

CARBON FOOTPRINT CALCULATORS FOR SMES

Dalhousie University's Eco-Efficiency Centre

Defining one's “carbon footprint”

The greenhouse gases emissions associated with a particular activity over a specified period, generally one year for organizations or all or part of the production process for products.

This includes both direct (e.g. fuel combustion) and indirect (e.g. electricity generation) emissions, and is typically measured in tonnes of carbon dioxide equivalent (CO_{2e}).

How is a carbon footprint calculated?

Sample business: Halifax Pizza Company

Annual electricity consumption = **50,000 kWh**
 Annual vehicle mileage = **30,000 km**
 Annual waste sent to landfill = **15 tonnes**

Environmental impact:

Electricity consumption = 855 g CO_{2e}/kWh = **0.855 kg**
 Automobile fuel combustion = 227 g CO_{2e}/km = **0.227 kg**
 Landfill emissions = .260 tonnes CO_{2e}/tonne = **260 kg**

Carbon footprint: = **0.855(50,000) + 0.227(30,000) + 260(15)**
 = 53,460 kg CO_{2e}
 = **53.5 tonnes CO_{2e}**

Limitations

- Accuracy of assumptions
 - ▣ Data source
 - ▣ Timeliness of data

- Limited accountability and validity
 - ▣ Lack of legal oversight, consumer protection

Province	Emissions intensity (Grams CO _{2e} /kWh)
British Columbia	20
Alberta	930
Saskatchewan	810
Manitoba	10
Ontario	180
Quebec	6
New Brunswick	366
Nova Scotia	837
Prince Edward Island	192
Newfoundland & Labrador	15
Yukon, Northwest Territories & Nunavut	80

Source: Environment Canada: "National Inventory Report 1990–2006 Greenhouse Gas Sources and Sinks in Canada" (2008)

Best practices

- Designed for intended purpose
- Well managed trade-off between simplicity and comprehensiveness
- Transparent methodology
 - ▣ Calculation assumptions
 - ▣ Sources of data
 - ▣ Dates
- Local relevance
- Impact categories applicable to wide variety of businesses
- Record of updates or modifications to formula

The EEC's carbon footprint calculator for SMEs

The EEC's carbon footprint calculator for SMEs

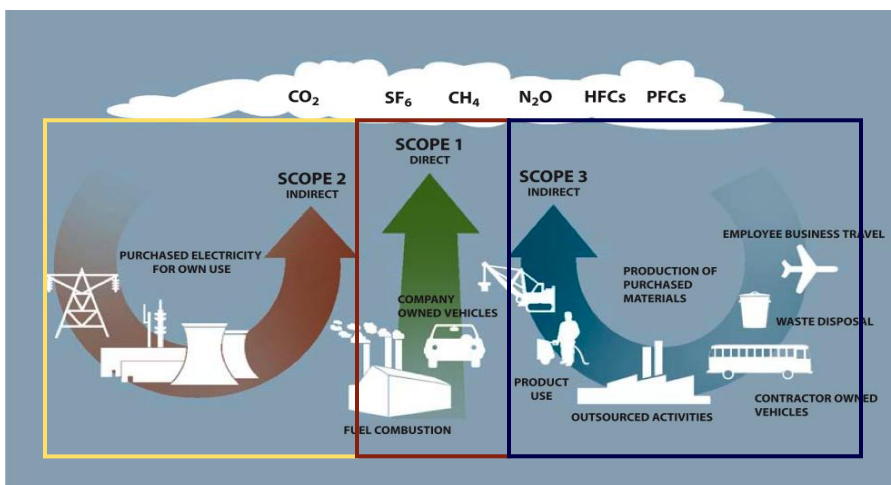
- Greenhouse gas estimation tool for SMEs in Nova Scotia
 - ▣ Customizable for users in other provinces
- Offered as an online tool
 - ▣ Supplemented by user's guide with reduction tips
- Developed using Greenhouse Gas Protocol
- Change over time (Δ) more important than absolute figures

Calculating your carbon footprint

A guide to conducting a carbon inventory for small- and medium-sized enterprises

Dalhousie University's
Eco-Efficiency Centre
Last updated: May 2009

Carbon Reporting Initiative: Greenhouse Gas Protocol



Source: WRI & WBCSD, 2004: "A Corporate Accounting and Reporting Standard"

The EEC's carbon footprint calculator for SMEs



- Scope 1 (Mandatory)
 - ▣ Onsite fuel combustion
 - ▣ Company-owned freight and vehicle use
 - ▣ Process emissions
- Scope 2 (Mandatory)
 - ▣ Electricity purchases
- Scope 3 (Optional)
 - ▣ Indirect heating combustion
 - ▣ Business travel
 - ▣ Waste

