GOING CARBON NEUTRAL

A Guide for Publishers

(Metric Edition)

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"If it were only a few degrees, that would be serious, but we could adapt to it. But the danger is the warming process might be unstable and run away. We could end up like Venus, covered in clouds and with the surface temperature of 400 degrees. It could be too late if we wait until the bad effects of warming become obvious. We need action now to reduce emission of carbon dioxide."

- Professor Stephen Hawking, Lucasian Professor of Mathematics, Cambridge University, on Larry King Live, Dec 25, 1999

Introduction

One of the many things that an individual or business can do to help address the enormous challenge of global climate change, as well as reducing your emissions, is to become carbon neutral.

Whenever we use fossil fuels, whether by driving, flying, using trucks and couriers, heating our buildings with oil or gas, or using electricity which has been generated with coal or gas, we cause the release of carbon, which forms carbon dioxide, the Number 1 greenhouse gas.

Whenever we use paper that is not recycled, we contribute to the loss of forests and forest soils, which store immense quantities of carbon, reducing the ability of our planet's ecosystems to store the carbon we are so busy releasing.

Whenever we send material as garbage to the landfill, we cause the release of methane, the Number 2 greenhouse gas.

What can we do? We can reduce our emissions, and we can render our existing emissions "carbon neutral" by investing in initiatives which will prevent the release of a similar amount of emissions elsewhere, or which support long-term carbon-storing initiatives.

The most common method used by businesses and individuals to become carbon neutral involves investing annually in a tree-planting initiative that will absorb (sequestrate) a similar quantity of emissions. This is fine, unless the trees burn down in a forest fire, or are eaten by bugs, which is becoming increasingly common as the temperatures rise.

The second method involves investing in an initiative which will prevent the release of a similar amount of emissions, such as paying to retrofit low income households with efficient lightbulbs, or supporting the use of wind energy by a low income community. The key to genuine carbon neutrality is that the organization receiving your support *would not have made the same investment on its own behalf.* Every one of us has to face up to our planetary responsibility, and become carbon neutral, but it is much harder for some than others. The current market cost to offset a tonne of CO2 is $12.50 CAN, and a typical

household of 4 people produces 20 tonnes or more of CO2 a year. The cost to offset this would be $250 CAN, which is difficult for most low income families; hence the validity of using your investment to support them.

This Publishers Template has been created in order to assist any publishers who might want to become carbon neutral.

Groundrules

When dealing with the greenhouse gas emissions associated with a product which passes through many hands (eg a book), it is important to establish some groundrules. The rules that have been adopted for this template are as follows:

- All of the emissions produced along the book publication chain belong to the publisher. The logic here is that if you had not dreamed up a particular title, the emissions along the chain, from the forest to the warehouse, would not have happened.

- "If you pay for it, the emissions are your responsibility". Thus if a reader orders a book off your website, the carbon emissions associated with shipping the book belong to the reader, not to you. Likewise when a bookshop orders a supply of your books. This principle could be extended to say that the paper company should cover the emissions from paper production, and the trucking companies and couriers should cover the emissions from shipping, but this feels like evasive carbon accounting, so it probably is. In a perfect carbon-neutral world, a carbon tax would be charged on all fossil fuel use, and the proceeds would be invested in initiatives to reduce global climate change. Until that happens, or until other companies in the production chain step up to the plate and take responsibility for their emissions, it seems right that the main producer should assume the responsibility.

Greenhouse Gas Emissions from Publishing

1. Paper for books
2. Office paper
3. Catalogue paper
4. Shipping
5. Couriers
6. Flights
7. Vehicles
8. Electricity
9. Oil used for heating
10. Gas used for heating
11. Waste landfilled

For each category, some relatively simple calculations are needed. The letters (A), (B), (C) are used to define steps in a multi-stage calculation.

1. THE PAPER YOU USED TO PRINT YOUR BOOKS

The production of paper produces CO2 from a variety of factors (forest soil loss, trucking, pulping, paper manufacturing, shipping). The trees themselves are considered carbon neutral, since they have already absorbed the CO2 that will be released as their fibres or the paper made from them break down and release the stored CO2 back into the atmosphere.

