std/yr)	3.11
82	San Isidro II Diesel	353	Combined Cycle	Diesel	No	87.2	(000' ton/yr)	14.84
83	San Isidro II GNL	353	Combined Cycle	LNG	No	2,846.3	(MM m^3-std/yr)	522.33
84	Ventanas 1	120	Coal/Steam	Coal	No	914.3	(000' ton/yr)	346.79
85	Ventanas 2	220	Coal/Steam	Coal	No	1,157.3	(000' ton/yr)	450.45
86	Nueva Ventanas	272	Coal/Steam	Coal	No	1,998.1	(000' ton/yr)	745.35
87	L.Verde	54.7	Coal/Steam	Coal	No	0.3	(000' ton/yr)	0.13
88	Nueva Renca	379	Combined Cycle	LNG	No	611.5	(MM m^3-std/yr)	116.18
89	Nueva Renca Diesel	379	Combined Cycle	Diesel	No	1,300.0	(000' ton/yr)	227.20
90	Renca	100	Diesel/Steam	Diesel	No	2.7	(000' ton/yr)	0.79
91	Constitución	11.1	Biomass/steam	Biomass	Yes	51.5	N.C.	0.00
92	Constitución A.	8	Biomass/steam	Biomass	Yes	30.9	N.C.	0.00
93	Petropower	75	Petcoke/steam	Petcoke	Yes	65.5	(000' ton/yr)	26.68

