

The “Bilan Carbone®”. Overview of a carbon balance method allowing to evaluate company’s exposure to fossil energy costs fluctuation

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Introduction

90 % of the carbon dioxide emitted comes from the combustion of fossil energies (petroleum products, coal and natural gas) and is therefore directly related to energy consumption

The European Union has committed to reducing its greenhouse gas emissions by 8 % by 2008-2012 in relation to levels recorded in 1990 (Kyoto Protocol). This commitment involves for the European Union an ambitious policy aiming at making industries more energy efficient with three main goals:

- cutting the high cost of energy ;
- reducing fossils energies addiction ;
- launching an emissions reduction process.

ADEME (French Agency for Environment and Energy Management) developed a simple method which is an effective solution for ranking emissions by source and for launching a **dynamic emissions reduction process: the Bilan Carbone® Method.**

Bilan Carbone® is both a tool and a methodology. The main component of the tool is a ready-to-use Excel spreadsheet that calculates the emissions caused by all the processes necessary for the existence of a given activity. Space heating, combustion for manufacturing processes, but also freight shipments, passengers travel, production of raw materials used, waste treatment ... To take these items into account, **simply fill in the spreadsheet (figure 1)** with energy consumption figures, kilometers travelled, quantities of materials purchased, etc. For



each source of CO₂ or other greenhouse gases, these data are then converted by the spreadsheet into the amount of carbon emitted, using fully documented emissions factors.

The general spirit of the Bilan Carbone® method is to provide the broadest possible panorama of emissions that are linked to processes used by a company or an organization. **This is also the only approach that is pertinent for looking forward and anticipating the effect of possible trends, for instance a significant rise in the market price of fossil energy.**

In practice, the accuracy of the results will depend to a large extent on the amount of time spent investigating emissions. The Bilan Carbone® tool has been elaborated specifically for the purpose of converting activity data (energy consumption, number of trucks driven and distance travelled, tonnes of steel purchased, etc) into estimated emissions, reasonably quickly, using “emissions factors”.

To estimate the greenhouse gases linked to the physical processes **necessary for the activity** wherever these emissions occur

IN-COMPANY ENERGY USE ON PREMISES (STATIONARY SOURCES)

3-Heating (non-electric)-Estimate based on heated surface area (m2)			with upstream emissions		w/o upstream emissions		w/o upstream	with upstream
Type of energy used	kWh per m2 heated	m2 heated	kg C eq per kWh	kg C eq /m2*yr	kg C eq per kWh	kg C eq /m2*yr	kg C eq	kg C eq
Natural gas for heating	234	10 000	0,063	0,0	0,056	0,0	0	0
Coking gas			0,051	11,8	0,046	10,8	108 491	118 404
Refinery gas			0,060	0,0	0,055	0,0	0	0
Coal			0,101	0,0	0,093	0,0	0	0
Lignite coke			0,115	0,0	0,106	0,0	0	0
Gasoline			0,084	0,0	0,072	0,0	0	0
Petroleum			0,077	0,0	0,072	0,0	0	0
Heavy heating oil			0,087	0,0	0,077	0,0	0	0
Domestic fuel oil			0,082	0,0	0,074	0,0	0	0
LPG			0,075	0,0	0,063	0,0	0	0
Kerosene			0,080	0,0	0,073	0,0	0	0
Ethane			0,060	0,0	0,055	0,0	0	0
Naphtha			0,077	0,0	0,072	0,0	0	0
Spent lubricants			0,075	0,0	0,068	0,0	0	0
Petroleum coke			0,103	0,0	0,094	0,0	0	0
Other hydrocarbons			0,072	0,0	0,065	0,0	0	0
Total								

TRANSPORT EMISSIONS FOR PASSENGER TRAVEL

3- Work-related car travel, employees, based on distances travelled		kg C eq per vehicle.km		Amortization kg C eq	Combustion w/o upstream kg C eq	Combustion with upstream kg C eq	Under Scope 1 kg C eq
Owned/operated vehicle?	distance travelled	Fuel w/o upstream	Fuel with upstream				
Urban, rush hour		0,011	0,073	0,084	0	0	0
Urban, other than rush hour	Y	0,011	0,066	0,076	37 971	227 835	227 835
Mixed itinerary		0,011	0,050	0,058	0	0	0
Extra-urban		0,011	0,041	0,047	0	0	0
Total					37 971	227 835	227 835

