Enfoui-Bec Inc.

Enfoui-Bec Inc. Emission Reductions Project Part I – "Avoidance of methane production from decay of biomass through composting"

Greenhouse Gas Emission Reductions Report for 2002-2007

Presented to: *Enfoui-Bec Inc.*

18 055 rue Gauthier
Bécancour, Québec
G9H 1C1

Prepared by: *L²I Financial Solutions*

2015, rue Victoria, suite 200
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March 25th, 2009

Quantification Group Letter

Consultant en solutions financières
Financial Solutions Consultant

May 4th , 2009

GDTS S.E.N.C.R.L.
Mr. Roger Fournier
President
6, boul. Desaulniers, office 600
Saint-Lambert (Québec) J4P 1L3

Sir,

Our firm was appointed to write a GHG emission reduction report for Enfoui-Bec Inc. 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 Enfoui-Bec Inc. 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,

Christine Lagacé, ADM.A
Vice-President, Financial Relations

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Enfoui-Bec Inc. avoidance of methane production from decay of biomass through composting GHG Emission Reductions Project

Greenhouse Gas Emission Reductions Report

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ABBREVIATIONS

BS: Baseline Scenario GHG emission source
CH_4 : methane
CO_2: carbon dioxide
CO_2 eq. : carbon dioxide equivalent, normally expressed in metric tons
EESA: *Évaluateur Environnemental de Site Agréé*
EPA : Environmental Protection Agency (USEPA)
GHG : Greenhouse gas
IPCC: Intergovernmental Panel on Climate Change
ISO: International Standardization Organization
LFG: Landfill Gas
MTCE : Metric ton of carbon equivalent
N_2O : Nitrous oxide
PS: Project Scenario GHG emission source
tCO_2 eq. : metric tons carbon dioxide equivalent
VEA: *Vérificateur Environemental Agréé*

Introduction

Introduction of the Editing and Quantification Team

Solutions L2i is a firm specialized in non-traditional corporate financing. These past four years, we have developed an expertise in the quantification of carbon credits. In that capacity, we help companies to count, quantify and accrue their carbon offsets and ensure their selling. Our expertise consists in selecting, applying and elaborating quantification methodologies to quantify the emissions based on reputable international sources. The reports are drafted in accordance with the following guideline: ISO 14064-2.

Profile Summary of the Team Members

Martin Brisebois, B.Sc., M.Env.

Mr. Martin Brisebois obtained a master degree in Environmental Sciences (Climate Change oriented) in 2006. He has already some experience in GHG quantification and in heavy metal contaminated waste management. He is currently in the process of obtaining two Environmental Charters (VEA and EESA), which are authority licensed charter agreements in Environmental Verification and Environmental Site Evaluation.

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 May 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 Environmental Site Evaluation.

Supervision

Mr. Yves Legault (Finance) and Mrs. Melina Valero (Management) 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 gas. They offer GHG quantification services, writing reports and the selling of the carbon credits on the organized markets such as the voluntary carbon market.

Executive Summary

Project Title
Enfoui-Bec Inc.. avoidance of methane production from decay of biomass through composting GHG Emission Reductions Project.

Type of GHG Project

This is a methane avoidance project. This emissions reduction report was written according to ISO 14064-2 Specifications Requirements for quantification, monitoring and reporting of greenhouse gas emission reductions and removal enhancements assertions.

GHG Project Proponent and Facilities Description:

Enfoui-Bec Inc. site is located at *Bécancour* near *Trois-Rivières*. The project proponent has its facilities at the following address:

Enfoui-Bec Inc.
18 055 rue Gauthier
Bécancour, Québec
G9H 1C1
Tel: (819) 233-2443
http://www.enfouibec.com/

They also have a site at Sainte Gertrude. Enfoui-Bec Inc. is responsible for the project's implementation, emission reductions and data monitoring.