POWER PLANT	POWER OUTPUT (MW)	PLANT TYPE	FUEL TYPE	LOW COST / MUST RUN	TOTAL ENERGY GEN (GWh/yr)	UNIT	FUEL OIL CONSUMPTION (Unit)
94 Laja	12.7	Biomass/steam	Biomass	Yes	44.7	N.C.	0.00
95 Bocamina	128	Coal/Steam	Coal	No	215.8	(000' ton/yr)	81.99
96 Arauco	9	Biomass/steam	Biomass	Yes	15.2	N.C.	0.00
97 San Fco. Mostazal	24	Open Cycle	Diesel	No	0.6	(000' ton/yr)	0.28
98 Cholguán	13	Biomass/steam	Biomass	Yes	81.6	N.C.	0.00
99 Licantén	4	Biomass/steam	Biomass	Yes	21.5	N.C.	0.00
100 Valdivia	61	Biomass/steam	Biomass	Yes	225.1	N.C.	0.00
101 Antilhue TG	101.3	Open Cycle	Diesel	No	71.7	(000' ton/yr)	18.53
102 Horcones TG	24.3	Open Cycle	Natural Gas	No	0.3	(MM m^3-std/yr)	0.12
103 Horcones Diesel	24.3	Open Cycle	Diesel	No	6.3	(000' ton/yr)	3.27
104 TG_Coronel	46.7	Open Cycle	Natural Gas	No	29.0	(MM m^3-std/yr)	3.21
105 TG_Coronel Diesel	46.7	Open Cycle	Diesel	No	63.2	(000' ton/yr)	16.60
106 Nueva Aldea	14	Biomass/steam	Biomass	Yes	93.9	N.C.	0.00
107 Nueva Aldea 2	10	Open Cycle	Diesel	No	0.0	(000' ton/yr)	0.00
108 Nueva Aldea 3	37	Biomass/steam	Biomass	Yes	192.9	N.C.	0.00
109 Candelaria	253.9	Open Cycle	Natural Gas	No	76.4	(MM m^3-std/yr)	28.99
110 Candelaria Diesel	253.9	Open Cycle	Diesel	No	95.1	(000' ton/yr)	26.81
111 Candelaria GNL	253.9	Open Cycle	LNG	No	11.3	(MM m^3-std/yr)	3.55
112 Curanilahue	2.1	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.00
113 Lebu	0	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.01
114 Cañete	3	Diesel engine	Diesel	No	0.7	(000' ton/yr)	0.19
115 Los Sauces	3	Diesel engine	Diesel	No	1.1	(000' ton/yr)	0.24
116 Traiguen	3	Diesel engine	Diesel	No	1.1	(000' ton/yr)	0.23
117 Victoria	0	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
118 Curacautin	3	Diesel engine	Diesel	No	1.5	(000' ton/yr)	0.36
119 Ancud	3.3	Diesel engine	Diesel	No	0.8	(000' ton/yr)	7.40
120 Collipulli	3	Diesel engine	Diesel	No	0.6	(000' ton/yr)	0.14
121 Quellon	4.99	Diesel engine	Diesel	No	0.8	(000' ton/yr)	0.00
122 Campanario Gas	180	Open Cycle	Natural Gas	No	0.1	(MM m^3-std/yr)	0.00
123 Campanario Diesel	220	Open Cycle	Diesel	No	25.9	(000' ton/yr)	6.45
124 Casablanca	1.2	Diesel engine	Diesel	No	0.2	(000' ton/yr)	0.05
125 Las Vegas	2	Diesel engine	Diesel	No	0.7	(000' ton/yr)	0.14
126 Curauma	2	Diesel engine	Diesel	No	0.5	(000' ton/yr)	0.16
127 Concon	2.2	Diesel engine	Diesel	No	0.4	(000' ton/yr)	0.18
128 Escuadrón (ex FPC)	14.2	Biomass/steam	Biomass	Yes	90.5	N.C.	0.00
129 Constitución 1	9	Diesel engine	Diesel	No	1.9	(000' ton/yr)	0.43
130 Maule	6	Diesel engine	Diesel	No	0.6	(000' ton/yr)	0.12
131 Monte Patria	9	Diesel engine	Diesel	No	0.2	(000' ton/yr)	0.04
132 Punitaqui	9	Diesel engine	Diesel	No	0.3	(000' ton/yr)	0.09
133 Esperanza	22.2	Diesel engine	Diesel	No	1.8	(000' ton/yr)	0.43
134 Degan	39.6	Diesel engine	Diesel	No	41.1	(000' ton/yr)	8.74
135 Olivos	96	Open Cycle	Diesel	No	4.0	(000' ton/yr)	0.91
136 Totoral	3	Open Cycle	Diesel	No	0.4	(000' ton/yr)	0.09
137 Quintay	3	Open Cycle	Diesel	No	0.9	(000' ton/yr)	0.21
138 Placilla	3	Open Cycle	Diesel	No	1.1	(000' ton/yr)	0.23
139 Chiloé	9	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
140 Quellon II	10	Diesel engine	Diesel	No	14.4	(000' ton/yr)	3.23