The loss of topsoil causes the release of stored carbon that would not otherwise have been released. This is worst with clearcut logging, and least to non-existent with FSC certified forestry. The use of recycled paper releases less CO2, since there is no loss of forest soil, and less fuel is used in logging and trucking.

The CO2 factors used have been taken from an extensive analysis done by Environmental Defence. www.environmentaldefense.org/article.cfm?contentid=1689

Step One: Determine the total number of books (not titles) that you published during 20___.
Number of books published: _____ (A)

Step Two: Determine the average weight of a book. This is your average weight factor.
Average weight per book = _____ kg (B)

Total weight of books published in 20___ (A x B) = _____kg (C)

Step Three: Determine what the CO2 Paper Factor is for the type of paper you used to print your books. If you used several kinds of paper for different titles, perform a separate calculation for each paper-type, and create a paper-use average as your overall CO2 Paper Factor.

1kg virgin paper produces 3.24 kg of CO2
1kg of EcoBook 100 (100% post-consumer waste) produces 1.76 kg of CO2

Type of paper	**CO2 per kg**
Virgin paper 0% post-consumer recycled	**3.24**
33% post-consumer recycled	**2.75**
50% post-consumer recycled	**2.50**
66% post-consumer recycled	**2.35**
100% post-consumer recycled	**1.76**

(Data for Virgin and 100% from EcoPaper. Data for 33%, 50%, and 66% extrapolated)

Your CO2 (Books) Paper Factor: _____ kg of CO2 per kg (D)

Step Four: Determine your total CO2 produced by multiplying (C) by (D)
(C) _____ x (D) _____ = _____ (E)

Result 1 = _____ kg of CO2 from your use of paper for printing books

2. OFFICE PAPER

The same principle applies here: recycled paper produces less CO2 than non-recycled paper.

Step One: Determine the total volume of office paper used from your purchasing manager. (Probably in boxes of 5,000 sheets). Total office paper used: _____ sheets (A).

Step Two: Divide by 500 to give you the number of reams. Total reams used: _____ (B)

Step Three: Weigh 1 ream (pack of 500 sheets). Weight of one ream: _____ (C)

Step Four: Calculate the total weight of office paper used (B x C): _____ (D)

Step Five: Determine your CO2 (Office) Paper Factor, using the chart above: ____ kg of CO2 per kg (E)

Step Six: Multiply (D) by (E) to determine the total CO2 released (F).
(D) _____ x (E) _____ = _____ kg (F)

Result: 2 = _____ kg of CO2 from your use of office paper

3. CATALOGUE PAPER

Apply the same process to the paper you used to print your catalogue:

Step One: Determine your CO2 (Catalogue) Paper Factor: _____ kg of CO2 per kg (A)

Step Two: Determine the total volume of Catalogue Paper used from your purchasing manager.
Total catalogue paper used: _____ sheets (B)

Step Three: Multiply (A) by (B) to determine the total CO2 released (C).
(A) _____ x (B) _____ = _____ kg (C)

Result: 3 = _____ kg of CO2 from your use of catalogue paper

4. SHIPPING

Shipping uses diesel, which releases 2.85 kg of CO2 for every litre of diesel burnt.

***Step One*:** List the main Trips involved in shipping books from your various printers to your distribution centres, and find out the distance of each trip.

Trip 1: _____ to _____. Distance = _____ km (A1)
Trip 2: _____ to _____. Distance = _____ km (A2)
Trip 3: _____ to _____. Distance = _____ km (A3)
Trip 4: _____ to _____. Distance = _____ km (A4)
Trip 5: _____ to _____. Distance = _____ km (A5)
Trip 6: _____ to _____. Distance = _____ km (A6)

***Step Two*:** Find out how many books were shipped on each trip.
Convert that into total weight, using your Average Weight Factor as determined in (1) Step 2 (B) above, to give you the total weight of books shipped per trip.

