

Communicating Environmental Performance of Printed Products

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Abstract

VTT conducted the LEADER project (2007-2010) to study the environmental impacts occurring during the life cycle of different print products. Communication was selected as one of the focus areas to increase the usability of the life cycle assessment and carbon footprint results among the industrial stakeholders. One key issue was how to present the results in an informative manner for non-expert stakeholders.

The environmental issues in the print products' value chain are for the most part communicated between companies, by professionals and very few actors have direct contact to the end-users. The needs and also the ability to make use of new environmental information and new tools vary a lot within the value chain.

An informative way to present the results of the LCA and carbon footprint case studies was to produce case specific presentation material in the form of printed and electronic brochures, titled fact sheets. Besides the numerical results of the LCA- and CF-calculations, the brochures include basic information about the research methods, products, assumptions made in the study and life cycle stages included. Guidance for interpreting the results was also added. This paper shows the development steps of the brochure and how the stakeholders have used it and what further needs they have for environmental communication of print products.

Background

The aim of the LEADER project (Lean development with renewable resources 2007-2010) was to study the environmental impacts occurring during the life cycle of print media products (figure 1). In the project, two research methods were applied to calculate the impacts: product-specific life cycle assessment (including carbon footprint) and the environmentally extended input-output model ENVIMAT [1]. This paper is based on the reports of the LEADER project [2, 3] and it includes a new study of the use of the factsheets. The full reports and the fact sheets can be downloaded on the VTT web site <http://www.vtt.fi/leader>. Further information about the project and different presentations of the results can be found from the same website.

Five case products that differ from each other in several ways were selected to be analysed in the project. By selecting different kinds of print media products, the impacts of different paper grades and printing methods were included in the project. Since all these products have different manufacturing processes and uses, the purpose of the project was not to compare different print products, printing technologies or paper grades. Instead, the aim was to provide an overview of the environmental impacts of printed media products and the possibilities of reducing those impacts.

The main objective of the sustainability communication part of the LEADER project was to identify the most relevant challenges related to the communication of environmental information. Other objectives were to gather ideas and tools for improving

communication within the value chain of print products and to get feedback on the drafts of the fact sheets that were under development. Different eco labels and other tools for environmental communication and how they were used in the printing industry were also reviewed in the project.

The research work of LEADER project was coordinated by VTT and conducted in cooperation with the Finnish Environment Institute (SYKE), Metropolia University of Applied Sciences, Finnmedia, several printing companies, suppliers, logistics companies and the paper manufacturers Stora Enso, UPM-Kymmene, Myllykoski and Metsäliitto. The project could not have been completed without the active participation of several paper and printing industry representatives and other actors from the print media value chain. Several cooperation partners from the industry have provided valuable information, data and comments during the project.

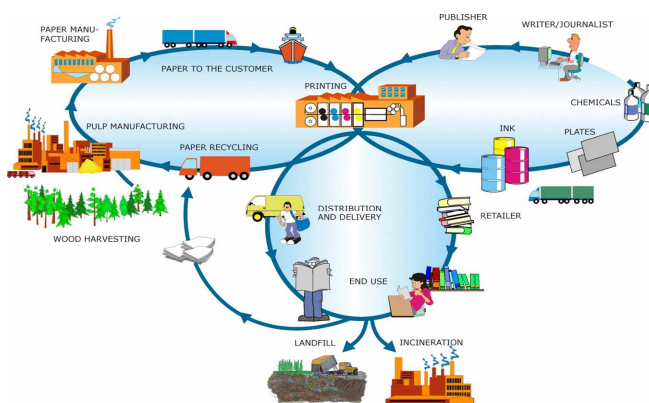


Figure 1. The life cycle of a printed product.

Research method

In the communication part of the research project altogether 32 persons from Finland representing different actors in the value chain of print products contributed to the data collection. Figure 2 presents the whole value chain with other parties related to the sustainability communication of print products. The number of informants to the research from each sector of the value chain is also presented in the figure. The data were gathered between April and August 2010.

In the stakeholder workshops general information about environmental sustainability was first presented. Then the representatives of different parts of the value chain exchanged their views in open discussion and the themes of the discussion were steered by the researchers, who also draw conclusions of the workshop.

The interviews were done by one or two researchers for one interviewee at the time. The interviewees were asked to describe the current situation of their sustainability communication. Then the draft versions of the fact sheets were presented and discussed.

The interviews were recorded and transcript was made for deeper analysis.

In this study of how the fact sheets have been utilized a qualitative research was conducted mainly by e-mail questionnaire, which was sent in April 2011 to 76 representatives of 28 different companies. 10 answers were received. The open questions concerned the quality of the report and the fact sheets and how the information has been used.