141 Colmito	55	Open Cycle	Diesel	No	1.1	(000' ton/yr)	0.33
142 Los Pinos	92.1	Open Cycle	Diesel	No	174.3	(000' ton/yr)	36.78
143 Chuyaca 1 y 2	20	Diesel engine	Diesel	No	5.5	(000' ton/yr)	1.39
144 Skretting	2.7	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.01
145 Cenizas	16.5	Diesel engine	Diesel	No	26.9	(000' ton/yr)	0.98
146 Santa Lidia	136	Open Cycle	Diesel	No	49.5	(000' ton/yr)	12.86
147 Trapén	90	Diesel engine	Diesel	No	42.7	(000' ton/yr)	8.92
148 Los Espinos	122	Diesel engine	Diesel	No	14.2	(000' ton/yr)	3.03
149 San Gregorio	0.5	Diesel engine	Diesel	No	0.3	(000' ton/yr)	0.06
150 Linares Norte	0.5	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.03
151 Biomar	2.4	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
152 Eagon	2.4	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
153 Salmofood I	1.6	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
154 Salmofood II	1.6	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.02
155 Teno	50	Diesel engine	Diesel	No	58.0	(000' ton/yr)	12.43
156 Newen	15	Diesel engine	Diesel	No	38.8	(000' ton/yr)	1.47
157 Watts	2.64	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
158 Multiexport I	1.6	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
159 Multiexport II	1.6	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
160 Tierra Amarilla	142	Diesel engine	Diesel	No	2.2	(000' ton/yr)	0.74
161 Quintero	240	Open Cycle	Diesel	No	16.8	(000' ton/yr)	4.05
162 Quintero GNL	240	Open Cyle	LNG	No	245.8	(MM m^3-std/yr)	67.84
163 Louisiana Pacific	2.9	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
164 El Peñón	80	Diesel engine	Diesel	No	57.7	(000' ton/yr)	12.25
165 San Lorenzo de D. De Almagro	60	Diesel engine	Diesel	No	0.3	(000' ton/yr)	0.18
166 Tapihue	6.4	Diesel engine	Diesel	No	1.0	(000' ton/yr)	0.25
167 Termopacífico	96	Diesel engine	Diesel	No	19.8	(000' ton/yr)	4.45
168 Quidico	0	Diesel engine	Diesel	No	0.0	(000' ton/yr)	0.00
169 Loma Los Colorados	14	Biomass/engine	Biomass	Yes	7.4	N.C.	0.00
170 Emelda	72	Open Cycle	IFO 180	No	1.2	(000' ton/yr)	0.35
171 Colihues IFO	22	Diesel engine	IFO 180	No	22.0	(000' ton/yr)	4.70
172 Colihues DIE	22	Diesel engine	Diesel	No	0.1	(000' ton/yr)	0.03
173 Curicó	0	Diesel engine	Diesel	No	0.4	(000' ton/yr)	0.00
174 Punta Colorada	16.3	Diesel engine	Diesel	No	8.0	(000' ton/yr)	1.54
175 Cabrero	11	Biomass/steam	Biomass	Yes	1.3	N.C.	0.00
176 Cem Bio Bio	13.6	Diesel engine	IFO 180	No	4.1	(000' ton/yr)	0.91
177 El Toro	450	Reservoirs	Hydro	Yes	1,784.2	N.C.	0.00
178 Rapel	377	Reservoirs	Hydro	Yes	469.7	N.C.	0.00
179 Canutillar	172	Reservoirs	Hydro	Yes	1,162.4	N.C.	0.00
180 Cipreses	106	Reservoirs	Hydro	Yes	517.3	N.C.	0.00
181 Colbun	478	Reservoirs	Hydro	Yes	1,542.4	N.C.	0.00
182 Pehuenche	570	Reservoirs	Hydro	Yes	2,091.3	N.C.	0.00
183 Pangue	467	Reservoirs	Hydro	Yes	1,630.7	N.C.	0.00
184 Ralco	690	Reservoirs	Hydro	Yes	2,220.6	N.C.	0.00
185 Canela 1	18.2	Aeolics	Wind	Yes	28.4	N.C.	0.00
186 Canela 2	60	Aeolics	Wind	Yes	122.6	N.C.	0.00
187 Lebu (Cristoro)	3.6	Aeolics	Wind	Yes	6.8	N.C.	0.00
188 Totoral (eólica)	46	Aeolics	Wind	Yes	84.7	N.C.	0.00
189 Monte Redondo	48	Aeolics	Wind	Yes	82.8	N.C.	0.00
TOTAL				(GWh/yr)	43,192.7		

