

INTERGRAF recommendations on CO₂ emissions calculation in the printing industry

Intergraf recognises that calculating the carbon footprint of printing activities and its products is crucial to help clients and consumers understand the environmental impact of their activities. Several calculation schemes exist in the printing industry in European countries, and some of them were developed with a strong involvement of Intergraf Member Federations.

The need for a common understanding of internationally recognised requirements is clear. Intergraf has taken a pragmatic approach together with its national printing federations around Europe to coordinate actions and support printers to reduce their CO₂ emissions. In a comparison exercise it was made obvious that by including a limited number of parameters in order of magnitude, some 95% of CO₂ emissions could be covered.

As a result, Intergraf is recommending 13 main parameters to be included in any calculation of the CO₂ emissions of a printing site or a printed product.

Introduction

The European Commission's package of proposals to fight climate change includes reductions in greenhouse gases of at least 20% by 2020 (compared with 1990 levels), raise in renewable energy's share to 20% and cut overall energy consumption by 20% (compared with projected trends). European industries have an important share in reaching this target, and initiatives to measure and reduce carbon emissions have already been taken in many sectors.

The European printing sector has a long history of complying with environmental restrictions and legislation. Pressures to reduce the environmental impact of the industry come from customers as well as European institutions and national governments. Since the general public's awareness has been raised on climate change and its link to CO₂ emissions, this is an important target group for information about the carbon emissions of different sectors. It should be clear to customers and consumers what the principles behind calculating CO₂ emissions are.

Intergraf member federations have conducted a comparison exercise between a number of currently available calculation schemes in order to draft recommendations. The conclusions of this exercise are presented in this paper.

Objective

The print market is becoming more and more international, with large actors operating across borders. Suppliers to the printing industry are often selling their products globally. Print-buyers are increasingly international, distributing their information material and publications to interest groups in many different countries. Printers are part of the same trend, and on-going consolidation in the sector is creating more international players.

The majority of the printing sector however consists of small or micro enterprises, in need of a simple model which is easily applicable to their activities. Models for calculating CO₂ emissions need to adopt an international approach, and be easy to use for both large and small companies.

Intergraf's objective is to recommend best practices for calculation systems of CO₂ emissions from printing activities. When following these recommendations, a printer will be able to identify around 95% of its total CO₂ emissions within the defined scope. The current analysis and cases used for calculations and comparisons of models between Intergraf member federations were based on sheet fed and heatset offset as well as publication gravure printing.

Calculation scope

The different calculation models in Europe have different scopes as well as different detail levels. As a result of discussions between Intergraf member federations, the following scope of the recommendation was determined. The defined scope is based on the existing knowledge of production of printed matter in a life cycle approach: *“Emissions of Green House Gasses in the life cycle of printed material excluding emissions related to capital assets, customer distribution and end of life of printed material.”*

The calculation should cover all six greenhouse gases (GHG) defined in the Kyoto protocol, expressed as carbon equivalents, provided relevant data are available. These gases are carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, and two groups of gases (hydrofluorocarbons and perfluorocarbons). Direct emissions from combustion covers exclusively fossil fuel.

