

**About the Bank carbon footprint calculator: Sources and methodologies.**  
**November 14, 2008**

**1. Bank account carbon calculator.**

Bank account means all deposit accounts held with the bank, and includes both checking and savings accounts and certificates of deposit. Where the website or other documents reference either “checking” or “savings” accounts, this is meant to include all deposits held by the bank on behalf of that person or institution.

Money deposited on savings accounts can in principle be used to finance all assets the bank has on its balance sheet. Therefore, for the savings and checking account carbon calculator, bank financing amounts were limited to bank funding provided through direct loans and direct investments in bonds and equity to fossil fuel production corporations. Fossil fuel production investment banking activities and use of assets under management are not reported in the balance sheet and are not financed by money deposited on savings accounts. Therefore, they were excluded from the carbon accounting for the purposes of this calculator.

The carbon intensity of “checking” or deposit accounts were calculated based on research by Profundo, a Dutch economic research consultancy firm, of each bank's portfolio of direct loans to public corporations that are engaged in fossil fuel extraction of coal, oil and/or natural gas, as well as direct investments in either shares or debt instruments by the banks of their own assets.

Identification of the oil, gas, coal and tar sands clients of the banks was undertaken to the extent possible using a variety of public and proprietary data sources. Detailed documentation of each bank's identified clients in fossil fuel production can be found in the full report.

[www.climatefriendlybanking.org/bankreport](http://www.climatefriendlybanking.org/bankreport)

For each company in the oil, gas and coal production sectors in which Canadian banks have invested, their figures on the annual production volumes of oil, gas and coal were converted into eventual CO<sub>2</sub> emissions, by using standard conversion factors for production, processing and combustion of different forms of fossil fuels. These CO<sub>2</sub> emission factors are based upon data provided by the *Carbon Dioxide Information Analysis Center* of the government of the United States and the *Canadian Association of Petroleum Producers (CAPP)*:

*(Carbon Dioxide and Climate - Third Edition (ORNL/CDIAC-39), Edited by: Fred O'Hara Jr., Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1990 ([www.cdiac.ornl.gov/pns/convert.html](http://www.cdiac.ornl.gov/pns/convert.html)); A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H<sub>2</sub>S) Emissions by the Upstream Oil and Gas Industry / Volume 1, Overview of the GHG Emissions, Canadian Association of Petroleum Producers, Calgary, September 2004.)*

**Light and medium crude oil and Natural Gas Liquids:** The average carbon content of crude oil and NGLs is 0.85 ton C per ton crude oil or NGLs. As each ton C is converted in 3.664 ton CO<sub>2</sub> through combustion, the CO<sub>2</sub> emission factor of crude oil is 3.664 \* 0.85 = 3.114 ton CO<sub>2</sub> per ton crude oil or NGLs.

According to the CAPP, additional GHG emissions (in CO<sub>2</sub> equivalent) attributable to the production of oil amount to 180 ton CO<sub>2</sub> per 1,000 m<sup>3</sup>. This amounts to 180/858.1 = 0.210 ton CO<sub>2</sub> per ton crude oil or NGLs.

The total conversion factor for light and medium crude oil and Natural Gas Liquids therefore amounts to **3.324 ton CO<sub>2</sub> per ton crude oil or NGLs**.

**Heavy crude oil and tar sands:** When heavy crude oil and tar sands are converted in to oil, the CO<sub>2</sub> release because of the combustion is similar to light and medium crude oil: 3.114 ton CO<sub>2</sub> per ton.

But producing and processing heavy crude oil and tar sands requires more energy. According to the CAPP, additional GHG emissions (in CO<sub>2</sub> equivalent) attributable to the production and processing of heavy crude oil and tar sands amount to 603.6 to 675.8 ton CO<sub>2</sub> per 1,000 m<sup>3</sup>. We will use 640 ton per 1,000 m<sup>3</sup> as an average, which amounts to  $640/858.1 = 0.746$  ton CO<sub>2</sub> per ton crude oil or NGLs.

The total conversion factor for heavy crude oil and tar sands therefore amounts to **3.860 ton CO<sub>2</sub> per ton crude oil or NGLs**.

**Natural gas:** The average carbon content of natural gas is 0.525 ton C per thousand m<sup>3</sup> of natural gas. As each ton C is converted in 3.664 ton CO<sub>2</sub> through combustion, the CO<sub>2</sub> emission factor of natural gas is  $3.664 * 0.525 = 1.924$  ton CO<sub>2</sub> per thousand m<sup>3</sup> of natural gas.

According to the CAPP, additional GHG emissions (in CO<sub>2</sub> equivalent) attributable to the production and processing of natural gas amount to 190.6 ton CO<sub>2</sub> per million m<sup>3</sup>. This amounts to 0.191 ton CO<sub>2</sub> per thousand m<sup>3</sup> of natural gas.

The total conversion factor for natural gas therefore amounts to **2.115 ton CO<sub>2</sub> per thousand m<sup>3</sup> of natural gas**.

**Coal:** The average carbon content of coal is 0.746 ton C per ton coal. As each ton C is converted in 3.664 ton CO<sub>2</sub> through combustion, the CO<sub>2</sub> emission factor of coal is  $3.664 * 0.746 = 2.733$  ton CO<sub>2</sub> per ton coal.

Combining these conversion factors with annual production figures, we calculated annual CO<sub>2</sub> emissions for each client of the Canadian banks in the oil & gas and coal production sectors.