Trip 1: _____ books x ____ kg per book = _____ kg of books shipped (B1)
Trip 2: _____ books x ____ kg per book = _____ kg of books shipped (B2)
Trip 3: _____ books x ____ kg per book = _____ kg of books shipped (B3)
Trip 4: _____ books x ____ kg per book = _____ kg of books shipped (B4)
Trip 5: _____ books x ____ kg per book = _____ kg of books shipped (B5)
Trip 6: _____ books x ____ kg per book = _____ kg of books shipped (B6)

***Step Three*:** A typical pallet carries 700 kg of books. For each trip, divide the weight of books shipped by 700 to determine how many pallets were used.

Trip 1: _____ kg (B1) divided by 700kg = _____ pallets (C1)
Trip 2: _____ kg (B2) divided by 700kg = _____ pallets (C2)
Trip 3: _____ kg (B3) divided by 700kg = _____ pallets (C3)
Trip 4: _____ kg (B4) divided by 700kg = _____ pallets (C4)
Trip 5: _____ kg (B5) divided by 700kg = _____ pallets (C5)
Trip 6: _____ kg (B6) divided by 700kg = _____ pallets (C6)

***Step Four*:** On average, a 54 foot trailer carries 24 pallets. For each trip, divide the number of pallets (eg C1) by 24 to determine the number of truckloads needed to ship your books.

Trip 1: _____ pallets (C1) divided by 24 = _____ truckloads (D1)
Trip 2: _____ pallets (C2) divided by 24 = _____ truckloads (D2)
Trip 3: _____ pallets (C3) divided by 24 = _____ truckloads (D3)
Trip 4: _____ pallets (C4) divided by 24 = _____ truckloads (D4)
Trip 5: _____ pallets (C5) divided by 24 = _____ truckloads (D5)
Trip 6: _____ pallets (C6) divided by 24 = _____ truckloads (D6)

Step Five: Multiply the total truckloads (eg D1) by the distance travelled for that Trip:

Trip 1: _____ truckloads (D1) x _____ km (A1) = _____ total km (E1)
Trip 2: _____ truckloads (D2) x _____ km (A2) = _____ total km (E2)
Trip 3: _____ truckloads (D3) x _____ km (A3) = _____ total km (E3)
Trip 4: _____ truckloads (D4) x _____ km (A4) = _____ total km (E4)
Trip 5: _____ truckloads (D5) x _____ km (A5) = _____ total km (E5)
Trip 6: _____ truckloads (D6) x _____ km (A6) = _____ total km (E6)

***Step Six*:** The average truck does 8 miles per gallon, or 30 litres per 100 km. Calculate the litres of fuel burnt by multiplying the total km for each Trip (eg E1) by 0.3.

Trip 1: _____ total km (E1) x 0.3 = _____ litres of diesel burnt (F1)
Trip 2: _____ total km (E2) x 0.3 = _____ litres of diesel burnt (F2)
Trip 3: _____ total km (E3) x 0.3 = _____ litres of diesel burnt (F3)
Trip 4: _____ total km (E4) x 0.3 = _____ litres of diesel burnt (F4)
Trip 5: _____ total km (E5) x 0.3 = _____ litres of diesel burnt (F5)
Trip 6: _____ total km (E6) x 0.3 = _____ litres of diesel burnt (F6)

***Step Seven*:** Diesel fuel produces 2.85 kg of CO per litre. Determine the CO2 released for each Trip by multiplying the litres burnt (eg F1) by 2.85:

Trip 1: _____ litres of diesel burnt (F1) x 2.85 = _____ kg of CO2 (G1)
Trip 2: _____ litres of diesel burnt (F2) x 2.85 = _____ kg of CO2 (G2)
Trip 3: _____ litres of diesel burnt (F3) x 2.85 = _____ kg of CO2 (G3)
Trip 4: _____ litres of diesel burnt (F4) x 2.85 = _____ kg of CO2 (G4)
Trip 5: _____ litres of diesel burnt (F5) x 2.85 = _____ kg of CO2 (G5)
Trip 6: _____ litres of diesel burnt (F6) x 2.85 = _____ kg of CO2 (G6)

Step Eight: Add all the totals G1 to G6.

Result: 4 = _____ kg of CO2 from trucking your books

5. COURIERS

The assumption is that almost all courier trips that a publisher requires are by air, which involves the use of kerosene, a fossil fuel. Local short-trip courier trips are ignored as being too minor and too complex to calculate.