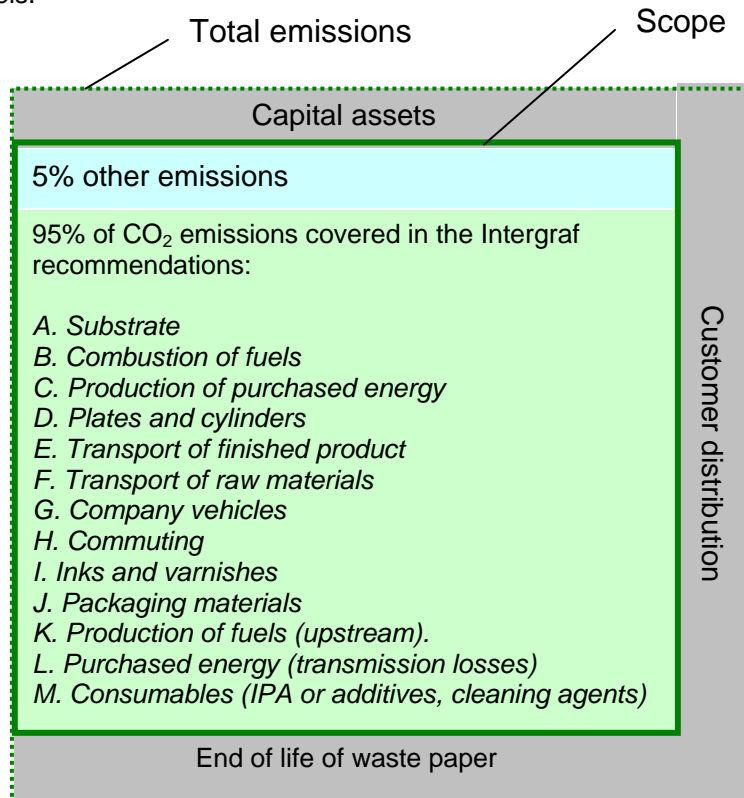
The Intergraf recommendation

The Intergraf recommendation for calculating carbon emissions from printing activities is described in the table on page 3. The table contains a reference to Scope 1, 2 and 3 in the Green House Gas Protocol (GHGP). This document can be found at: <http://www.wbcsd.org/DocRoot/dseriJfQI7TUHsp4jNxN/ghg-protocol-revised.pdf>

All the parameters in the table are defined as either “Site relevant” or “Product relevant” to point out where the customer may influence the carbon footprint of the printed material. It’s important to stress that both “Site relevant” and “Product relevant” parameters always must be included in a calculation according to this recommendation. Dividing the parameters into “site” and “product” is only intended for specific product calculations, where “site” parameters can be calculated based on average data for the company while “product” parameters must be calculated according to the exact specifications of the product under consideration.

In a general order of magnitude, Intergraf lists the **main 13 parameters** which are normally responsible for most CO₂ emissions that can be associated with printing activities on site, or in relation with the production of printed products. When summing up these factors, a printer will be able to identify around **95% of its total CO₂ emissions** within the defined scope.

All calculation systems should provide a reference to the source of CO₂ equivalent data used in the respective models.



Top parameters for calculating CO2 emissions

No.	Parameter	Site/Product relevant	GHGP Scope
A.	Production of substrate	Product	Scope 3
	Emissions from production of purchased substrate used for printing (e.g. paper and plastic).		
B.	On-site combustion of fuels	Site	Scope 1
	Emissions from combustion of fuels in the company (direct emission) : (<i>Natural gas, fuel oils, LPG gas, coal and heatset inks</i>) Production of the combusted fuels are described under point K.		
C.	Production of purchased energy	Site	Scope 2
	Emissions from production of purchased energy consumed in the company (indirect emission): (<i>Electricity, steam, district heating, compressed air, cooled water</i>) Production of the fuels used for energy production and transmission losses is described under point L.		
D.	Production of plates and cylinders	Site	Scope 3
	Emissions from production of purchased offset plates or gravure cylinders.		
E.	Transport of finished product	Product	Scope 3
	Emissions from transport of the finished product to the first point of delivery of the primary customer should be included in the calculation. Further transport (to point of sale or end-users) is to be accounted by customers, such as publishers. Production of the combusted fuels are described under point K.		
F.	Transport of raw materials	Product	Scope 3
	Emissions from transport of substrates from the production of the material to the printer should be included, Transportation of other raw materials e.g. chemicals, printing plates and packaging materials can normally be left out due to low relevance. Production of the combusted fuels are described under point K.		
G.	Company owned or leased vehicles	Site	Scope 1
	Emissions from combustion of fuels in company owned or leased vehicles (direct emission). Production of the combusted fuels are described under point K.		
H.	Employees commuting	Site	Scope 3
	Emissions from commuting by workers from the home to the work place should always be considered in calculations. The travelling of workers and the emissions deriving from it is depending on the geographic location of the company and its employees. For some companies it can therefore be an important source of emissions, why it should be considered in calculation models. The travelling of visitors to the company is however not considered. Production of the combusted fuels are described under point K.		
I.	Production of inks and varnishes	Product	Scope 3
	Emissions from production of purchased inks and varnishes.		
J.	Production of packaging materials	Product	Scope 3
	Emissions from production of purchased packaging materials e.g. card and PE-plastic		
K.	Production of fuels (upstream)	Site	Scope 3
	Emissions from production and transportation of fuels for on-site combustion and transportation.		
L.	Purchased energy (upstream and transmission losses)	Site	Scope 3
	Emissions from production and transportation of fuels for production of purchased energy. Transmission losses of purchased energy.		
M.	Production of Isopropanol (IPA), or alternative fountain solutions additives, and cleaning agents	Site	Scope 3
	Emissions from production of purchased IPA and cleaning agents.		

