MINAS BASIN
PULP AND POWER COMPANY LIMITED

Hantsport, Nova Scotia, Canada

GHG Emission Reductions Quantification Report 2007 & 2008 updates

Prepared by

L2I Financial Solutions

August 24th, 2009

Quantification Group Letter

Consultant en solutions financières
Financial Solutions Consultant

August 12th, 2009

GDTS S.E.N.C.R.L.
Mr. Roger Fournier
Partner
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Saint-Lambert (Québec) J4P 1L3

Sir,

Our firm was appointed to write a GHG emission reduction report 2007-2008 update for *Minas Basin Pulp & Power Company Limited*. We produced the report according to the ISO 14064 part 2 standards.

We consider the report being a true and fair view of the GHG emission reductions situation at *Minas Basin Pulp & Power Company Limited* considering the time spent on research via official sources, discussions with the customers and the level of assurance is deemed to be reasonable.

Confident in the hope that everything complies with your requirements, we remain,

Yours very truly,

Melina Valero, MBA, LL.L
President and CEO
L2I Financial Solutions

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Acronymes

CH_4	Methane
CO_2	Carbon dioxide
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
N2O	Nitrogen oxide
OTC	Over-The-Counter
SSR	sources, sinks and reservoirs
tCO_2	Tonnes carbon dioxide equivalent
VER	Verified Emission Reduction

EXECUTIVE SUMMARY

Project title
Minas Basin GHG emission reductions

Project Type and methodology
The greenhouse gas emission reductions project has been done according to *ISO 14064-2 standard Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*. IPCC methodology – 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 Energy – has been used to calculate the emission reduction.

Project location
The project is located in Hantsport, Nova Scotia, Canada.

Minas Basin
53, Prince Street
P.O. Box 401
Hantsport, Nova Scotia, Canada
B0P 1P0

Latitude: 45° 3'59.16"N
Longitude: 64°10'28.57"W

Contacts:

Minas Basin
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Vice President – Finance
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L2I Financial Solutions
Contact: Mélina Valero
Chief Executive Officer
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St-Lambert, Québec, Canada

Project description
The project consists in quantifying greenhouse gas emissions attributed to the enhancement of more energy efficient manufacturing equipments. Thus the company's emissions will be calculated and a baseline scenario will be used as a comparison in order to calculate the net emission reduction.

Starting and ending date
The project starts in January 2003 and will go on until 2010. The years ranging from 2003 to 2006 are already quantified in a previous report. This report is an update to the previous report, which includes the years 2007 and 2008. The year 2002 is used for calculating an intensity factor before the project's start date, and thus is used for quantifying the baseline scenario GHG emissions from the pulp and paper production per year.

Emission reductions present and future

Table 1 - GHG offsets (CCX) and VER (OTC) per year

Allowance	OTC
Year	tCO_2 equiv.
Goods	VER
2007	14 463
2008	21398
Total	35 861

Table 2 - Future VER (OTC) and GHG offsets (CCX) Objectives

Allowance	OTC
Year	tCO_2 equiv.
2009	21398
2010	21398
Projected Total	**42 796**

INTRODUCTION

Minas Basin Pulp & Power Company Limited (Minas) was founded in 1927 in Hantsport Nova Scotia. The company is located 45 minutes from the ice free Port of Halifax and it has overnight access by road to a few Canadian provinces and to New England. Minas Basin is specialized in recycled paperboard products such as linerboard and coreboard. Their annual capacity can reach 100,000 metric tons. It uses 100% recycled fibre as feedstock for its production.

In 2002, Minas decided to change some of its equipment used in its production process in order to reduce its energy consumption. These changes were operational in January 2003. It eliminated Paper Machine #1 and proceeded with an extensive enhancement of Paper Machine #2 increasing it's speed and drying capacity. Minas Basin also focuses on protecting the environment. In addition to the 100% recycled fibre used as feedstock, they operate two hydroelectricity generation facilities, which supply electricity to the paperboard mills reducing electricity demand from the grid, i.e. from power plants. They also have a corporate policy that states that they will meet or exceed all environmental standards and regulations.

