

MONITORING REPORT

Trupan Biomass Power Plant in Chile

CDM Registration Reference Number: 259

VERSION 01

Monitoring period:

From: October 01, 2007

To: September 30, 2008



Celulosa Arauco y Constitución S.A.

October, 2008

SUMMARY TABLE

Name of the CDM project activity:	Trupan Biomass Power Plant in Chile
CDM registration reference number:	259
Starting date of the project activity:	04/04/2001
Starting date of the first crediting period:	01/05/2003
Length of the first crediting period:	Seven (7) years.
Maximum length of the crediting period:	3 x Seven (7) years
Period covered by the current monitoring report:	01 October 2007 – 30 September 2008 (both days included)
Total net emission reductions claimed in the monitored period:	153,151 tCO₂eq

1. Project description and current status

Project description

The Project is designed to use own and third party biomass for electric power generation that would have otherwise been left in piles for natural decay. The Project is presented by Celulosa Arauco y Constitución S.A. (from now on, Arauco) a leading forestry and pulp-producing company in the world, 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 Project involves the construction and operation of a new Power Plant inside the Trupan Industrial Complex site of 30 MW generating electric power capacity. Approximately 50% of the power available is destined to serve the needs of the Trupan Industrial Complex. The remaining 50% is reserved for external energy generation, which is sold to free (unregulated) customers of Arauco Generación¹ and to the spot market in the Interconnected Central System (SIC).

The new Power Plant was part of the expansion project of the Trupan wood panel mill (Trupan Line N°2). Before this project, Trupan had steam generation capacity but no electric power generation capacity, so the Complex sourced all its electric power requirements through the grid². However, when the Trupan management evaluated the expansion project, it considered the surplus of biomass available in the region, the benefits of the Kyoto Protocol and decided to build a new on-site biomass Power Plant with enough capacity to fulfill the electric power needs of the Trupan Industrial Complex and to generate additional 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 traditional practice of the Panel Board Industry in Chile. Given that utilizing a high-pressure boiler implied a significant increase in cost compared to the more conventional saturated-steam power boiler solution, the decision of building such Power Plant relied on the possibility of not depending on the SIC for electric power anymore, on selling excess power to the grid, on supplying electric power to other industrial facilities and mills within the Arauco Group and on the potential benefits from being a CDM project activity.

It must be noted that since this Power Plant was located inside the Trupan Complex site, it first served the energy requirements of the Industrial Complex and exported the surplus energy to the grid. If the Power Plant had been built outside the Trupan site, it would have injected all of its power to the grid, and the Trupan Industrial Complex would have had to buy the energy from the grid³.

¹ Arauco Generación S.A. is a subsidiary of Celulosa Arauco y Constitución S.A.. Arauco Generación provides administration services to Arauco in the areas of engineering and electric power generation.

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

³ Arauco Generación S.A., a subsidiary of Celulosa Arauco y Constitución S.A., represents the Trupan Power Plant in the CDEC-SIC (the relevant dispatch center).

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.

The Trupan project activity proponent 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 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 to demonstrate 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 this additional power generation capacity, making the Trupan Power Plant facility quite unique and particular in its type.

Baseline methodology

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: N°3.

Documentation

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>

Implementation and current status

The project has been completed as planned and described in the Project Design Document (PDD). Though the Trupan project activity falls under the category of an “early CDM project activity” (started functioning before the CDM registration date), the monitoring plan has been implemented and enforced just as described in the corresponding PDD.

Sustainability, economic and social well-being

The Trupan biomass Power Plant reduces carbon emissions by replacing fossil fuel-based electricity generation and by preventing forestry biomass to be left to decay. The project promotes sustainable development by:

- Fostering the diversification of electricity generation towards renewable energy sources in the country.
- Using clean, efficient and top of the line technology to generate power, thus, conserving natural resources and the environment.
- Becoming a benchmark of an efficient and renewable energy generation project in the country. This encourages the development of modern and more efficient generation of electricity and thermal energy throughout the country using renewable biomass sources.
- Optimizing the use of natural resources, avoiding new uncontrolled waste disposal places in the surrounding area of the Power Plant.

2. Monitored parameters

All parameters needed to make the emission reduction calculations according to the monitoring plan are described in the PDD, section D.2. This section provides additional explanatory information about the monitored data.