Notes:

As shown by the graph on page 2, the Intergraf recommendation does not include some parameters which have a low relevance in relation to total emissions, in normal operation conditions. These represent a maximum of 5% of the defined scope for calculations. These parameters are:

- Production of other materials like plate developing agents, fountain solution, gum, blankets and small supplies.
- Transport of other raw materials than the substrate.
- Transport and treatment of production waste and waste water.
- Business travel by employees and visitors.
- Emissions from VOC's.

It's important to emphasize that some of the left out parameters may influence the calculation with more than 5% under certain operating conditions. Special attention should be brought to the handling of waste from the plant. This recommendation is based on the assumption that waste plates and cylinders are recycled. Small runs may as well influence the amount of waste to the extent that 5% could be exceeded.

Certain limitations to the scope have been defined for the following reasons:

Capital assets

The capital assets of a printing plant, such as building material, machinery etc, **cannot currently be included** in a calculation model since it is difficult to obtain reliable figures. There is no clear consensus on their impact on CO₂ emissions; it varies greatly across different plants, depending on their individual activities.

Customer distribution

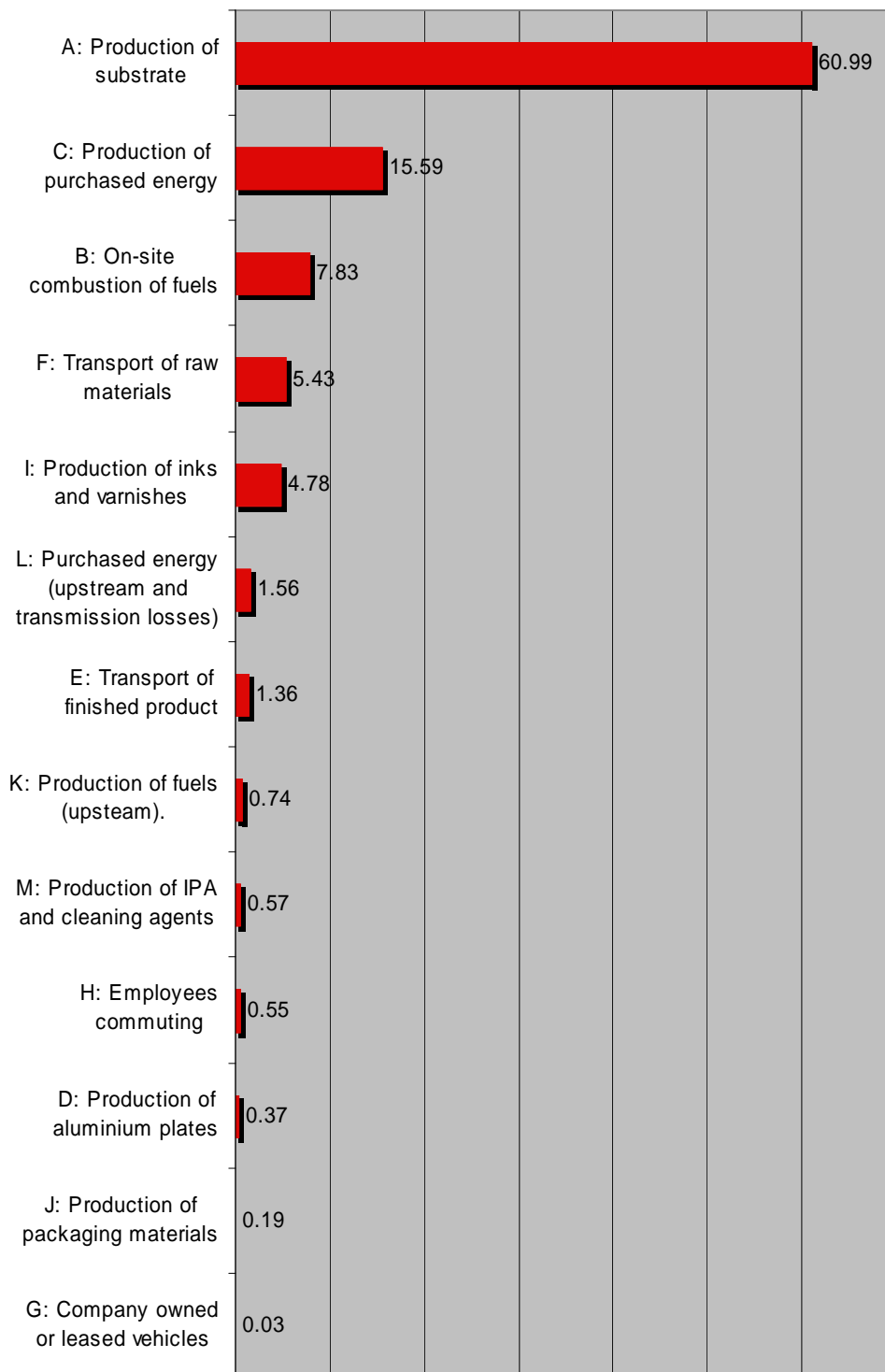
Transport of the finished product to the first point of delivery of the primary customer should be included in the calculation. Further transport (to point of sale or end-users) is to be accounted by customers, such as publishers. Freight is therefore job relevant, and no generic data on freight can be used.