OPERATING MARGIN CALCULATION
ACCORDING TO THE ACM0002 (VERSION 06)

Each year in which the project generation occurs.

		2010
Total emissions from non-low cost / must run power plants	(tCO_2/yr)	16,876,891
Total emissions from low-cost / must-run power plants	(tCO_2/yr)	76,213
Total energy generated in the SIC	(GWh/yr)	43,193
Total energy by non-Low cost / must run power plants	(GWh/yr)	20,727
Total energy by low cost / must run power plants	(GWh/yr)	22,466
Factor λ	(number)	0.0065068493
Operating Margin	**(tCO_2/GWh)**	**808.99**

Notes:
- Low cost / must run units present very low GHG emissions, since they are basically hydro plants and very few biomass plants.

BUILD MARGIN CALCULATION

ACCORDING TO THE ACM0002 (VERSION 06)

POWER PLANTS	POWER OUTPUT (MW)	PLANT TYPE	FUEL TYPE	START OPERATION	CDM PROYECT	TOTAL GEN IN 2010 (GWh/yr)	SIC EMISSION 2010 (tCO2/ GWh)
Confluencia	155	Run of the river	Hydro	Dic-10	No	3.9	0.0
Mariposas	6	Run of the river	Hydro	Dic-10	No	0.0	0.0
Cem Bio Bio	13.6	Diesel engine	IFO 180	Dic-10	No	4.1	748.3
Cabrero	11	Biomass/steam	Biomass	Nov-10	No	1.3	0.0
Los Corrales	0.8	Run of the river	Hydro	Sep-10	No	0.2	0.0
La Higuera	154.7	Run of the river	Hydro	Sep-10	Yes	0.0	0.0
Juncalito	1.5	Run of the river	Hydro	Sep-10	No	1.3	0.0
El Tártaro	0	Run of the river	Hydro	Sep-10	No	0.1	0.0
Guayacán	12	Run of the river	Hydro	Sep-10	No	20.8	0.0
Carbomet	0	Run of the river	Hydro	Ago-10	No	20.7	0.0
El Salvador	23.8	Open Cycle	Diesel	Ago-10	No	0.3	1,137.3
San Clemente	5.5	Run of the river	Hydro	Jul-10	No	5.9	0.0
Curicó	0	Diesel engine	Diesel	Jul-10	No	0.4	0.0
Punta Colorada	16.3	Diesel engine	Diesel	Jul-10	No	8.0	651.9
Trueno	5.6	Run of the river	Hydro	Jun-10	No	19.7	0.0
Emelda	72	Open Cycle	IFO 180	Jun-10	No	1.2	996.7
Colihues IFO	22	Diesel engine	IFO 180	Jun-10	No	22.0	727.9
Colihues DIE	22	Diesel engine	Diesel	Jun-10	No	0.1	743.1
La Paloma	5.4	Run of the river	Hydro	May-10	No	4.0	0.0
Loma Los Colorados	14	Biomass/engine	Biomass	Abr-10	No	7.4	0.0
Quidico	0	Diesel engine	Diesel	Mar-10	No	0.0	0.0
Guacolda 4	152	Coal/Steam	Coal	Ene-10	No	1,036.6	885.6
Totoral (eólica)	46	Aeolics	Wind	Ene-10	No	84.7	0.0
Monte Redondo	48	Aeolics	Wind	Ene-10	No	82.8	0.0
Quintero GNL	240	Open Cyle	LNG	Nov-09	No	245.8	896.4
Canela 2	60	Aeolics	Wind	Nov-09	Yes	0.0	0.0
Tapihue	6.4	Diesel engine	Diesel	Oct-09	No	1.0	819.2
Termopacífico	96	Diesel engine	Diesel	Oct-09	No	19.8	760.0
Truful Truful	0.5	Run of the river	Hydro	Oct-09	No	0.0	0.0
Nueva Ventanas	272	Coal/Steam	Coal	Oct-09	No	1,998.1	1,049.5
San Lorenzo de D. De	60	Diesel engine	Diesel	Sep-09	No	0.3	1,966.4
Louisiana Pacific	2.9	Diesel engine	Diesel	Jul-09	No	0.0	747.2
El Peñón	80	Diesel engine	Diesel	Jul-09	No	57.7	716.7
Pehui	1.1	Run of the river	Hydro	Jun-09	No	7.1	0.0
Biomar	2.4	Diesel engine	Diesel	Jun-09	No	0.0	749.5
Eagon	2.4	Diesel engine	Diesel	Jun-09	No	0.0	747.5
Salmofood I	1.6	Diesel engine	Diesel	Jun-09	No	0.0	0.0
Salmofood II	1.6	Diesel engine	Diesel	Jun-09	No	0.1	743.1
Teno	50	Diesel engine	Diesel	Jun-09	No	58.0	723.4