The methodology used is to calculate the total weight of items couriered, and divide by 70 kg (the average human weight) to convert the items couriered into "human-equivalents". From there, we can base the calculation on the average person-flight across North America, which releases 2000 kg of CO2.

Step 1: Obtain data for the following:

(A) _____ galleys couriered for _____ titles = _____ trips
(B) _____ page spreads couriered for _____ titles = _____ trips
(C) _____ review copies couriered for _____ titles = _____ trips
(D) _____ other items couriered = _____ trips

Step 2: Calculate the total number of courier trips (A + B + C +D) = _____ (E)

Average weight factor of a galley/page-spread/book = _____ kg (F) (See 1, Step 2 (B) above)

Total weight of items couriered (E x F) = _____ kg (G)

Step 3: Turn the couriered items into imaginary humans, at 70 kg per human
(G) divided by 70 = _____ "human-books" (H)

Step 4: The average human flight across North America releases 2000 kg of CO2.
(Calculated from www.chooseclimate.org/flying)

_____ "human-books" (H) x 2000 = _____ kg of CO2

Result 5 = _____ kg of CO2 from the use of couriers

6. FLIGHTS

Step 1: Familiarize yourself with www.chooseclimate.org/flying, which will calculate the CO2 emissions from any particular flight. You can also use www.sasems.port.se

Step 2: List all flights taken on publishers' business during the year, and determine the CO2 emissions for each flight. A return flight should be entered twice.

Date	Single Flight	Distance	% full	CO2	# tickets	CO2 total
					Total	

Result 6 = _____ kg of CO2 from flying

7. VEHICLE TRAVEL

Cars and trucks burn fuel. Every litre of gasoline burnt releases 2.5 kg of CO2. Every litre of diesel releases 2.85 kg of CO2.

If you use an electric car, you will need to do your own calculations based on the fuel mix used by your local electricity generating station. On average, 1km of EV travel draws 120 watts of power.

If you use a biodiesel car, you do not need to count the CO2 emitted since it is "current cycle" CO2: the biodiesel fuel source has already absorbed CO2 from the atmosphere before it is released during combustion.

Step 1: Determine the mileage used for each vehicle during the year on publishers' business. Personal trips to and from work are not included, as they are the responsibility of the driver, not the publisher. Divide the total by 100 km to be ready for the fuel efficiency conversion in Step 3.

Vehicle 1 = _____ km, divided by 100 km = _____ (A1)
Vehicle 2 = _____ km, divided by 100 km = _____ (A1)
Vehicle 3 = _____ km, divided by 100 km = _____ (A1)
Vehicle 4 = _____ km, divided by 100 km = _____ (A1)
Vehicle 5 = _____ km, divided by 100 km = _____ (A1)
Vehicle 6 = _____ km, divided by 100 km = _____ (A1)

Step 2:. Determine the fuel efficiency of each vehicle, and then the total litres of fuel burnt.

Vehicle 1 = ____ litres/100 km (B1). Multiply by (A1) = _____ total litres burnt (C1)
Vehicle 2 = ____ litres/100 km (B1). Multiply by (A2) = _____ total litres burnt (C2)
Vehicle 3 = ____ litres/100 km (B1). Multiply by (A3) = _____ total litres burnt (C3)
Vehicle 4 = ____ litres/100 km (B1). Multiply by (A4) = _____ total litres burnt (C4)
Vehicle 5 = ____ litres/100 km (B1). Multiply by (A5) = _____ total litres burnt (C5)

Vehicle 6 = ____ litres/100 km (B1). Multiply by (A6) = _____ total litres burnt (C6)

Step 3: Separate out the gasoline and diesel vehicles by deleting the relevant text below. Then multiply the total litres burnt by 2.5 or 2.85 kg of CO2 respectively to obtain the total CO2.