Latitude: 46° 17' 11, 71'' N
Longitude: 72° 33' 11, 93'' W

Project Brief Description

Enfoui-Bec Inc. is using slime from pastes and paper companies to produce compost instead of managing it through landfills. The goal is to reduce the direct environmental impact caused by waste, such as odour nuisances. The compost produce is use for lands and farms fertilisation around Enfoui-Bec Inc.

Project Starting Date

The composting project starts in January of 2002.

Offsets Use and Users

The target users are the potential offsets VER (Verified Emission Reductions) buyers on the carbon voluntary market.

Programs Presentation

The GHG project will be publicly listed on the GHG CleanProjects Registry. A requirement of GHG CleanProjects is that the GHG Report conforms with the ISO 14064-2 standard.

GHG Project Protocols and Standards

Verified Emission Reductions (VERs) were assessed according the ISO 14064 part 2 international standards. Thus, the PDD (Project Design Document) was drafted in accordance with the provisions and guidelines of the ISO 14064-2.

Risks and / or Limits of the project

This quantification report has been prepared based on several information sources. Data collection was completed in January 2009. Thereafter, some complementary demands were made to complete the document. The risks or limits are related to the information sources.

The risks or limits of the project are closely bound to the baseline scenario selection. For example, the baseline could be altered in a few year's by a law and regulation change. Thus, it will be important to monitor tendencies and regulation on paste and paper slime management.

Another risk that could alter the project is the efficiency of the composting activity. Aeration of the compost must be well maintained in order to reduce methane emission.

Compliance with relevant local laws and regulations related to the project

There are no specific Canadian or Quebec laws or regulations that stipulate the obligation of making compost with paste and paper slime. In other words, there are no laws that stipulate that Enfoui-Bec Inc. had to apply the project in this report, they could have continued with the baseline scenario instead: landfill (management system) without Landfill Fuel Gas (LFG) recovery.

Methodology

We have opted for the quantification methodology proposed by the Environmental Protection Agency (EPA, USA) titled: *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks*, published in September 2006 [1], because we

[1] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

have the supporting documentation related to the company's energy consumption and we are able to estimate the GHG emissions based on the emission factors provided by this methodology. Therefore, the present document was drafted in accordance with the provisions and guidelines of the EPA *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks*, published in September 2006 [2].

- Choosing the emission factors from this methodology remain the most appropriate choice for the project since Enfoui-Bec Inc. activities are in North America.
- Emission factors reflect the North American energy consumption;
- The EPA *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks* contains well research and established emission factors for composting or landfilling that makes it a relevant document[3].

Table 1 - GHG Emission Reductions Summary:

Year	Total Project Emission Reductions (Metric tons CO2 eq.)
2002	74 781
2003	81 923
2004	78 643
2005	78 414
2006	100 153
2007	69 682
Total:	**483 596**

Ownership of the GHG emission reductions/removals:

Enfoui-Bec Inc. owns the raw materials used in the project. They also own all the equipment and installations needed for the composting operations proposed in this report. Thus they legally own the CO_2 eq emission reduction credits that are quantified in this report.

Verification notification

Initially quantified by L2I – Financial Solutions Consultant, the verification of the VERs will be conducted by the following external verification entity; GDTS s.e.n.c.r.l. according to the ISO 14064 part 3.

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[2] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[3] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.93 landfilling and p.61 composting emission factors, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

Chapter 1: GHG Emission Reductions Project Historical Basis

1.1 Enfoui-Bec Inc. History

Enfoui-Bec Inc. was founded in 1982. Before the site was bought, it was exploited for the following activities; a sand-pit and a borrow-pit. Enfoui-Bec made some research on the properties of the soil. From the positive results, a landfill site emerges.