Newen	15	Diesel engine	Diesel	Jun-09	No	38.8	128.0
Watts	2.64	Diesel engine	Diesel	Jun-09	Yes	0.0	0.0
Multiexport I	1.6	Diesel engine	Diesel	Jun-09	No	0.0	0.0
Multiexport II	1.6	Diesel engine	Diesel	Jun-09	No	0.0	0.0
Tierra Amarilla	142	Diesel engine	Diesel	Jun-09	No	2.2	1,146.3
Quintero	240	Open Cycle	Diesel	Jun-09	No	16.8	816.4
Lebu (Cristoro)	3.6	Aeolics	Wind	Jun-09	No	6.8	0.0
Guacolda 3	152	Coal/Steam	Coal	Abr-09	No	1,199.1	1,027.3
San Gregorio	0.5	Diesel engine	Diesel	Mar-09	No	0.3	765.8
Linares Norte	0.5	Diesel engine	Diesel	Mar-09	No	0.1	712.2
Chuyaca 1 y 2	20	Diesel engine	Diesel	Feb-09	No	5.5	859.2
Trapén	90	Diesel engine	Diesel	Feb-09	No	42.7	705.8
Los Espinos	122	Diesel engine	Diesel	Feb-09	No	14.2	720.7
Lircay	19	Run of the river	Hydro	Ene-09	No	121.8	0.0
Santa Lidia	136	Open Cycle	Diesel	Dic-08	No	49.5	877.3
El Manzano	4.85	Run of the river	Hydro	Dic-08	No	27.5	0.0
Skretting	2.7	Diesel engine	Diesel	Oct-08	No	0.1	743.1
Cenizas	16.5	Diesel engine	Diesel	Oct-08	No	26.9	123.2
Los Pinos	92.1	Open Cycle	Diesel	Sep-08	No	174.3	712.7
Colmito	55	Open Cycle	Diesel	Ago-08	No	1.1	1,006.6
Chiloé	9	Diesel engine	Diesel	Jul-08	No	0.0	929.3
Coya	10.8	Run of the river	Hydro	Jul-08	No	83.3	0.0
Ojos de Agua	9	Run of the river	Hydro	Jun-08	Yes	0.0	0.0
Puclaro	6	Run of the river	Hydro	May-08	Yes	0.0	0.0
Totoral	3	Open Cycle	Diesel	Abr-08	No	0.4	708.7
Quintay	3	Open Cycle	Diesel	Abr-08	No	0.9	758.5
Placilla	3	Open Cycle	Diesel	Abr-08	No	1.1	693.2
Olivos	96	Open Cycle	Diesel	Feb-08	No	4.0	764.8
Campanario Diesel	220	Open Cycle	Diesel	Ene-08	No	25.9	842.6
Quellon II	10	Diesel engine	Diesel	Ene-08	No	14.4	757.9
Nueva Aldea 3	37	Biomass/steam	Biomass	Ene-08	Yes	0.0	0.0
Canela 1	18.2	Aeolics	Wind	Sep-07	Yes	0.0	0.0
Hornitos	55	Run of the river	Hydro	Sep-07	Yes	0.0	0.0
Palmucho	32	Run of the river	Hydro	Sep-07	No	232.4	0.0
Constitución 1	9	Diesel engine	Diesel	Jul-07	No	1.9	769.7
Maule	6	Diesel engine	Diesel	Jul-07	No	0.6	626.8
Monte Patria	9	Diesel engine	Diesel	Jul-07	No	0.2	783.7
Punitaqui	9	Diesel engine	Diesel	Jul-07	No	0.3	1,073.8
Chiburgo	19.4	Run of the river	Hydro	Jul-07	No	75.8	0.0
Curanilahue	2.1	Diesel engine	Diesel	Jul-07	No	0.1	0.0
Degan	39.6	Diesel engine	Diesel	Jul-07	No	41.1	719.2
Escuadrón (ex FPC)	14.2	Biomass/steam	Biomass	Jun-07	No	90.5	0.0
Esperanza	22.2	Diesel engine	Diesel	Jun-07	No	1.8	790.2
San Isidro II	353	Combined Cycle	Natural Gas	Abr-07	No	16.9	402.6
San Isidro II Diesel	353	Combined Cycle	Diesel	Abr-07	No	87.2	574.7
San Isidro II GNL	353	Combined Cycle	LNG	Abr-07	No	2,846.3	596.1
Quilleco	70.8	Run of the river	Hydro	Abr-07	Yes	0.0	0.0
El Rincón	0.28	Run of the river	Hydro	Abr-07	No	2.4	0.0
Casablanca	1.2	Diesel engine	Diesel	Abr-07	No	0.2	762.8
Las Vegas	2	Diesel engine	Diesel	Abr-07	No	0.7	702.4
Curauma	2	Diesel engine	Diesel	Abr-07	No	0.5	1,125.9
Concon	2.2	Diesel engine	Diesel	Abr-07	No	0.4	1,495.9
Eyzaguirre	2.1	Run of the river	Hydro	Mar-07	No	6.7	0.0
Campanario Gas	180	Open Cycle	Natural Gas	Mar-07	No	0.1	0.0