These pictures originate from the Minas Basin website : http://www.minas.ns.ca/ourenvironment/index.html. The picture on the left represents Minas Basin's exclusive use of recycled fiber. The picture on the right is one of the two hydro generation facilities operated by Minas Basin.

1.0 GENERAL REQUIREMENT

1.1 Relevant GHG Schemes and Methodology

ISO 14064-2 : 06 standards and IPCC methodology - 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 Energy- are used as good practice to identify sources, sinks and reservoirs (SSRs) for the project and baseline scenario. They also served as good practice guidance to quantify, monitoring and report GHG emissions and emission reductions.

2.0 PROJECT DESCRIPTION

2.1 Project description

This project consists in quantifying greenhouse gas emissions attributed to the enhancement of the speed and the drying capacity of the Paper Machine. Thus the company's emissions will be calculated and a baseline scenario will be used as comparison to get the net emissions reductions.

2.2 Project location

The project is located in Hantsport, Nova Scotia, Canada.

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2.3 Inputs and sources of input

Paper recycled fibres are the only input in their production. It comes mainly from domestic, commercial and industrial waste.

2.4 GHG general information

The main greenhouse gases responsible for global warming are: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), hydrofluorocompound (HFC), perfluorocarbon (PFC), sulphur hexafluoride (SF_6).

A large amount of the carbon that is released into the atmosphere as fossil energy is consumed. Petroleum and coal are the principal sources of GHG emissions related to this consumption. By changing to more energy efficient manufacturing equipment, the project avoids emissions from energy consumption and help to reduce the release of CO_2 into the atmosphere.

2.5 Project technologies and products

Minas goes through different stages in order to produce its final products. It uses old corrugated containers as furnish. This recycling effort diverts more than 100,000 metric tons of waste from landfill per year and spares thousands of trees every year. The pulp goes through a paper machine following by the winding process. The corrugators' bridge is the final step to get their product: linerboard.

2.6 Identification of Minas greenhouse gas

The main greenhouse gases identified in Minas production are: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O).

2.7 Recycled linerboard

Linerboard is a type of paperboard used in making corrugated carton metric tonnes. Minas is one of the smaller paperboard producer in North America but the only producer in Eastern Canada.

2.8 Project proponents and relevant stakeholders

L2I Financial Solutions
Contact: Mélina Valero – President and C.E.O.
2015, Victoria Street, suite 200
St-Lambert, Québec, Canada

2.9 Project consultant

The environmental impact assessment was performed by L2I Financial Solutions.

L2I Financial Solutions is a firm specialized in non-traditional corporate financing. These past four years, we have developed an expertise for the quantification of carbon credits. In that capacity, we help companies count, quantify and accrue their carbon credits. We also ensure that they then can be sold. Our expertise consists in elaborating calculation methodologies to quantify the emissions based on reputable international principles. The reports are drafted in accordance with the following guidelines: ISO 14064, CCX and the Over-The-Counter Market (OTC).

Quantification team

David Dussault, M.B.A.

Mr. David Dussault has obtained a bachelor's specialized in law, a master's degree in Business Administration and he will receive his master's degree in Environmental Studies in April of 2009. He is currently in the process of obtaining two Environmental Charters (VEA and EESA), which are authority licensed charter agreements in Environmental Verification and Site Evaluation.

Supervision

Mrs. Mélina Valero (Management) and Mr. Yves Legault (Finance) are responsible for supervising the carbon credits quantification team. For many years now, they have been on the look-out for their customers needs regarding the quantification of greenhouse gases. They offer GHG quantification services, the compilation of reports and finally the sale of the carbon credits on the organized markets, for instance the voluntary carbon market.

2.10 Summary environmental impact assessment

An environmental impact analysis is not required for this GHG project. There are no negative environmental impacts resulting from the proposed project.

By producing a 100% recycled product for the market place, Minas contributes in saving thousands of trees, also in saving millions of gallons of water, in preventing thousands of cubic meters of landfill and preventing at least a thousand metric tonnes of air pollution every year. By operating renewable, ecological hydro sites, Minas also avoids consuming hundreds of gigawatts of electricity originating from fossil fuel power plants.