Figure 1: examples of Bilan Carbone spreadsheets

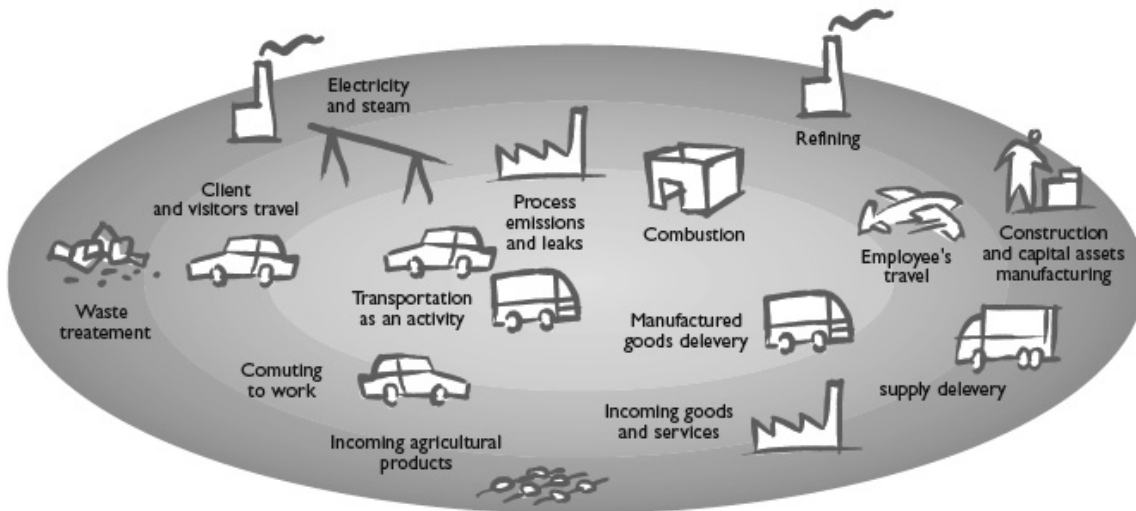


Figure 2: Standard scopes: Company, intermediate and overall greenhouse assessment.

(figure 2); no distinction is made on the basis of ownership of the means or resources implemented.

A picture of overall impact is the best place to start to determine what can be usefully done to help lower emissions and energy consumption.

Action plan

The carbon balance is **intended to provide incentives for action and reduce greenhouse gas emissions**. Voluntary action to cut greenhouse gas emissions will reduce the organization's

dependence on fossil fuels, and thus minimize its vulnerability in the event of higher prices for hydrocarbons, an eventuality that can hardly be dismissed in the present context.

The panorama of emissions that are linked to processes used by the company is the best place to start to determine what can be usefully done to help lower emissions, for with this vision all opportunities for action are highlighted, even small ones and those that are not obvious at first glance.

A study had been realised for ADEME in order to assess 130 Bilan Carbone® operations (four-hundred-plus companies have already used Bilan Carbone®).