Vehicle 1 (gasoline or diesel) _____ C1 x 2.5 or 2.85 = _____ kg of CO2
Vehicle 2 (gasoline or diesel) _____ C2 x 2.5 or 2.85 = _____ kg of CO2
Vehicle 3 (gasoline or diesel) _____ C3 x 2.5 or 2.85 = _____ kg of CO2
Vehicle 4 (gasoline or diesel) _____ C4 x 2.5 or 2.85 = _____ kg of CO2
Vehicle 5 (gasoline or diesel) _____ C5 x 2.5 or 2.85 = _____ kg of CO2
Vehicle 6 (gasoline or diesel) _____ C6 x 2.5 or 2.85 = _____ kg of CO2

Step 4: Add the totals, for the result.

Result 7 = _____ kg of CO2 from car-travel

8. ELECTRICITY

The production of most electricity involves the release of CO2. The amount of CO2 released per kilowatt hour (kWh) depends on the source of your electricity: coal, gas, oil, solar, wind, hydro, etc.

Step 1: Collect all your electricity bills for the year, and tally up the kWh used for each month. If your bills come bi-monthly, list them 1 to 6, below. If you have more than four buildings, add extra columns.

kWh per Building				
Month	**Building A**	**Building B**	**Building C**	**Building D**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Step 2: Add your totals together = _____ kWh. (A)

Step 3: Convert your kWh into CO2, using the conversion factors listed below.

Conversion factors:

If your electricity is all green, sustainably sourced: 1000 kWh = 0 kg CO2
If your electricity is half green, half gas-fired: 1000 kWh = 95 kg CO2
If your electricity is all gas-fired: 1000 kWh = 190 kg CO2
If your electricity is half gas, half coal-fired 1000 kWh = 245 kg CO2
If your electricity is all coal-fired: 1000 kWh = 300 kg CO2
If your electricity is nuclear: 1000 kWh = 45 kg CO2

Notes:

(a) Green electricity is solar, wind, hydro, geothermal, etc.

(b) Some large-scale hydro may produce large amounts of methane, but the results differ for every dam, and no data has ever been collected on a dam by dam basis
(c) The full nuclear fuel cycle produces about 15% the emissions of a coal-fired power plant

Step 4*:* Our electricity produces _____ kg of CO2 per 1000 kWh (B).

Result 8 (A x B) = _____ kg of CO2 from your use of electricity

9. OIL USED FOR HEATING

Step 1: Collect all your oil bills for the year, and tally up the litres used for each month. If your bills come bi-monthly, list them 1 to 6, below. If you have more than four buildings, add extra columns.

Litres of Heating Oil used per Building				
Month	**Building A**	**Building B**	**Building C**	**Building D**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Step 2: Add your totals together = _____ litres. (A)

Conversion factor: 1 litre of heating oil produces 2.8 kg of CO2 (B)

Result 9 (A x B) = _____ kg of CO2 from heating oil

10. GAS USED FOR HEATING

Step 1: Collect all your gas bills for the year, and tally up the gigajoules used for each month. If your bills come bi-monthly, list them 1 to 6, below. If you have more than four buildings, add extra columns.

Gigajoules of gas used for heating				
Month	**Building A**	**Building B**	**Building C**	**Building D**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Total				

Step 2: Add your totals together = _____ gigajoules. (A)

Conversion factor: 1 gigajoule of natural gas produces 50 kg of CO2 (B)

Result 10 (A x B) = _____ kg of CO2 from gas used for heating

11: WASTES LANDFILLED

Wastes that are sent to the landfill produce methane emissions, which are 23 times more powerful a greenhouse gas than CO2 over 100 years. Methane emissions are normally expressed as "CO2 equivalent" (CO2e), to make the overall calculations of emissions easy.

The EPA's calculator calculates CO2e emissions from waste by material and method of disposal: http://yosemite.epa.gov/oar/globalwarming.nsf/WARM?openform

Typically, one kg of garbage releases one kg of CO2 equivalent.

Step 1: Weigh several typical bags of your garbage, to obtain an average weight.
One bag of garbage weighs _____kg (A)

Step 2:. How many bags of garbage do you produce per year? _____ bags. (B)

Step 3: Multiply A by B = _____. Multiply by 1 for kgs of CO2e

Result 11 = _____ kg of CO2e from your disposal of garbage.