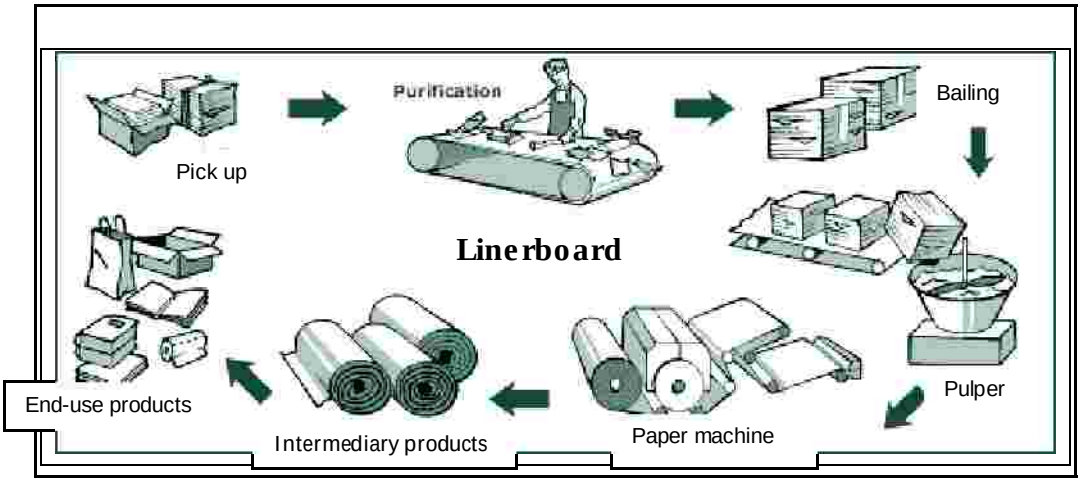
3.0 DETERMINING THE BASELINE

The baseline is the most appropriate and best estimate as a reference scenario for which the project can be compared to. The baseline scenario covers the same temporal range as the project.

3.1 Baseline scenario

The chosen baseline scenario uses a defined intensity factor (GHG per metric ton of production) based on the 2002 year's energy-consuming equipments (Paper Machine No. 1 & No. 2) since the new equipment was operational in January 2003. It's important to compare the project GHG emissions with the same paper production (metric ton) in the baseline scenario, this is the reason why we had to use an intensity factor based on the year 2002 (GHG/metric tonne of production). Therefore, the baseline GHG emission is calculated using the actual production for 2007 and the intensity factor defined in 2002, when Minas Basin was using paper machine No 1 & No 2.

Figure 1 : Paper production



[1]

[1] http://www.fostplus.be/tpl/page.cfm?pagID=25

4.0 IDENTIFYING GHG SOURCES, SINKS AND RESERVOIRS RELEVANT FOR THE BASELINE AND PROJECT SCENARIO

To calculate what would be the GHG emissions from the production with the old paper machine we must use an intensity factor based on the year 2002. GHG and emission factors have been taken from Environment Canada - National Inventory Report 1990-2006.

4.1 Selection and Identification of GHG sources, sinks and reservoirs

The emission sources come from the use of oil and electricity for the recycled paper production.

Gases involved in the baseline and project scenario are: carbon dioxide (CO_2), methane (CH_4) and nitrogen oxide (N_2O).