The following table provides information about the monitored data for the baseline and project emission data variables:

Project activity monitored data

ID number.	Data variable.	Additional comments
1. $BF_{i,y}$	Quantity of biomass of type i combusted in the project plant.	The total biomass per type used in the power boiler was constantly monitored during the verification period. The weight of the biomass was measured by weighing the trucks with and without the biomass cargo (entering and exiting the plant) by electronic weighbridges. The volume of the biomass was also measured and recorded each time. The biomass consumption at the power plant was determined by considering the biomass purchases (measured) and stock variations (measured) during each month.
2. NCV_i	Net calorific value of biomass fuel type i.	The net calorific values of the biomass types entering to the power boiler were measured in an external lab in the region and recorded each year.
3. EF_{CH_4}	Methane emission factor for combustion of biomass in the project plant.	Following the ACM0006 (Version 01) guidance, the project proponent used uncertainty-adjusted referenced default values for this emission factor. Comparisons with direct measurements of the CH_4 quantities in the power boiler flue gases showed that the CH_4 emission factor used in the emission reduction calculation was extremely conservative (see “Additional data”, below).
4. AVD_y	Average return trip distance between biomass fuel supply sites and the project site.	Distances from biomass providers to the Plant were constantly monitored and recorded. This variable was calculated and reported on a monthly basis for the calculation of the project activity emission reductions each month.
5. TL_y	Average truckload of the trucks used for transportation of biomass.	Idem as above.
6. EF_{km,CO_2}	Average CO_2 emission factor for transportation of biomass with trucks.	Average fuel consumption was obtained from the transportation subcontractors, which was then used to calculate the corresponding CO_2 emission factor.
7. $COEF_{CO_2,i}$	Emission factors.	This factor was calculated using IPCC default values (Carbon content and fraction of carbon oxidized) and local national data (Net calorific values of the corresponding fossil fuels).
8. OF_y	On-site use of transport fuel.	Total quantities of fossil fuel per type for on-site biomass transportation were constantly monitored and monthly recorded. These amounts were used to calculate the fossil fuel consumption related to the project activity, just as described in page 44 of the validated PDD.
9. FF_y	Fossil fuel used in Power Boiler.	Total quantities of fossil fuel per type used in the power boiler were constantly monitored at the Power Plant. These amounts were used to calculate the fossil fuel consumption related to the project activity, just as described in page 44 of the validated PDD.

Baseline monitored data

ID number.	Data variable.	Additional comments
10. EG_y (EG_h if dispatch data OM is used)	Net quantity of electricity displaced by the project activity from the grid.	The net energy displaced from the grid resulted from subtracting the additional energy consumption of the Power Plant due to the project activity to the gross energy generation of the Power Plant (measured). The additional power consumption was determined by subtracting the baseline electricity consumption (established in the PDD) to the total energy consumption of the Power Plant (measured).
11. Q_y	Heat quantity	This information was obtained from the amount of steam to the processes and the corresponding enthalpy conditions.
12. EF_y	CO ₂ emission factor of the grid.	Calculated as the average (equal weights of 50% for each) between the OM and BM SIC emission factors.
13. $EF_{OM,y}$	CO ₂ Operating Margin emission factor of the grid.	This factor was calculated according to the chosen baseline methodology (which indicates to follow the ACM0002 methodology). For this coefficient and according to the PDD, the Simple Adjusted OM factor was used. For the 2008 coefficient, the information was available only until September 2008.
14. $EF_{BM,y}$	CO ₂ Build Margin emission factor of the grid.	This factor was calculated according to the chosen baseline methodology (which indicates to follow the ACM0002 methodology). 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. For the 2008 coefficient, the information was available only until September 2008.
15. $F_{i,y}$	Amount of each fossil fuel consumed by each power source / plant.	This information was directly obtained by the CDEC-SIC Dispatch Center or directly from the electric power companies themselves.
16. $COEF_i$	CO ₂ emission coefficient of each fuel type i consumed by the electric power generators in the relevant grid.	This factor was calculated using IPCC default values (Carbon content and fraction of carbon oxidized) and local national data (Net calorific values of the corresponding fossil fuels).
17. $GEN_{j/k/n,y}$	Electricity generation of each power source / plant j/k or n.	This information was directly obtained by the CDEC-SIC Dispatch Center. For the 2007 generation, the information was available only until September 2007.
18.	Identification of power source / plant for the OM calculation.	This information was directly obtained by the CDEC-SIC Dispatch Center.
19.	Identification of power source / plant for the BM calculation.	This information was directly obtained by the CDEC-SIC Dispatch Center.
20. λ_y	Fraction of time during which low-cost / must-run sources are on the margin.	This factor was calculated from information directly obtained from the CDEC-SIC Dispatch Center. For the 2008 coefficient, the information was available only until September 2008.
21.a $GEN_{j/k/l/y}$ IMPORTS	Electricity imports to the project electricity system.	This information was directly obtained by the CDEC-SIC Dispatch Center. There are no imports / exports to the project activity electricity system.