12: ADD IT ALL UP

CO2 Emissions for 20___		**Kg**
1	Paper	
2	Office paper	
3	Catalogue paper	
4	Shipping	
5	Couriers	
6	Flights	
7	Car Travel	
8	Electricity consumption	
9	Oil for heating	
10	Gas for heating	
11	Waste landfilled	
12	**Total**	

Grand Total = _____ kg of CO2 divided by 1000 = _____ Tonnes

13: PURCHASE YOUR CARBON OFFSETS

Step One: Consider which organization you want to use to neutralize your emissions.
Future Forests (UK): www.futureforests.com
Tree Canada: www.treecanada.org
Solar Electric Light Fund: www.self.org

Step Two: Contact an organization, and ask how much it would cost you to offset your emissions.

Step Three: Send them a cheque for the amount.

Step Four: Tell all your staff, partners, clients and customers, and encourage them to do the same.

Step Five: Repeat in future years, until the challenge of climate change has been overcome.

14: REDUCE YOUR EMISSIONS FOR FUTURE YEARS

This is a more detailed task than we can go into here, but the information above can serve as a guide. There are three components to a successful carbon reduction strategy:

I. The choice to make the effort, as part of the worldwide global effort to reduce our greenhouse gas emissions.

II. The choice to operationalise your decision: this means putting someone in charge, and tasking him or her to make it happen. The wider the staff involvement, the easier it will be, and the greater the satisfaction they will experience.

III. The details of the changes that will reduce your emissions. Here are some pointers:

1, 2 & 3. Paper
- Can you use more post-consumer recycled paper to print your books, catalogues, and advertising materials?
- Can you ask that all office paper be used on both sides?
- Can you ask your staff to change their computer settings to use more of each sheet? (See www.rfu.org)

4. Shipping
- Is there any wastage in the routes that your materials are taking during shipping?

5. Couriers
- Could you switch to a green courier company that uses more sustainable vehicles?
- Could you send any galleys or page spreads electronically, as a PDF?

6. Flights
12. Are you sending staff on any unnecessary flights, where teleconferencing might do?

7. Car Travel
- Could you switch to more fuel-efficient vehicles, or to biodiesel, or electric vehicles? Could you join a car-share coop, or use bicycles around town?

8, 9 & 10. Electricity, Oil, and Natural Gas
- Could you hire someone to undertake an energy efficiency survey, to see where you could save energy and money by better insulation, and switching to more efficient lighting and appliances?

11. Waste
- Could you increase your recycling by making it easier for staff to recycle, to minimize waste going to the landfill?

THE END

"To me the question of the environment is more ominous than that of peace and war….

I'm more worried about global warming than I am of any major military conflict."
U.N. Weapons Inspector Hans Blix, (March 14, 2003)

"*Our house is burning down and we're blind to it...The Earth and humankind are in danger and we are all responsible. It is time to open our eyes. Alarms are sounding across all the continents . . . We cannot say that we did not know! Climate warming is still reversible.*
Heavy would be the responsibility of those who refused to fight it."
French President Jacques Chirac, Earth Summit, Johannesburg, August, 2002

"*The future belongs to those who understand that doing more with less is compassionate, prosperous, and enduring, and thus more intelligent, even competitive.*"
Paul Hawken

About the author:
Guy Dauncey is an author, speaker, and organizer who works to develop a positive vision of a sustainable future, and to translate that vision into action. He is President of the BC Sustainable Energy Association (www.bcsea.org), and Editor of *EcoNews*, a monthly newsletter that promotes the vision of a sustainable Vancouver Island. He is the author of five books, including *Stormy Weather: 101 Solutions to Global Climate Change* (New Society Publishers, 2001) which won a Nautilus Award at the New York Book Expo in May 2002, and *Cancer: 101 Solutions to a Preventable Epidemic* (New Society Publishers, June 2007). He lives in Victoria, BC, Canada. His home page is www.earthfuture.com.

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NOTE: If you spot any errors in this Guide, do please send them to the author, so that we can make the necessary corrections. This is the first attempt at laying out this full set of calculations, and there are sure to be ways that it can be improved.

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