Figure 2: Project and Baseline Scenario Sources

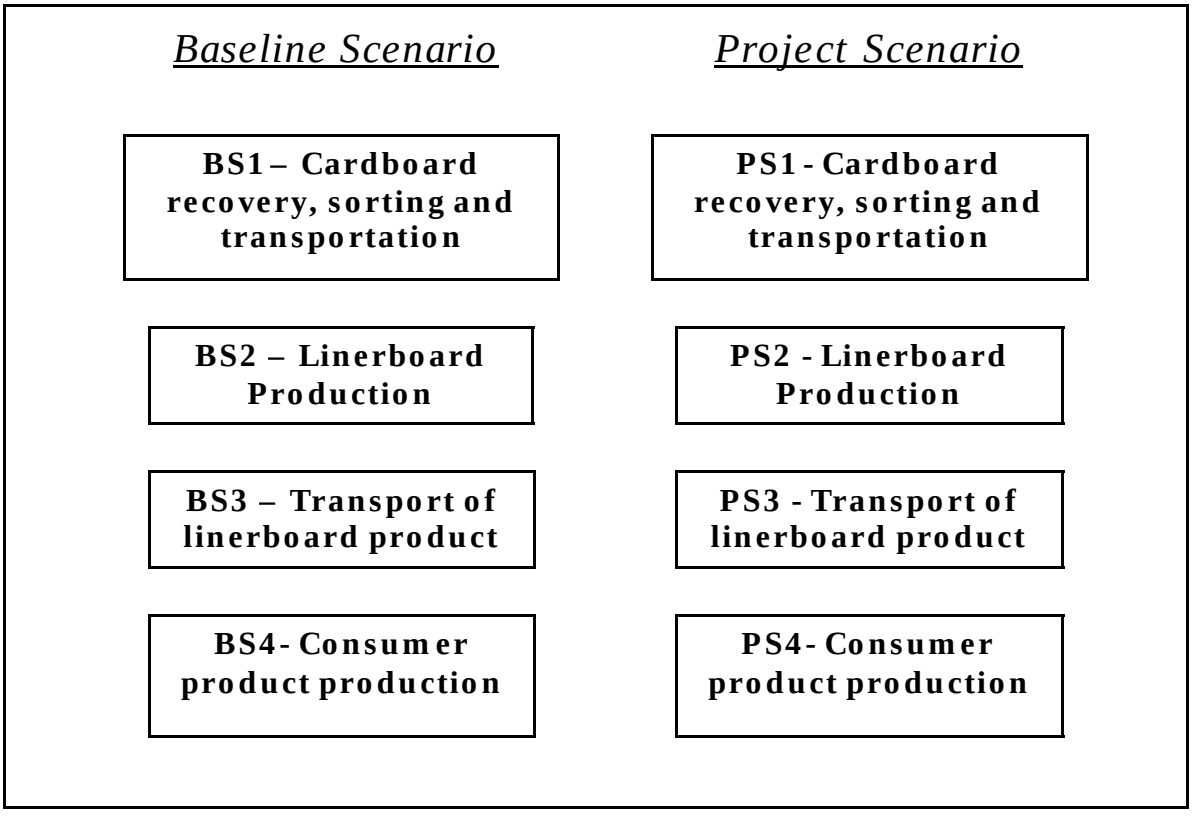


Table 3 - Emission sources comparison (metric metric tonne of CO_{2e})

Baseline scenario		Project scenario	
	Emission factors - No project -		Emission factors - Project -
BS1: Cardboard recovery, sorting and transportation	Related sources not modified by the project	**PS1:** Cardboard recovery, sorting and transportation	Related sources not modified by the project
BS2: Linerboard Production	Quantified sources [2] BS1 et BS2 Oil : 3.124184 X 10^{-3} Elect. production: 3.5 X 10^{-6} Elect. consumption: 5.49 X 10^{-4}	**PS2:** Linerboard Production	Quantified sources[3] PS1 et PS2 Oil : 3.124184 X 10^{-3} Elect. prod.: 3.5 X 10^{-6} Elect. cons: 5.49 X 10^{-4}
BS3: Transport of linerboard product	Related sources not modified by the project	**PS3:** Transport of linerboard product	Related sources not modified by the project
BS4: Consumer product production		**PS4:** Consumer product production	

BS : CO_2 emission source, baseline scénario
PS : CO_2 emission source, project scenario

[2] Environment Canada - National Inventory Report 1990-2006 .
[3] Environment Canada - National Inventory Report 1990-2006 .

5.0 QUANTIFYING GHG EMISSIONS

5.1 Choice of methodology

The choice of methodology of quantification has been chosen among all recognized methodologies available such as Intergovernmental Panel on Climate Change (IPCC), Environment Canada and recognized quantification protocols.

We have based our quantification on the IPCC methodology that is found in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2 – Energy[4]. But for the baseline scenario, we had to use an intensity factor based on the energy consumption and the paper production of 2002, because the linerboard production is different from one year to another.