First, a license for dry deposits is issued and another one is acquired for the reception of the paper residues. In the fall of 1987, a special waste division was also added. Those special wastes were disposed in a cell excavated in high quality soil; a clay type of soil. In 1997, the enterprise bought a fleet of trucks and some containers in order to offer a larger spectrum of services to their customers. Composting was then developed in the pastes and paper division. In 2001, a new regulation stipulates an obligation to dispose of contaminated soil in high safety cells. Enfoui-Bec Inc. conforms with the new legislation in 2002. Increasingly, the contaminated soils remain a source which needs to be developed. Thus, the decontamination activity is started. In 2006, a processing center is born.

The goal of Enfoui-Bec Inc. is to reduce solid waste landfilling by their recycling activity. Sorting solid waste is an important activity. First of all, wood is preserved, shredded and sent to pastes and paper companies to be used as combustion fuel in their boilers. As for the concrete and asphalt, they are aggregated and sent to the crusher. This recycled material is used as a subbase for parking and other activities. In 2006, Enfoui-Bec Inc. installed a charges system, related to the new regulation, and therefore the construction of a sorting center. Over the years, the purchases of equipment increase : back-digging shovel, crusher, articulated truck, mechanical ram, etc.

In the future, Enfoui-Bec Inc. is looking forward to optimizing their wooden recycled products and finding a better use for their product than using it as combustion energy in boilers. Through these activities, they offer a longer lifespan for wood.

1.2 Data Collection

Data collection was completed through interviews, on site, in Bécancour in May of 2008 and the rest of the data during the month of July in 2008.

During the site visit, the organization's overall operations were reviewed in order to understand all processes and associated equipments impacting the quantity of greenhouse gases emissions.

Phone conversations with the general manager, Mrs Josianne Lemay, and the operations' manager Raymond Lyonnais were necessary in order to complete the information.

1.3 GHG Project Scenarios – Enfoui-Bec Inc.

The project contributes to GHG emissions reduction since it makes it possible to produce less methane trough aerobic treatment (composting) of the biomass decay than it would otherwise in the baseline scenario (landfilling).

Composting has an important impact on reducing GHG emissions. The methane is a gas that is released with anaerobic biomass decay in a landfill environment, so by composting, we reduce the methane production by aerobic treatment instead of the anaerobic decay of the biomass.

The composting facilities are operational since 2002 and it replaces the landfill management that was in place.

Figure 1 – Enfoui-Bec Inc.'s composting installation

In the EPA methodology, emission factors for Yard Trimmings are recommended to be used, yard trimmings being considered as surrogates for organic (type unknown) material in general[4]. For Enfoui-Bec Inc.'s composting project, the pastes and paper slime is an organic material.

The emission factors used in this report are different for the baseline and the project scenario, because of the default methane conversion factors (MCFs) specific to each management method: composting or landfilling. The emission factors for all the sources are included in the Environmental Protection Agency (EPA, USA) methodology titled: *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks*, published in September 2006.[5] Before, January 2002, the pastes and paper slime that was sent to a landfill, was managed without any biogas recovery.

[4] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, exhibit 8-1, p.108.
Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[5] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

1.4 Baseline Scenarios Description and Selection

The baseline scenario was selected among alternative scenarios representing what would have happened without this project. If this project had not been implemented, the methane production would have been higher with the landfill management option.

Baseline potential scenarios:

1. Status quo, not changing the management system in place (landfill) for another management system (composting);
2. Another scenario would be installing a methane recovery system in the landfill management system;
3. Also, the projected scenario which implies the replacement of the landfill management system by the composting management system.

The first option was considered realistic since, before the project's implementation, the landfill management system for pastes and paper slime was already in place. The second scenario was evaluated to be different from the first one in terms of methane emissions, because the biogases are collected and thus can be used as an energy source. Furthermore, this scenario has a financial barrier compared to the status quo, and there's no legal obligation to install a biogas recovery system. Finally, financial barriers are significant for the third scenario, which involves composting installations and their subsequent exploitation for the purpose of commercializing their end product, and thus, this scenario is rejected as a baseline and is proposed as the project scenario.