End of life of paper products

Emissions resulting from "end of life" treatment of paper products, as well as paper waste from a plant, are a highly complex subject requiring detailed analysis. Intergraf has therefore drawn the conclusion that it **cannot currently be included** when calculating carbon emissions from printing activities.

Waste paper can be incinerated, recycled or landfilled, and the impact on the climate varies depending on the treatment undertaken. Most significant emissions at this stage come from waste paper ending in landfills, which release CH₄. Recycling or incineration has less impact on the climate. Waste treatment varies between different European countries, where completely different conditions and facilities prevail. The inclusion of recycling and incineration in a calculation of CO₂ emissions could very possibly have a positive effect. The carbon footprint could as a result be smaller. Intergraf therefore aims at including this aspect in the future, when more reliable calculation models are available. More analysis is needed on the matter, and progressing on the subject will require further investigations with relevant experts.

SPECIFIC EXAMPLE of primary CO₂/equivalent sources for a single PRINTING SITE INVESTIGATION on a yearly basis (%)



These values provide an illustrative example of proportions of CO₂ emissions, and should therefore **not be interpreted** as representative values for the European printing industry in general.

The company under investigation operates heatset printing facilities and produces magazines and advertising leaflets. It has in-house facilities for file content management, prepress, printing, finishing, and provides distribution services.