21.b COEF _{ijy} IMPORTS	CO ₂ emission coefficient of fuels used in connected electricity systems (if imports occur).	See 21.a above.
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Though pages 43 and 44 of the registered PDD establish that the biomass associated to the project activity must be calculated using a specific electric power generation factor, EB038 requested the project proponent to use equation 24 of the ACM0006 (Version 01) instead. According to this, the project proponent used this equation to calculate the biomass related to the project activity for the outstanding monitored period. For subsequent periods, the project proponent will continue to use equation 24 of the ACM0006 (Version 01) on this matter, just as instructed by the EB038 report.

The biomass related to the project activity will continue to be used in the calculation of the fossil fuel consumption associated to the project activity, just in the way it is indicated in the registered PDD.

Leakage monitored data

ID number.	Data variable.	Additional comments
22.	Amount of biomass of type i fired in all grid-connected power plants in the region / country	This variable was obtained from host country official data (Infor publications, company annual reports, publicly available environmental studies, among other official sources).
23.	Quantity of biomass of type i that is available in surplus in the region / country.	This variable was obtained from host country official data (Infor publications, company annual reports, publicly available environmental studies, among other official sources).

Other monitored data

ID number.	Data variable.	Additional comments
24.	Biomass origin	All biomass fuels used in the Trupan power plant fully comply with the law. This ensures the renewable origin of the biomass. For more details, please see Annex N° 4 or the registered PDD.

Additional data

To perform the emission reduction calculation, the project proponent monitored some additional data, which was in some cases necessary, in other cases optional for the compliance with the monitoring plan presented in the registered PDD.

Complementary data

BDt / m ³ st	This factor was calculated each month to determine the amount of bone-dry ton (BDt) of biomass from humid volumetric quantities of biomass (cubic meters). To do so, the volume, the biomass humidity and the weight of the biomass were used and monitored at the Plant.
Biomass humidity	This variable was constantly measured and monthly reported for the calculation of the net emission reductions of the project activity.
CH ₄ emission factor for uncontrolled burning of biomass	<p>According to the baseline methodology ACM0006 (Version 01), page 33, the project proponent may undertake measurements or use referenced default values to calculate the CH₄ 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 proponent to use the IPCC default factor corrected by the lowest conservativeness factor (Table N°4, page 34 of the ACM0006 Version 01). This led to extremely conservative CH₄ baseline emissions for the project activity, since in reality a significant portion of the biomass is left to natural decay in the open air, releasing a much higher amount of CH₄ than if it were burned in an uncontrolled way. As a result, the project proponent explicitly mentioned in the PDD (page 67) and in the validation report (page A39) that a local CH₄ measurement would be attempted in order to have a more accurate and fair estimation of the baseline emissions from this source.</p> <p>During September 2006, the project proponent hired the U.S. Forest Service of Missoula, Montana, USA to conduct a local measurement of the CH₄ emission factor for uncontrolled burning of biomass in the nearby area of the Power Plant. The result of this measurement indicated a CH₄ emission factor for uncontrolled burning of the same type of biomass used in the Trupan Power Plant of 740.5 Kg of CH₄ / TJ, with an associated standard deviation of 162.2 Kg of CH₄ / TJ. According to Table 4 of the ACM0006 (Version 01) baseline methodology, this led to a conservativeness factor of 0.94⁴, resulting in an adjusted CH₄ baseline emission factor for uncontrolled burning of biomass of 696.1 Kg of CH₄/TJ.</p>
CH ₄ emission factor for controlled burning of biomass in the power boiler	The project proponent also requested the U.S. Forest Service to carry out a CH ₄ emission factor measurement for controlled burning of biomass in the power boiler. The result of the measurement indicated insignificant (zero) CH ₄ emissions in the flue gases of the power boiler ⁵ . Considering this result and the fact that the project proponent is still using an IPCC default factor of 15.3 Kg of CH ₄ / TJ to calculate the project activity emissions related to biomass controlled burning in the power boiler, the net emission reduction calculation derived from the more efficient way of burning the biomass due to the project activity is conservative.

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

⁵ According to the final measurement report, the flue gases of the power boiler presented lower concentration of CH₄ (0.55 ppm) than clean air levels (1.7 ppm to 2 ppm). Therefore, the combustion process in power generation resulted in a net loss of CH₄ from the air used.