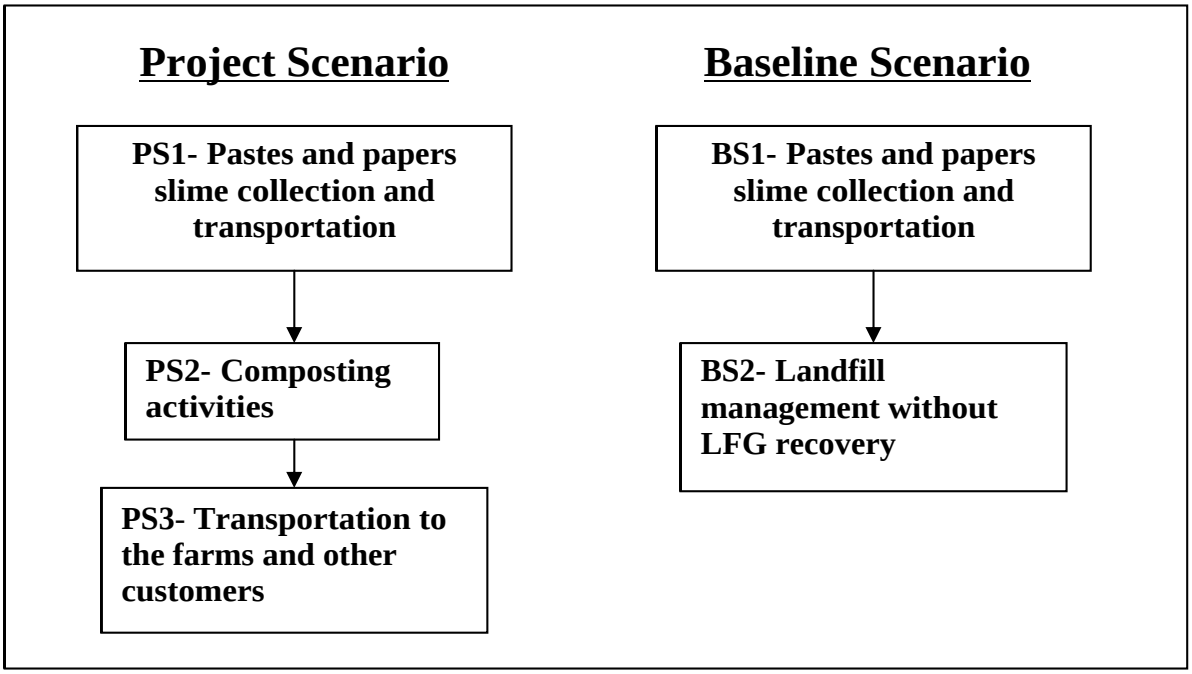
In summary, the baseline scenario:

- Landfill system already in place, without Landfill Gas (LFG) recovery.

Identification of the Project and Baseline Emission Sources and Sinks

The GHG emission sources or sinks identified in this project were analyzed in conformity with the requirements of the ISO 14064 part 2 standards.

Figure 2: Project and Baseline Scenario Sources



BS: Baseline Scenario GHG emission source
PS: Project Scenario GHG emission source

Table 2: Emission sources comparison (metric tons CO_2 eq)

Project Scenario Composting		**Baseline Scenario Landfill activities**	
	Emission factors - Project - (Factors –metric tons CO_2 eq)		Emission factors - No-project - (Factors –metric tons CO_2 eq)
PS1- Pastes and papers slime collection and transportation	Process EPA factor for composting[6] : - 0,05 MTCE / Yard Trimming	**BS1**- Pastes and papers slime collection and transportation	Process EPA factor for landfilling [7]: 0,05 MTCE / Yard Trimming

[6] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, exhibit 4-6, p.61, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html

PS2: Composting activities		**BS2:** Landfill management option	
PS3- Transportation to the farms and other customers	Related source not modified by the project		

BS: Baseline Scenario GHG emission source
PS: Project Scenario GHG emission source

Transportation of the paste and paper slime to the landfill (baseline scenario) and the composting platform (project scenario) are controlled sources to both activities, and they are considered to be similar since they are both on Enfoui-Bec site. As for the landfill and composting activities, they are also controlled sources. There's a third sources of GHG emission in the project scenario, and it's the transportation of the compost to the customer's. This source is considered to be related to the project, since it's the customer's who makes the transportation. Moreover, the EPA emission factors include the transportation GHG emissions.