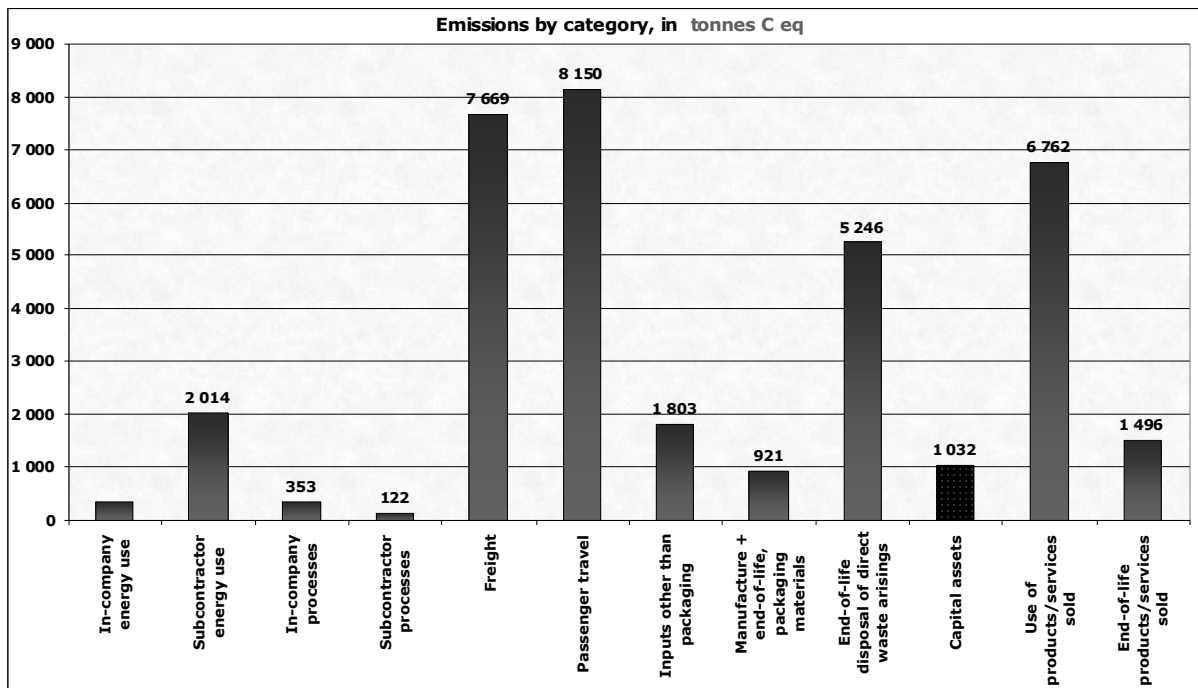


Figure 3: example of bar chart giving the results (emissions by source in tonne carbon equivalent) for a firm

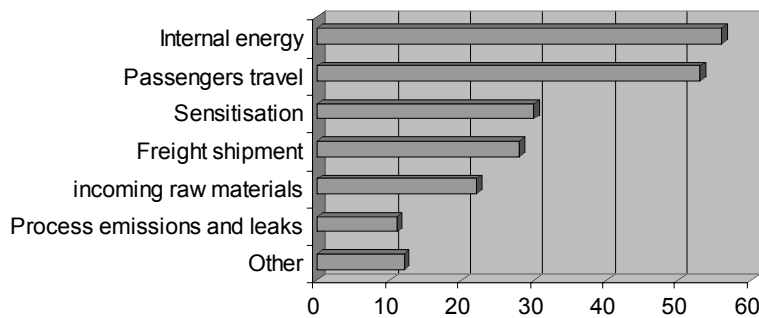


Figure 4: different items to reduce GHG emissions implemented by companies (ADEME study from 130 Bilan Carbone®)

It is worth noticing that 3 companies out of 4 have been implemented one or more actions at the end of the assessment. The item “internal energies” (the most emissive station) is also the most quoted (figure 4). In 62 % of the cases, concrete actions are implemented, mainly actions about buildings heat insulation and the reduction of energy consumption. This report probably underlines that the progression margins are significant on this item or actions are more easily implemented, since it concerns emissions generated by direct activities of the owner.

The project-comparison utility

This utility has two functions. It can be used to compare emissions for two planned activities, in order to choose the best option in terms of climate impact or hydrocarbon consumption. **The same utility can also be used to simulate expenditures for the reporting entity, in the hypothesis of higher prices for fossil fuels, or taxation of emissions.**

Most of the processes that occur “elsewhere” and are used by an organization, are recorded in its accounts as charges, even if the emissions do not occur directly on site. This tool allows users to think more concretely about the **possible economic impacts of dependence on fossil fuels**. For an example, see Table 1.

Result for the firm: its additional costs risk of an energy cost increase is 200 000 euros (5 % of its turnover).

CONCLUSION

Whether you want to anticipate new regulations concerning GHG emissions, or master fluctuating fossil energy costs, the Bilan Carbone® assessment will enable you to evaluate your company’s exposure, or even vulnerability, pertaining to these two variables that are so important for the development of corporate activity.

90 % of the interviewed owners consider the Bilan Carbone® methodology very positive. Moreover, after the Bilan Carbone®

Table 1.

RATE EXCHANGE	Exchange rate baseline* (dollars per euro)	1.30
	Coming exchange rate (dollars per euro)	1.43
OIL	OIL barrel price baseline (dollars)	60
	Coming barrel price (dollars)	80
	kg CO2 by oil litre	2.86
	Barrel capacity (l) :	159
	exchange rate (euros per kg équ. CO2)	0.02
	Additional cost per tonne équ. CO2	22
GAS	GAS % repercussion on gas price	80
	Gas price baseline* (\$ per MMBTU)	7.2
	Coming gas price (\$ per MMBTU)	9.12
	kg CO2 par MMBTU	61
	Additional cost per tonne équ. CO2	14
COAL	COAL % repercussion on coal price	100
	Coal price baseline* (\$ per tonne)	60
	Coming coal price (\$ per tonne)	80
	kg CO2 per coal tonne	2420
	Additional cost per tonne équ. CO2	4

*2006

operation, 25 % of the interviewed owners claim to use the greenhouse gases guideline to come to a decision.

The Bilan Carbone® is a easy-to-use tool, which however needs some time to calculate possible new emission factors to achieve the assesment and hindsight to suggest concrete steps to reduce GHG emissions. The emission factors developed for this tool are primarily adapted to situations encountered in Europe.