ϵ_{boiler}	<p>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).</p> <p>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 Norm and was further validated by an expert opinion from a highly reputed consulting company, in the field of heat and power generation.</p>
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Summary of the main monitored data

According to the monitoring plan outlined above, the following table shows a summary of the main monitored data of the project activity during the monitored period.

Summary of main monitored data per year

		2007	2008
Operating Margin	(tCO ₂ /GWh)	809.0	864.4
Build Margin	(tCO ₂ /GWh)	570.5	505.0
Combined Margin	(tCO ₂ /GWh)	689.8	684.7
Net energy displaced from the grid	(GWh/yr)	40.7	151.1
Additional biomass due to project activity	(BDT/yr)	17,311	73,572
Net calorific value of the biomass	(TJ / 000 ton)	19.05	18.59
Avg distance between sawmills and P.Plant	(Km)	83.8	72.5
Avg load for 1 trip	(Ton/truck)	17.5	16.2
Additional fossil fuel consumed in P. Boiler			
Diesel	(Lt/yr)	7,996	54,804
Fuel Oil	(ton/yr)	0	0
LPG	(Lt/yr)	205	986
Addit. fossil fuel used for biomass transp. in P.Plant			
Diesel	(Lt/yr)	24,022	86,244

Note: Year 2007 considers monitored data from October to December and year 2008, from January to September.

Some differences between the monitored data and the one used to calculate the net emission reductions in the registered PDD are due to the following reasons:

1. The use of some referential data in the PDD instead of actual monitored data (i.e. conversion factors, humidity factors, etc.).
2. An improvement in the accuracy of some monitored data that was previously used to calculate some emission reduction coefficients in the PDD (i.e. the CDEC-SIC Dispatch Center made some ex-post corrections in the power plant generation data for the past years).
3. The replacement of natural gas for diesel in fossil fuel power plant⁶ and a lower share of hydro power generation in the SIC grid during 2007 and 2008 compared to the year in which the Trupan PDD was written.

⁶ Natural gas from Argentina for electric power generation in Chile was virtually unavailable in 2007 and 2008.

Leakage

Though there are no official studies in the country about the supply / demand situation of forest biomass in the relevant area, Arauco performed annual studies for 2007 and 2008 using official bulletins from INFOR⁷ as well as other (whenever available) official sources to calculate the biomass supply and demand in the Trupan Power Plant influence area⁸. This study was part of the monitoring plan of the Trupan project activity and was carried out according to 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)

TRUPAN INFLUENCE AREA SUPPLY / DEMAND SITUATION

Biomass supply		2007	2008
Total supply	(m³st/yr)	10,483,068	9,713,681
Biomass demand			
Total demand	(m³st/yr)	5,680,530	5,801,773
Total supply / total demand	(number)	1.8454	1.6743

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 the Trupan influence area continue to function without restriction and that new biomass based projects are currently being considered in the area⁹.

From the above analysis, 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.

$$L_y = 0$$

⁷ INFOR stands for "Instituto Nacional Forestal" or "National Forestry Institute" in English.

⁸ The Trupan influence area is clearly defined in page 65 of the registered PDD.

⁹ Including some prospective CDM biomass projects.

Biomass sources

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 N°23, 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.

Since the Chilean forest law is very stringent, failing to comply with it may imply hefty penalties for the transgressors in some cases. For these reasons all Arauco plants tend to be very selective in choosing their suppliers and have tight quality controls in the reception of raw-material.

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.

Quality assurance

Quality control and quality assurance mechanisms for the monitored data were implemented as mentioned in the registered PDD. The following table provides additional information in the same format as the one used in the PDD.

Data	Uncertainty level	QA/QC procedures implemented during the monitored period.
1	Low	<p>Biomass fuels, as well as any other raw material that enters the Trupan Complex are weighed at the entrance of the complex (incoming and exiting trucks). In addition, the cargo volume of each truck carrying biomass fuels is also registered. Biomass inventory is monthly measured and therefore biomass consumption at the Trupan Power Boiler is duly calculated each month. 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.</p> <p>In addition to the above, the project proponent carried out energy balances on a periodic basis as a consistency crosschecking measure.</p>
2	Low	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.
3, 6, 7, 16, 21.b	Low (CO ₂) / Medium (CH ₄)	Local values were used whenever possible. In cases in which they were not available, IPCC factors were used instead.
4	Low	Since the location of each biomass supplier is known (i.e. 99% of the biomass comes from permanent type sawmills in the nearby area), distances were obtained for each biomass supplier point from a regional road map.
5	Low	Trucks that transport the biomass are all of standard sizes. This variable was calculated from measured data (weight and volume of the cargo). Electronic weighbridges in which the measurements were performed receive periodic calibration and maintenance.
8, 9	Low	Fuel meters received periodic maintenance and calibration and the consistency of metered fuel consumption was checked with purchase dispatch bills.
10	Low	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. Finally, the plant manager also performed consistency checks between the total energy generated by the plant and the total biomass fired at the power boiler (efficiency checks).
11	Low	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 Nueva Aldea Phase I plant and therefore, receive periodic maintenance according to proper industry standards.
12, 13, 14, 15, 17, 18, 19, 20, 21a, 21b	Low	As mentioned in the PDD, the quality control of this data is beyond the control of the project operator. However, the project proponent calculated this emission coefficient from official and publicly available data from the CDEC-SIC dispatch center.