### **Calculating CO<sub>2</sub> intensity**

The annual CO<sub>2</sub> emissions of each client of the Canadian banks in the oil & gas and coal production sectors were divided by the client's total assets. The assets of the company include all his machinery, equipment, supplies, etc.: everything which is needed to produced oil, gas and coal. How much oil, gas or coal can be produced by one unit of assets (expressed in dollars), varies per company. The same applies to CO<sub>2</sub> volumes resulting from these production volumes of oil, gas and coal. Dividing calculated CO<sub>2</sub> volumes by total assets of the company therefore indicates the CO<sub>2</sub> intensity of capital invested in each company. This leads to a *CO<sub>2</sub> intensity factor* for each client: which annual amount of CO<sub>2</sub> emissions is financed by each dollar invested in the company.

### **What does this mean for money put in savings or checking accounts?**

For private clients of the bank groups it is interesting to know how much CO<sub>2</sub> is produced with every C\$ 10,000 they put on a savings or checking account at one of the banks.

We calculate the amounts financed and the corresponding annual CO<sub>2</sub> volumes for the following two categories of financial services provided to producers of oil, gas and coal:

- Corporate loans and project finance to producers of oil, gas and coal;
- Investments in shares and bonds of oil, gas and coal producers.

Similarly, we included in the denominator all categories for which the money put on savings or checking accounts can be used:

- Loans to commercial customers;
- Loans to private customers;
- Loans to banks;
- Loans to governments;
- Investments in shares and bonds

Recalculating relative CO<sub>2</sub> emissions using these categories of financial services to oil, gas and coal producers and these denominators, results in an estimate of the volume of CO<sub>2</sub> which is financed annually by the bank with every \$ 10,000 put in a savings or checking account.

The full Profundo report, “*Financing of fossil fuels and renewable energy by Canadian Banks,*” with further the details of this methodology can be found at: [www.climatefriendlybanking.org/bankreport](http://www.climatefriendlybanking.org/bankreport) .

The CO<sub>2</sub> intensity of bank deposit accounts based on 2007 holdings were determined to be:

Bank	CO <sub>2</sub> intensity of deposit accounts (kg CO <sub>2</sub> /year per C\$10,000)
RBC	1,120 kg CO <sub>2</sub>
Scotiabank	1,430 kg CO <sub>2</sub>
TD	970 kg CO <sub>2</sub>
BMO	1,070 kg CO <sub>2</sub>
CIBC	1,160 kg CO <sub>2</sub>
Desjardins	40 kg CO <sub>2</sub>
Vancity	0 kg CO <sub>2</sub>

The “carbon footprint” of deposit accounts is calculated by multiplying the per dollar carbon intensity of the bank in which the account(s) are held times the total approximate average amount of money held in those accounts as entered by the account(s) holder or other parties.

To put account carbon “footprint” amounts in context, the calculator reports comparable emissions as equivalent to either:

- the comparable amount of carbon dioxide released on average in Canada per day from running a 20w CFL light bulb (75W incandescent light bulb equivalent lumens) or 0.1152 kg CO<sub>2</sub>/day CFL use; or
- the comparable amount of carbon dioxide released from average daily use in Canada of a compact car, or 9.55 kg CO<sub>2</sub>/day.

The CO<sub>2</sub> conversion co-efficients for these are drawn from documentation provided by the Pembina Institute for the Canadian One Tonne Challenge carbon calculator website.

<http://www.onelesstonne.ca/sourcescalcs.pdf>

## 2. Bank Profiles.

- a) **Rank** of banks is determined by the relative amount of the banks total assets as reported in each Bank's respective 2007 annual reports.
- b) **Direct Fossil Fuel Funding** is the sum of corporate loans and investments in bonds and shares with the banks own assets for fossil fuel extraction corporations, as per September 2008 Profundo economic research, "*Financing of fossil fuels and renewable energy by Canadian Banks.*" [www.climatefriendlybanking.org/bankreport](http://www.climatefriendlybanking.org/bankreport)
- c) **Direct Renewable Energy Funding** is the sum of corporate loans and investments in bonds and shares with the banks own assets for various forms of renewable energy, such as wind, solar, biomass and biofuel, hydro, fuel cells and others, but excluding fossil energy, nuclear energy, large-scale hydro and biomass and biofuel based on non-sustainable crops. All types of financing for project and companies which are involved for more than 50% of their annual turnover in renewable forms of energy are included. For more information on these methodologies and findings, see Profundo economic research, "*Financing of fossil fuels and renewable energy by Canadian Banks.*" [www.climatefriendlybanking.org/bankreport](http://www.climatefriendlybanking.org/bankreport)
- d) **Total Fossil Fuel Financing** is the sum of direct fossil fuel financing plus financing provided by investment banking services and from third party assets under management by the bank.
- e) **CO<sub>2</sub> from Total Fossil Fuel Financing** is calculated as the percentage of the total assets of each producer of oil, gas and coal that is financed by each bank, and then attributing to each bank the corresponding share in the annual volumes of oil, gas and coal produced by each fossil fuel producer. These annual fossil fuel volumes are then converted into annual CO<sub>2</sub> emissions which result from the combustion of these fossil fuels.
- f) **Financed Emissions as % of Canada's Total Energy Emissions** is the amount from "e" above, divided by 583 Mt CO<sub>2</sub>, which is Canada's total emissions from energy use in 2006 as reported by the Canadian government, times 100 to convert into a percentage amount. [www.ec.gc.ca/pdb/ghg/inventory\\_report/2006/som-sum\\_eng.pdf](http://www.ec.gc.ca/pdb/ghg/inventory_report/2006/som-sum_eng.pdf)
- g) **Savings Account Carbon Footprint** is the carbon intensity of direct fossil fuel financing in kg per year per C\$10,000.

For more information:

Bill Barclay  
Global Finance Campaign  
Rainforest Action Network  
221 Pine St., Suite 500  
San Francisco, CA 94104  
[www.ran.org](http://www.ran.org)