Sample company: Atlantic Logistics



Your organization	<ul style="list-style-type: none">• Period of analysis: April 2008 to March 2009• Business name: Atlantic Industries Ltd.• 60 employees in Halifax, Nova Scotia
Onsite fuel combustion	<ul style="list-style-type: none">• 5,000 m³ of natural gas
Process emissions	<ul style="list-style-type: none">• This section will only apply to a limited number of businesses in the manufacturing/industrial sector (generally does not apply to commercial/ institutional organizations).
Company-owned vehicles	<ul style="list-style-type: none">• 1 company car, 2000 litres of fuel purchased annually• 2 freight vans, 50,000km annually each• 2 cube vans, 100,000km annually each
Electricity purchases	<ul style="list-style-type: none">• 500,000 kWh annually
Heating fuel combustion	<ul style="list-style-type: none">• Rented office space utilizes 2,500L of equivalent heating oil
Waste	<ul style="list-style-type: none">• 500 pounds of garbage weekly• 300kg of paper recycling biweekly• 500kg of non-paper recycling monthly
Business travel	<ul style="list-style-type: none">• 10 short-haul flights annually• 30 long-haul flights annually• 20,000km of car/taxi travel annually

Your organization

Your Organization

* All fields on this page are mandatory.

Footprint period (please enter start of 12-month period)

Start: December 2009 End: November 2010

Business name

Industry
Accommodation and Food Services

Number of employees
1-5

Province
Nova Scotia

Postal Code
B3A1XL

Onsite Fuel Combustion

Onsite Fuel Combustion

* All fields on this page are mandatory.

Natural Gas	
Type of operation	Agriculture, Construction, Public
Annual consumption (m ³)	0.000
Emissions intensity per m ³ (g/cubic metre)	1907.31
Greenhouse gas emissions (kg)	0
Diesel	
Annual consumption (L)	0.000
Emissions intensity (g/L)	2789.79
Greenhouse gas emissions (kg)	0
Furnace oil	
Type of operation	Forestry, Construction, Public
Annual consumption (L)	0.000
Emissions intensity (g/L)	2740.07
Greenhouse gas emissions (kg)	0
Propane	
Annual consumption (L)	0.000
Emissions intensity (g/L)	1543.98
Greenhouse gas emissions (kg)	0
Total greenhouse gas emissions for energy use (tonnes)	0

Process Emissions*

Process Emissions*

* Note: This section will only apply to a limited number of businesses in the manufacturing/industrial sector (generally does not apply to commercial/institutional organizations). Please disregard if your business does not report direct greenhouse gas emissions arising from industrial processes.

Carbon dioxide (CO2)		1 Hydrofluorocarbons (HFCs)	
		HFC-125 ▾	
Tonnes emitted annually	<input type="text" value="0.000"/>	Warming potential	<input type="text" value="2800"/>
Warming potential	<input type="text" value="1"/>	Tonnes emitted annually	<input type="text" value="0.000"/>
Greenhouse gas emissions (tonnes)	<input type="text" value="0"/>	Greenhouse gas emissions (tonnes)	
Methane (CH4)		2 Hydrofluorocarbons (HFCs)	
		HFC-125 ▾	
Tonnes emitted annually	<input type="text" value="0.000"/>	Warming potential	<input type="text" value="2800"/>
Warming potential	<input type="text" value="21"/>	Tonnes emitted annually	<input type="text" value="0.000"/>
Greenhouse gas emissions (tonnes)	<input type="text" value="0"/>	Greenhouse gas emissions (tonnes)	

Company-Owned Vehicle Emissions

Company-owned vehicle emissions

(includes leased vehicles)

Company-owned cars (include for commuting purposes only if company-owned)

Number in fleet	<input type="text" value="0"/>		
Input preference (kms or litres of fuel consumed)		Kilometres per vehicle annual ▾	
Kilometres per vehicle annually	<input type="text" value="0.000"/>		
Emissions per km (kg)	<input type="text" value="0.212531"/>		
Greenhouse gas emissions (cars) (kg)		<input type="text" value="0"/>	

Company-owned boats

Fuel type of boats (gasoline or diesel)	Diesel ▾		
Litres of fuel purchased annually	<input type="text" value="0.000"/>		
Emissions per litre of fuel (kg)	<input type="text" value="3.00715"/>		
Greenhouse gas emissions (kg)		<input type="text" value="0"/>	

Company-owned planes

Litres of fuel purchased annually	<input type="text" value="0.000"/>		
Emissions per litre of fuel (kg)	<input type="text" value="2.60698"/>		
Greenhouse gas emissions (kg)		<input type="text" value="0"/>	

Company-owned trucks (you may enter up to three different types)

Electricity Purchases

Electricity Purchases

For this page, start by collecting the electricity bills for each meter assigned to your business. Calculating your electricity emissions will be most accurate with 12 months of bills, but if these are unavailable please refer to the annual consumption calculator found below.