22, 23	Medium	The biomass surplus index was calculated using as much official information as possible. Practical 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).
24	Low	In most cases, the Trupan biomass suppliers have some kind of sustainability certification (i.e. Certfor) or have signed supply contracts explicitly declaring to comply with the outstanding forest Chilean law which guarantees a sustainable origin of the biomass sold to the Trupan plant. Further quality assurance of this variable can be found in Annex N°4 of the registered PDD.

In addition to the above, the project proponent developed a dedicated information system designed exclusively to guarantee the quality of the information related to the Trupan CDM project activity. During 2006/2007, this system was successfully incorporated to the Trupan's ISO-14,001 / OHSAS 18,001 systems.

3. Emission reductions

Calculation formulas

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

$$\text{Project Activity Net Emission savings} = \text{Baseline Emissions} - \text{Project Activity Emissions} - \text{Leakage}$$

or

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

or

$$PNE_y = (BL_{E1,y} + BL_{E2,y}) - (P_{E1,y} + P_{E2,y} + P_{E3,y} + P_{E4,y}) - L_y$$

Where:

$BL_{E1,y}$: Baseline emissions from avoided biomass disposal (tCO₂eq/yr).

$BL_{E2,y}$: Baseline emissions from grid electricity displacement (tCO₂/yr).

$P_{E1,y}$: Project emissions from biomass controlled burning in the Power Plant (tCO₂eq/yr).

$P_{E2,y}$: Project emissions from biomass transportation to the biomass Power Plant (tCO₂/yr).

$P_{E3,y}$: Project emissions from biomass transportation within the Power Plant site (tCO₂/yr).

$P_{E4,y}$: Project emissions from fossil fuel consumption in the Power Plant (tCO₂/yr).

L_y : Are the leakage emissions (tCO₂/yr).

The following section of the monitoring report evaluates each part of this equation and calculates the net emission reductions of the Trupan project activity on a monthly basis.

Emission reductions for the monitored period

For the calculation of the net emission reductions of the Trupan project activity, an Excel spreadsheet with the monitored data and the monthly / yearly 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 monthly net emission reduction of the Trupan project activity:

Net emission savings per month

	Net emission savings (tCO ₂ eq/yr)	Baseline emissions		Project activity emissions				Leakage (tCO ₂ /yr)
		Grid emissions (tCO ₂ /yr)	Methane emissions (tCO ₂ eq/yr)	Methane in P.B. (tCO ₂ eq/yr)	Fossil fuel in P.B. (tCO ₂ /yr)	Transport onsite (tCO ₂ /yr)	Transport to P. Plant (tCO ₂ /yr)	
(Months)								
Year 2007								
October	9,349	8,228	1,295	28	6	19	121	0
November	9,851	8,595	1,451	32	3	20	139	0
December	13,072	11,250	2,076	46	12	25	170	0
Total year 2007	32,273	28,073	4,822	106	21	64	431	0
Year 2008								
January	13,841	11,598	2,565	56	1	28	237	0
February	11,733	10,455	1,458	32	7	20	121	0
March	10,957	9,281	1,922	42	35	26	142	0
April	14,060	11,947	2,423	53	34	26	197	0
May	14,934	12,521	2,739	60	20	28	219	0
June	13,408	11,506	2,163	48	4	25	184	0
July	14,232	12,384	2,115	46	12	24	185	0
August	14,200	12,284	2,195	48	19	26	187	0
September	13,514	11,467	2,416	53	14	27	275	0
October	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0	0
Total year 2008	120,878	103,445	19,996	440	146	230	1,748	0
3rd verif (Oct 07-Sept 08)	153,151	131,518	24,818	546	168	294	2,178	0
Total emissions claimed	153,151	131,518	24,818	546	168	294	2,178	0

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

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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