1.5 GHG Reductions Monitoring

Data Management

The slime data are accounted and aggregated manually on a daily basis, and inserted into *Excel spreadsheet* once a year by the accounting department of Enfoui-Bec. Josianne Lemay, general manager, is in charge of the data collection and input. She also audits the data from the *Excel spreadsheet*. The data is kept in a central server at the head office.

Among data to be monitored, fossil fuel and electricity will be filed for all discussed controlled sources, including stationary and mobile sources, per month or per calendar year. Production data is already monitored per activity, per day, and reported per month.

The following tables present the monitored parameters:

Energy consumption data

Electricity:
Enfoui-Bec Inc. consumes electricity in their mechanical equipment used for their recycling and composting activities.

[7] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, exhibit 6-8, p.93, Landfills without LFG recovery, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html

Data / Parameters	Electricity
Data unit :	kWh
Description :	Wood Recovery, sorting operations and associated equipment.
Source of data to be used :	Hydro-Quebec energy bills
Value of data applied for the purpose of calculating expected emission reductions :	Included in the EPA factors
Description of measurement methods and procedures to be applied :	Electricity bills are entered monthly into an excel spreadsheet file. Backups of the computer are done periodically.
QA/QC procedures to be applied :	Section 5.10 of ISO 14064-2[8]
Any comment :	

Fossil fuel: Diesel

Enfoui-Bec Inc. consumes diesel in their recycling and composting mechanical equipment.

Data / Parameters	Diesel
Data unit :	Liters
Description :	Trucks and equipment, including crusher
Source of data to be used :	Fuel bills and consumption data
Value of data applied for the purpose of calculating expected emission reductions :	Included in the EPA factors
Description of measurement methods and procedures to be applied :	Gas consumption is recorded manually on (dated) forms and subsequently transferred onto an excel spreadsheet.
QA/QC procedures to be applied :	Section 5.10 of ISO 14064-2[9]
Any comment:	

Fossil fuel: Gasoline

Enfoui-Bec Inc. consumes gasoline in their recycling and composting mechanical equipment.

Data / Parameters	Gasoline
Data unit :	Liters
Description :	Trucks and equipment.
Source of data to be used :	Fuel bills and consumption data
Value of data applied for the purpose of calculating expected emission reductions :	Included in the EPA factors
Description of measurement methods and procedures to be	Gas consumption is recorded manually on (dated) forms and subsequently transferred onto an excel

[8] International Standards ISO 14064-2 :2006(F), Section 5.10, p.13
[9] Idem

applied :	spreadsheet.
QA/QC procedures to be applied :	Section 5.10 of ISO 14064-2[10]
Any comment:	

Production data

Data / Parameters	**Pastes and papers Slime**
Data unit :	Yards
Description :	Volume of pastes and paper slime
Source of data to be used :	Trucks containers
Value of data applied for the purpose of calculating expected emission reductions :	Yards of slime
Description of measurement methods and procedures to be applied :	Collect data are then handled by accounting and aggregated into *Excel Spreadsheet*.
QA/QC procedures to be applied :	Section 5.10 of ISO 14064-2[11]
Any comment :	N.A.

Environmental Impacts

In the case of this project, the environmental impacts are considered limited since most of the activities included in this project are aimed at reducing the methane production from the landfill management baseline scenario. Furthermore, there's no waste generated from composting activities.

[10] Idem
[11] International Standards Organization ISO 14064-2 :2006(F), Section 5.10, p.13

Chapter 2: GHG Emission Reductions Quantification

2.1 Methodology Selection

The choice of the quantification methodology has been made through several internationally recognized sources such as the Intergovernmental Panel on Climate Change (IPCC), the U.S.' Environmental Protection Agency, Environment Canada and recognized quantification protocol sources.