POWER PLANTS	POWER OUTPUT (MW)	PLANT TYPE	FUEL TYPE	START OPERATION	CDM PROYECT	TOTAL GEN IN 2010 (GWh/yr)	SIC EMISSION 2010 (tCO2/GWh)
Los Vientos TG	132	Open Cycle	Diesel	Ene-07	No	49.2	962.3
Cañete	3	Diesel engine	Diesel	Ene-07	No	0.7	878.8
Los Sauces	3	Diesel engine	Diesel	Ene-07	No	1.1	732.5
Traiguen	3	Diesel engine	Diesel	Ene-07	No	1.1	702.9
Curacautin	3	Diesel engine	Diesel	Ene-07	No	1.5	787.0
Collipulli	3	Diesel engine	Diesel	Ene-07	No	0.6	735.7
Nueva Aldea 2	10	Open Cycle	Diesel	2006	No	0.0	0.0
Ancud	3.3	Diesel engine	Diesel	2006	No	0.8	29,960.6
Quellon	4.99	Diesel engine	Diesel	2006	No	0.8	3.1
Antilhue TG	101.3	Open Cycle	Diesel	2005	No	71.7	872.5
TG_Coronel	46.7	Open Cycle	Natural Gas	2005	No	29.0	242.4
TG_Coronel Diesel	46.7	Open Cycle	Diesel	2005	No	63.2	886.7
Nueva Aldea	14	Biomass/steam	Biomass	2005	Yes	0.0	0.0
Candelaria	253.9	Open Cycle	Natural Gas	2005	No	76.4	831.9
Candelaria Diesel	253.9	Open Cycle	Diesel	2005	No	95.1	952.0
Candelaria GNL	253.9	Open Cycle	LNG	2005	No	11.3	1,020.0
L.Verde TG	18.8	Open Cycle	Diesel	2004	No	4.2	826.2
Licantén	4	Biomass/steam	Biomass	2004	No	21.5	0.0
Valdivia	61	Biomass/steam	Biomass	2004	Yes	0.0	0.0
Horcones TG	24.3	Open Cycle	Natural Gas	2004	No	0.3	841.7
Horcones Diesel	24.3	Open Cycle	Diesel	2004	No	6.3	1,764.4
Ralco	690	Reservoirs	Hydro	2004	No	2,220.6	0.0
Nehuenco II	398.3	Combined Cycle	Natural Gas	2003	No	213.2	1,437.0
Nehuenco II Diesel	398.3	Combined Cycle	Diesel	2003	No	1,547.6	552.1
Nehuenco II GNL	398.3	Combined Cycle	LNG	2003	No	765.9	588.0
Cholguán	13	Biomass/steam	Biomass	2003	Yes	0.0	0.0
Chacabuquito	25.5	Run of the river	Hydro	2002	Yes	0.0	0.0
Nehuenco TG 9B	108	Open Cycle	Natural Gas	2002	No	2.9	1,184.8
Nehuenco TG 9B Dies	108	Open Cycle	Diesel	2002	No	0.6	1,048.3
Nehuenco TG 9B GNL	108	Open Cycle	LNG	2002	No	3.7	1,026.5
San Fco. Mostazal	24	Open Cycle	Diesel	2002	No	0.6	1,526.0
Peuchén	80	Run of the river	Hydro	2000	No	166.5	0.0
Mampil	49	Run of the river	Hydro	2000	No	106.5	0.0
Taltal 2 GNL	122.45	Open Cycle	LNG	2000	No	0.0	833.0
Taltal 1 GNL	122.45	Open Cycle	LNG	2000	No	1.7	977.9
Taltal 2	122.45	Open Cycle	Natural Gas	2000	No	36.5	664.2
Taltal 1	122.45	Open Cycle	Natural Gas	2000	No	19.3	664.1
Taltal	244.9	Open Cycle	Diesel	2000	No	90.6	857.8

TOTAL GEN. PER YEAR	(GWh / yr)	43,192.7
20% OF GEN. PER YEAR	(GWh / yr)	8,638.5

BUILD MARGIN	(tCO2/GWh)	742.37

COMBINED MARGIN CALCULATION
ACCORDING TO THE ACM0002 (VERSION 06)

OM: Calculated ex post (Option 2, the year in which the emissions occur)
BM: Calculated ex-post (Option 2, updated annually from the date the first emissions occur)

		2010
Operating Margin	(tCO_2/GWh)	808.99
Build Margin	(tCO_2/GWh)	742.37
Combined Margin	**(tCO_2/GWh)**	**775.68**