To find out how widely the results have been distributed an analysis of the visits on project web pages was done. Snoobi software was used to identify the amount, length, origin and entering method of the external visits to the page.

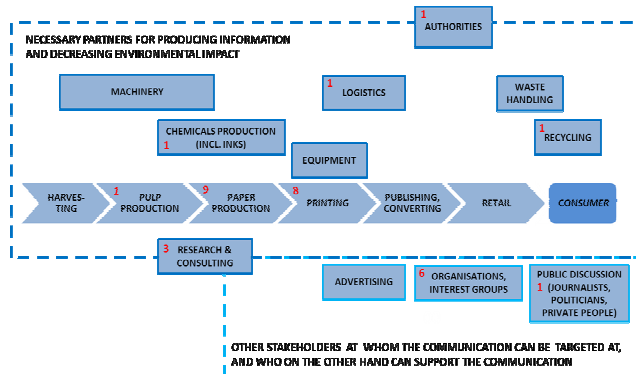


Figure 2. Scheme of the parties involved in the sustainability communication of print product. The number shows how many interviews there was from each group.

Challenge of communication

Due to increasing public interest in the environmental impacts of consumption, there is a growing need for information about the environmental performance of print products. Within the paper and printing industry, product-based information is required for different purposes; internal communication between different actors in the graphic arts industry and individual companies and external communication to customers and consumers.

The way how to communicate depends strongly on the target group and audience. The message to consumers is formulated differently compared to the message to actors of the value chain. Other level of communication is within the media value chain, where the stakeholders, like publishers and advertisers, seek deeper information on environmental sustainability of digital and printed distribution channels. On the third level the business to business message within the media sector can be formulated differently than when it is targeted to totally different sectors.

In the discussions, only a few of currently available tools for sustainability communication were mentioned as being in frequent use. The paper producers generally utilize **Paper Profile** for providing information on their products. In January 2011 WWF launched a similar service called **Check Your Paper** and the use of it is increasing. Some companies publish **sustainability and corporate responsibility reports**. The Nordic **Swan label** was also named in many discussions, as were ecolabels in general. **Meetings and informal discussions** with both own personnel and customers, and **tailored reports** for certain purposes (internal or

for customers), play an important role in current communication of environmental information.

Discussions about the challenges in sustainability communication dominated all the interviews and group discussions. All stressed that the messages should be clear and concise not only for the consumers, but also for the majority of the personnel of the companies within the value chain. On the other hand, there was also demand for information that could be used in comparisons of products and which would support sustainable choices.

In brief, the most frequently mentioned challenges and obstacles in sustainability communication were:

- laborious calculations and assessments
- need for messages that are concise and interesting, but nonetheless include detailed information
- comparability of the results of LCA and CF calculations
- presentation of the results in a wider perspective and in an accurate context
- lack of credibility when a company announces favourable results concerning itself
- confrontation between printed and digital media
- activation of consumer communication
- fear of drawing critical attention.

The interviewees described the features of good sustainability communication in fairly similar terms. According to the discussions, the sustainability communication of a print product should be clear, simple, positive and sufficiently diversified. It should also be open, convergent and informative bringing out other important values, like domestic production and renewability. The results should also be presented proportional to other everyday activities in a form that is useful to a consumer for making environmentally conscious choices.

As one of the key themes in the discussions emerged how communication should be developed. All the interviewees emphasized that the value chain should actively send convergent messages about the environmental work and sustainability of print products. Many of the interviewees brought up communication and education targeted at the company's own personnel and direct customers as an essential starting point in achieving closer collaboration and more effective communication within the field, which would then in time also contribute to consumer communication.

Based on the data from the workshops and interviews it can be concluded that there is substantial demand for information related to sustainability among the stakeholders of the print products, although many of the actors had not yet received requests for information from customers. There is a wide consensus within the field that this is a topical subject and that proactive efforts should be initiated in cooperation with the other stakeholders. Although more advanced tools and more detailed information definitely need to be created, it was emphasized that a great deal of useful information already exists and that it should be communicated more effectively.

Developing the fact sheets

To increase the usability of the project results, transparent and detailed reporting of case definitions, system boundaries, made assumptions and results achieved was considered important. To gain wider attention among industry representatives, other means

than a scientific report [2] of communicating the research results would also be required.

Firstly, a researcher workshop was held among the sustainability researchers of VTT and SYKE to consider the most important aspects that should be included in the material. Secondly, a literature study related to available tools and guidelines was conducted. Examples found from the literature provided valuable input and guidelines, but due to the relative nature of the results of LCA and carbon footprint studies, it was evident that more information than a mere label was required.