IPCC methodology takes into consideration the emissions related to the following gas:

- § CH_4
- § CO_2
- § N_2O

Based on this methodology, we can conclude that Minas is responsible and owns the emissions avoidances and the emission reductions related to their products.

5.2 Methodology description and justification

Calculation of total emission reduction (TR) is the difference between the old Paper Machine GHG intensity factor and the new Paper machine intensity factor for the project production. Three types of data are used: specific GHG emission factors, intensity factors since 2002 energy consumption and paper production, and quantity (metric tonnes) for each types of energy (oil and electricity). Quantity is provided by Minas. Specific emission factors for each energy are available through Environment Canada - National Inventory Report 1990-2006[5]. And the intensity factor (GHG/paper production) is calculated with the energy consumption data and the paper production since 2002. The following table shows the different emission factors:

Table 4: Baseline and project emission factors

	CO_2	CH_4	N_2O
Oil (Bunker C)	3124 g / L	0,12 g / L	0,064 g / L
Oil (Bunker C)	0,003124 t / L	1,20E-07 t / L	6,40E-08 t / L
Electricity - Hydro production	3,5 Kt CO2e/TWh	3,50E-06 t CO_{2e} / KWh	

[4] IPCC Guidelines for National Greenhouse Gas Inventories (2006), volume 2 – Energy;
[5] Environment Canada - National Inventory Report 1990-2006.

Electricity - Nova Scotia	0,549	**Kg CO2e/KWh**	0,000549	**t CO2e/KWh**
Intensity Factor	1,19	**t CO_{2e}/ metric tonne product**		

This type of methodology has been chosen since the production is not the same from one year to another. We could not compare the GHG emissions of 2002 with the other years since Minas Basin didn't have the same production. This is why we used the intensity factor of 2002, reference year, to estimate the baseline scenario GHG emission for each subsequent year.

5.3 Set-up formula to calculate the emissions

Total reduction (TR)
Total GHG reduction is the difference from the project intensity factor and the baseline intensity factor multiplied by the project production since 2003.

$$TR = (IF2002 - IF200x) * P_{project}$$

IF2002= Intensity factor before the project was in place. (t CO_{2e} / metric tonne production);
IF200x= Intensity factor for 2007 and 2008. (t CO_{2e} / metric tonne production);
$P_{project}$= Project production per year since 2003 (metric tonne).

Baseline Intensity factor
This formula takes into consideration the production and the GHG emissions that would be generated by the old equipments for the year 2002, before the project was implemented.

$$IF2002 = [(Q_{OB} * EFO_{CO2}) + (Q_{OB} * EFO_{CH4}) + (Q_{OB} * EFO_{N2O}) + (Q_{EPB} * EF_{EP}) + (Q_{ECB} * EF_{EC})^{6}] / P2002$$

Q_{OB} = Oil quantity in the baseline scenario (liter);
Q_{EPb} = Electricity produced in the baseline scenario (KWh);
Q_{ECb} = Electricity consumed in the baseline scenario (KWh);
EFO_{CO2} = Heavy oil (Bunker C) CO2 emission factor (0.003124 t/liter)[7];
EFO_{CH4} = Heavy oil (Bunker C) CH4 emission factor (1.2 X 10^{-7} t/liter)[8];
EFO_{N2O} = Heavy oil (Bunker C) N2O emission factor (6.4 X 10^{-8} t/liter)[9];
EF_{EP} = Electricity produced emission factor (3.5X 10^{-6} t CO_{2e} per KWh)[10];
EF_{EC} = Electricity consumed emission factor (5.49 X 10^{-4} t CO_{2e} per KWh)[11];