Electricity
Province (select from list)
Emissions factor (grams of CO₂e/kWh)
Annual electricity consumption (kWh)
Percentage supplied by renewable power (%)

If your business purchases electricity specifically from a renewable supplier, enter the percentage of your total electricity consumption purchased in the box above. Please disregard if this does not apply to your company.

Total greenhouse gas emissions for electricity consumption (tonnes)

Indirect Fuel Combustion

Natural Gas
Type of operation
Annual consumption (m³)
Emissions intensity per m³ (g/cubic metre)
Greenhouse gas emissions (kg)

Diesel
Annual consumption (L)
Emissions intensity (g/L)
Greenhouse gas emissions (kg)

Furnace oil
Type of operation
Annual consumption (L)
Emissions intensity (g/L)
Greenhouse gas emissions (kg)

Propane
Annual consumption (L)
Emissions intensity (g/L)
Greenhouse gas emissions (kg)

Total greenhouse gas emissions for energy use (tonnes)

Waste

Landfill

Weight of garbage sent to landfill (please select units) Kilograms ▾
Collection interval ▾
Collections per year
Emissions associated with landfilled waste (per specified unit)
Greenhouse gas emissions annually (tonnes)

Recycling (Paper)

Weight of paper to recycling (please select units) Kilograms ▾
Collection interval ▾
Collections per year
Emissions savings associated with paper recycling (tonnes)
Greenhouse gas emissions annually (tonnes)

Recycling (Non-paper, i.e. glass, aluminum, plastic)

Weight of non-paper items sent to recycling (please select units) Kilograms ▾
Collection interval ▾
Collections per year
Emissions savings associated with non-paper recycling (tonnes)
Greenhouse gas emissions annually (tonnes)

Organic Waste

Weight of materials sent to organics recycling (please select units) Kilograms ▾

Business Travel

Business Travel

Plane - Short-haul trips (<= 1,609 kilometres, i.e. Halifax-St. John's, Ottawa-New York, Vancouver-San Francisco)

Number of roundtrips
Example flight: Ottawa - Newark Airport - distance (km)
Sample roundtrip flight emissions (kg)s
Greenhouse gas emissions (kg)

Plane - Long-haul trips (>1,610km, i.e. Halifax-Vancouver, Toronto-London, Montreal-Frankfurt)

Number of roundtrips
Example flight: Halifax-Vancouver distance (km)
Sample roundtrip flight emissions (kg)s
Greenhouse gas emissions (kg)

Car/taxi

Distance travelled annually (km)
Emissions per km of average car (g/km)
Greenhouse gas emissions (kg)

Intercity train (i.e. ViaRail)

Number of one-way trips (i.e. 2 roundtrips = 4 one-way trips)
Average distance per one-way trip (km)
Emissions for train transit (g/passenger-km)

Output

Total Footprint

Impact Categories

Onsite Fuel Combustion	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Process Emissions	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Company-owned Vehicles	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Electricity Purchases	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Indirect Fuel Combustion	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Waste	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Business Travel	<input type="text" value="0"/>	<input type="text" value="0 %"/>
Total footprint of impacts > 0 (tonnes)	<input type="text" value="1"/>	
Net footprint w/ savings (tonnes)	<input type="text" value="1"/>	

This emissions estimate is equivalent to the emissions generated by 0 cars.

<input type="checkbox"/>	0.0% Onsite Fuel Combustion
<input type="checkbox"/>	0.0% Process Emissions
<input type="checkbox"/>	0.0% Company-owned Vehicles
<input type="checkbox"/>	0.0% Electricity Purchases
<input type="checkbox"/>	0.0% Indirect Heating Combustion
<input type="checkbox"/>	0.0% Waste
<input type="checkbox"/>	0.0% Business Travel

Objectives

- Provide Canadian SMEs with user-friendly tool to estimate emissions
 - ▣ Encourage management of pertinent data
 - ▣ Enhance opportunities for stakeholder engagement
- Fill in gaps in data
 - ▣ How do businesses compare with competitors, regionally?
 - ▣ How should SME targets be set with respect to climate change legislation?

QUESTIONS?

www.dal.ca/eco-efficiency

Thank you