The selected methodology is based on the EPA's report: Solid Waste Management and Greenhouse Gases, A Life-Cycle Assessment of Emissions and Sinks[12]. This report adopts the perspective of waste management for different materials, permitting us to understand what life-cycle stages should be considered to reduce emissions.

All factors and equations were obtained from the EPA's 2006 methodology entitled: *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks*, published in September 2006[13]. The formulas for the emission factors come from EPA methodology for landfill and composting of Yard Trimmings (concordant surrogate). The GHG emission factors are expressed in Metric Tonnes of Carbon Equivalent per Wet ton. See p.93 and p.61 of the EPA methodology[14].

The major greenhouse gases responsible for global warming, as per the EPA, are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro fluorocarbon (HFC), per fluorocarbon (PFC) and sulphur hexafluoride (SF_6). The EPA methodology considers CO_2, CH_4 and N_2O for each of their GHG emission factors[15]. See p.114 of the EPA *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks* :

"All of the exhibits presented so far in this report have expressed GHG emissions in units of MTCE, calculated as the sum of the individual gases (CO2, CH4, N2O, and PFCs) weighted by their global warming potential."

Among them, gases involved in this project are CO_2 and CH_4, based essentially on composting and landfill activities[16]. See p.ES-9 of the EPA *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks* :

"Waste management (CO2 emissions associated with composting, nonbiogenic CO2 and N2O emissions from combustion, and CH4 emissions from landfills); these emissions are offset to some degree by carbon storage in soil and landfills, as well as avoided utility emissions from energy recovery at combustors and landfills."

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[12] EPA (2006), Solid Waste Management and Greenhouse Gases, A Life-Cycle Assessment of Emissions and Sinks, page 24, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

[13] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

[14] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.93,61, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

[15] EPA, (2006). Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.114, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

[16] EPA (2006), Solid Waste Management and Greenhouse Gases, A Life-Cycle Assessment of Emissions and Sinks, page ES-9, Internet link: http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html

In the EPA methodology, conversion from MTCE to $MTCO_2$ eq is equal to 44/ 12. So, for each emission factor in MTCE, we must make the conversion to Metric Tonnes of Carbon Dioxide equivalent[17]. See p.5 of the EPA *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks* :

"In this report, emissions of CO2, CH4, N2O, and PFCs have been converted to their "carbon equivalents." Because CO2 is 12/ 44 carbon by weight, 1 metric ton of CO2 is equal to 12/ 44 or 0.27 metric tons of carbon equivalent (MTCE). The MTCE value for 1 metric ton of each of the other gases is determined by multiplying its GWP by a factor of 12/ 44. (All data provided here are from the IPCC, *Climate Change 1995: The Science of Climate Change*, 1996, p. 121.)"

2.2 Total GHG Emission Reductions

Without composting, Enfoui-Bec Inc. would have continued to manage pastes and paper slime through a landfill management system.

In the EPA's 2006 methodology; *Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks*, "yard trimmings" is the corresponding surrogate for organic material such as pastes and papers slime.[18]

Baseline scenario GHG emission quantification:

SLE (t CO_2 eq.) **= SM (**tons of material) *** EFSL (**t CO_2 eq. **/** tons of Yard Trimmings)

SLE (t CO_2 eq.) = Slime Landfilling Emissions;
SM (tons) = Slime material (tons);
EFSL (t CO_2 eq.) = **EFSL** (MTCE/ ton of Yard Trimmings) * (44/ 12) t CO_2 eq. / MTCE[19]

EFSL (MTCE/ ton of Yard Trimmings) = Emission Factor for Yard Trimmings managed through landfills without LFG recovery = 0,05 MTCE / wet ton of Yard Trimmings [20];

Quantifying GHG emissions and/or removals for the project:

Project scenario GHG emission quantification:

SCE (t CO_2 eq.) **= SM (**tons of material) *** EFSC (**t CO_2 eq. **/** tonnes of material)

SCE (t CO_2 eq.) = Slime Composting Emissions;

[17] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.5, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[18] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.108, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[19] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.5, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[20] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, exhibit 4-6, p.61, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html

EFSC (t CO_2 eq.) = **EFSC** MTCE/ ton of material Yard Trimmings * (44/ 12) t CO_2 eq. / MTCE [21]
EFSC (MTCE/ ton of Yard Trimmings) = Emission Factor for Yard Trimmings composting = -0,05 MTCE / ton of Yard Trimmings [22];

Quantifying GHG emissions reduction and removal enhancements for the GHG project:

These following equations illustrate the GHG emission reductions quantification process.

TPER (metric tons CO2 eq.) = $SLE_{(T)Baseline}$ - $SCE_{(T)Project}$

TPER = Total Project Emission Reduction (metric tons CO_2 eq.).

Additionality for this project is calculated based on the CO2 eq emissions from composting (including forest sequestration) compared to the emissions associated with the landfill baseline scenario (net Carbon Storage included). Total emission reductions are obtained by subtracting the emissions in the project scenario from the baseline scenario (See table below).

[21] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, p.5, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html
[22] EPA (2006), Solid Waste Management and Greenhouse Gases, A life-Cycle Assessment of Emissions and Sinks, exhibit 6-8, p.93, URL address: http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html

Table 3 – Project Emission Reduction Summary (metric tons CO_2 eq.)

Composting - Pastes and papers Slime								
Year	Pastes and papers Slime (metric tons)	Composting Project Scenario Emission Factor (MTCE/ Ton of Yard Trimmings recovered)	Composting Project Scenario Emission Factor (t CO2 eq./ Ton of Yard Trimmings recovered)	Emissions Composting t CO2 eq.	Landfilling Reference Scenario Emission Factor (MTCE/Wet Ton of Yard Trimmings)	Landfilling Reference Scenario Emission Factor (t CO2 eq./Wet Ton of Yard Trimmings)	Emissions Landfilling t CO2 eq.	Emission Reductions t CO_2 eq.
	A	B	C=B*44/12	D=A*C	E	F=E*44/12	G=A*F	H=G-D
2002	203949,50	-0,05	-0,183	-37 391	0,05	0,183	37 391	74 781
2003	223 425,25	-0,05	-0,183	-40 961	0,05	0,183	40 961	81 923
2004	214 482,00	-0,05	-0,183	-39 322	0,05	0,183	39 322	78 643
2005	213 855,00	-0,05	-0,183	-39 207	0,05	0,183	39 207	78 414
2006	273 144,75	-0,05	-0,183	-50 077	0,05	0,183	50 077	100 153
2007	190 041,75	-0,05	-0,183	-34 841	0,05	0,183	34 841	69 682
TOTAL (ton)	1 318 898			-241 798			241 798	**483 596**

Table 4 - GHG Emission Reductions Summary:

Year	Total Project Emission Reductions (Metric tons CO2 eq.)
2002	74 781
2003	81 923
2004	78 643
2005	78 414
2006	100 153
2007	69 682
Total:	**483 596**

2.3 Uncertainty

Uncertainty is associated with the project, in regards to data accuracy and variables used in the quantification of the GHG emissions. Production data is based on delivery and is accountant-verified annually. Other activity data such as fossil fuels and electricity are also closely monitored and controlled.

The overall level of uncertainty is rather low since the methodology and all emission factors are provided by official the US Environmental Protection Agency.

Conclusion

Enfoui-Bec Inc.'s project of : *avoidance of methane production from decay of biomass through composting*, contributes to reduce GHG emissions by reducing methane production. Consistent with their environmental mission, Enfoui-Bec Inc. and their committed employees are proud to be working towards the resolution of the global climate change issues.