[6] IPCC Guidelines for National Greenhouse Gas Inventories (2006), volume 2 – Energy. chapter 2 stationary combustion, equation 2.1, p. 2.11
[7] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial
3124g/l) 1000) 1000 = 0.003124 t/l CO2
[8] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial
0.12 g/l) 1000) 1000 = 1.2 X 10^{-7} t/l CH4
[9] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial
0.064 g/l) 1000) 1000 = 6.4 X 10^{-8} t/l N2O
[10] Hydro-Québec: Emissions de gaz à effet de serre des options de production d'électricité, Figure 1: moyenne des 2 coefficients d'émissions:hydraulique au fil de l'eau. 3.5 Kt CO2e/TWh * 1000 ? 10^{9} = 3.5X 10^{-6} t CO_{2e}/KWh
[11] National Inventory Report 1990-2006 (May 2008), Greenhouse Gas Source and Sinks in Canada, p.510 Internet link : http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/2006_report_e.pdf

P2002 = Production for 2002 expressed in metric tons.

Project emissions

This formula takes into consideration the production and the GHG emissions that are generated by the new equipments since 2003.

$$IF200x = (Q_{OP} * EFO_{CO2}) + (Q_{OP} * EFO_{CH4}) + (Q_{OP} * EFO_{N2O}) + (Q_{EPP} * EF_{EP}) + (Q_{ECP} * EF_{EC}) / P_{project}$$

Q_{OP} = Oil quantity in the project (liter);
Q_{EPP} = Electricity produced in the project (KWh);
Q_{ECP} = Electricity consumed in the project (KWh);
EFO_{CO2} = Heavy oil (Bunker C) CO2 emission factor (0.003124 t/liter)[12];
EFO_{CH4} = Heavy oil (Bunker C) CH4 emission factor (1.2×10^{-7} t/liter)[13];
EFO_{N2O} = Heavy oil (Bunker C) N2O emission factor (6.4×10^{-8} t/liter)[14];
EF_{EP} = Electricity produced emission factor (3.5×10^{-6} t CO_{2e} per KWh)[15];
EF_{EC} = Electricity consumed emission factor (5.49×10^{-4} t CO_{2e} per KWh)[16];
$P_{project}$ = Production for the given year expressed in metric tons.

[12] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial 3124g/l) 1000) 1000 = 0.003124 t/l CO2
[13] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial 0.12 g/l) 1000) 1000 = 1.2×10^{-7} t/l CH4
[14] Environment Canada - National Inventory Report 1990-2006 p.597 Heavy Fuel Oil - Industrial 0.064 g/l) 1000) 1000 = 6.4×10^{-8} t/l N2O
[15] Hydro-Québec: Emissions de gaz à effet de serre des options de production d'électricité, Figure 1: moyenne des 2 coefficients d'émissions:hydraulique au fil de l'eau. 3.5 Kt CO2e/TWh * 1000 ? 10^9 = 3.5×10^{-6} t CO_{2e}/KWh
[16] National Inventory Report 1990-2006 (May 2008), Greenhouse Gas Source and Sinks in Canada, p.510 Internet link : http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/2006_report_e.pdf

6.0 SUMMARY OF GHG EMISSIONS FROM THE BASELINE

Section 5.3 detailed formulas that must be used to calculate emissions related to the baseline scenario intensity factor. Here are the result calculations for the baseline scenario.

Calculation for emissions and reductions related to the project starts in 2002. This year have been chosen since it was the last where the old equipment was in operation.

Given that the aim of this emission reduction quantification report is to sell those credits on the Over The Counter (OTC) market, we have enough data to illustrate the effectiveness of the project scenario compare to the baseline scenario.

Table 5 – Baseline Intensity factor

	Production (t)	Total t CO_2e	Intensity (t CO2e/unit)
2002	74310,814	88286	**1,19**

7.0 SUMMARY OF GHG EMISSIONS FROM THE PROJECT

Section 5.3 also detailed formulas that must be used to calculate emissions related to the project scenario intensity factor. Here are the result calculations for the project scenario.

The following table presents a summary of the project scenario intensity factors.

Table 6 - Summary of project scenario intensity factors

	Production (t)	Total t CO_2e	Intensity (t CO2e/unit)
2007	74559	74118	0,99
2008	79457	73002	0,92

8.0 QUANTIFYING GHG EMISSION REDUCTIONS

The total reduction of GHG emissions for this project is obtained by subtracting the project intensity factor to the baseline intensity factor multiplied by the project production.

The next table summarizes the resulting emission reductions achieved from the project.

Table 7 - Emission reductions

		Intensity difference 2002-200X (t CO2e/unit)	Production (t)	Reduction
	2007	0,19398	74559	14463
	2008	0,26931	79457	21398
Summary	Total			35861

9.0 GHG OFFSETS AND VERIFIED EMISSION REDUCTION (VER)

The GHG emission reduction allocation is done for every year that Minas was operating its new Paper Machine. Since this is an update, we have included the tCO_2 for the year 2007. Offsets will be VER (Verified Reduction Emission) available on the OTC.

Table 9 - GHG offsets (CCX) and VER (OTC) per year

Allowance	OTC
Year	tCO_2 equiv.
Goods	VER
2007	14 463
2008	21398
Total	35 861

The VER forecast is based on Minas' technology; no change will be implemented before a new, more efficient and more profitable manufacturing technology is available. However, Minas' equipment has a long-term lifespan, due to this, it is expected that the company will maintain it's present position until 2010.

Table 10 - Future VER (OTC) and GHG offsets (CCX) Objectives

Allowance	OTC
Year	tCO_2 equiv.
2009	21398
2010	21398
Projected Total	**42 796**

10.0 UNCERTAINTY AND LIMITS

Oil and electricity emission factors used in the calculations come from recognized sources: Environment Canada - National Inventory Report 1990-2006, Hydro-Québec and GHG Registries. Conditions in which those emission factors have been used allow our calculations to be in the same range as IPCC. We've followed the IPCC methodology found in 2006 IPCC Guidelines for National Greenhouse Gas Inventories

The intensity factor used for estimating the baseline emissions was not part of a recognized source, but on another hand, it was directly calculated from the data of Minas' production and energy consumption. In a way, it's even more accurate then using a general factor.

A revision of the different emission factors must be done each year in order to adjust the emission reduction if necessary.

The calculations are compliant with the results of similar projects in as much as the available data, from the company and recognized sources, are accurate.

All calculations are verifiable and are endorsed by references.

We can conclude that the uncertainty is low since all data has been acquired from and verified by the client, and because the data is reconciled with supplier invoices.

11.0 DATA COLLECTION AND MONITORING

Minas Basin consumes significant amounts of heavy fuel oil, to provide steam for the drying of paper, and electricity, to operate manufacturing machinery and equipment. Fuel oil is delivered by tanker truck, daily and signed receipt documents and supplier invoices are used to record and monitor purchases. The boiler house operation meters fuel usage, steam generation, boiler efficiency etc. and this information is collected in a computerized database daily. Fuel inventory is reconciled by physical dip of holding tanks each month.

Management reports on fuel consumption, cost and steam generation and use are distributed monthly to assist the optimization of operations. Steam utilization is an important cost element in the manufacture of paper, which is carefully monitored and forecasted.

Electricity for the Mill is obtained from two sources; purchases from Nova Scotia Power (the provincial electrical utility) and from hydro generated at Minas Basin's five-megawatt generation facility, on the St. Croix River system. All electrical activity is carefully metered and recorded by a 24-hour operations staff and costs and consumptions are reconciled monthly with utility invoices and

production records. Monthly reports and review meetings are used by management to insure operational efficiency and cost minimization.

During recent years Minas Basin has made considerable efforts and investments to reduce energy consumption, to achieve both cost and environmental objectives. Timely, accurate record systems and continuous improvement efforts by management have been successful in making notable progress.

12.0 ENVIRONMENTAL IMPACT ASSESSMENT

An Environmental Impact Assessment (EIA) is not necessary for Minas' project since it respects Canadian environmental laws and regulations. Finally, the project is also providing sufficient information to answer the OTC market requirements concerning the environmental impacts.

13.0 CONCLUSION

An exhaustive study of Minas' emission sources has been realized. We have considered all data that has an impact on CO_2 emissions and reductions. A plant visit has been realised. Production and energy consumption data as well as different studies have been examined, and a rigorous analysis has been done in regards to the company's emission situation.

ISO 14 064 part 2 standard has been followed in order to have this report register at the CSA level and for market trading use.