The main target group for communicating the research results were the representatives of the paper and printing industry and other actors in the print media value chain who are familiar with the production processes, techniques and product properties. The main characteristics related to the product life cycle and the differences between different types of print products were considered to be well known. However, most of the actors are not familiar with the methodology related to life cycle assessment and carbon footprint calculation.

The main challenge related to communicating the LCA and carbon footprint results is the amount of background data and results presented. To be able to increase the understanding of the critical aspects related to the environmental performance of print products, case-specific presentation materials in the form of printed and electronic brochures, i.e. fact sheets were developed. The fact sheets summarize some of the main results of each case study include basic information about the research method, product properties, assumptions made in the study and life cycle stages. Also guidance for interpreting the results was included.

It was decided that the fact sheets would focus on the carbon footprint results. Those cases which included life cycle assessment results, a second fact sheet describing the principles of LCA and the environmental impacts related to the case product's life cycle was produced.

It is known, that the frame of how the facts are presented has an influence on how the message is accepted. If a message has a negative goal frame, the reader might not adopt the message. If the goal frame is positive, the readers adapt and behave in a positive way and according to the message. The effect of the frame choice depends on socio-demographic characteristics and other personal characteristics. [4] For the frame of the fact sheets a neutral or slightly positive message frame was chosen to increase the credibility of the message.

After the researchers had decided the main characteristics of the fact sheets, the content and the usability of the fact sheets was evaluated by the actors in the print media value chain and selected experts during the workshop and theme interviews. In general, the fact sheets were favourably received by all the informants. Due to the greater complexity of the method and results, the facts sheets on the environmental performance of products were generally considered more difficult to digest, whereas the carbon footprint fact sheet was considered to be easy to read.

Varying opinions were presented on the style and layout of the fact sheets. Some of the informants would have appreciated a more commercial and simple approach to the contents, and stronger arguments that would be more easily adopted by the potential end-users or consumers as well. On the other hand, it was considered that a neutral style and informative content would

increase the credibility of the contents and results presented. Figures and graphics were considered to be useful, but it was also considered important to provide enough information and guidance for interpreting the figures in the text.

Based on the comments received, both the contents and the layout of the brochures were updated and modified. Altogether eight fact sheets describing the carbon footprints and environmental impacts of the case products were produced.

Use of the fact sheets

The fact sheets were developed to help the internal and external communication need of the players in the value chain of printing. Feedback and comments on the use of the fact sheets showed that the chosen format fitted the needs of the value chain.

The fact sheets were over all described positively. They were considered as excellent, clear, compact, snappy, informative, important, well-structured, and including all the main information needed. They were also considered as easy to approach and including all the relevant background information and case description so the calculations could be verified. Clarifying the terms and comparing the results with driving a car was also appreciated.

VTT as a neutral research party and the source and the publisher of the fact sheets was considered to give more credibility to the results presented. Reading the fact sheet was seen as a possible inspiration to get more information on the topic. The impact of the recycling and waste management stage was new information to several repliers.

On the down side the amount of information squeezed into the fact sheets was considered heavy, but no part was suggested to be left out. There was also a hope that the texts should have been even more simple and clear so the non-professionals in sustainability would understand it easier.

Several suggestions for improving the fact sheets were also made. The functional unit of one ton of products was considered complicated to relate to everyday life. Biodiversity was not included in the project and that is why it was not included in the fact sheets either even though it was hoped for. Some guidelines of how to decrease the environmental load was also hoped for. Some repliers would have preferred European case studies instead of Finnish.

All the answers showed that the information has been used in internal meetings, trainings and personnel magazines. The main target group has been the sales people, but via different methods the message has been distributed widely to employees. The information has been perceived positively and further discussion of how to influence company's own environmental impact has been inspired by it.

The fact sheets have been used as background information for the company specific numbers given to the stakeholders. The target has been to describe the terms and how the calculations were done so that the readers can easier interpret the company's numbers. Also the information from the fact sheets has been used in the company's own marketing and sales material. The material combined with ISO 14001 certificate has made the customer communication easier.

This material has also been given to different journalists and reporters as background information for their articles about the environmental sustainability of printing. The project and the results

have received wide publicity in the printing and paper making magazines, especially in Finland.

The material has also been used as a source of information to several Master's Thesis at different universities. Furthermore, it has been a source for the new and improved edition of the book "Finnish environmental guide for graphic industry". In the ISO standardizing work there is a TC130 Graphics Technology standards group that has a working group developing a standard for the carbon footprint of commercial printing. The information provided in the project and the published fact sheets have also been a source of information in this group.

The analysis of the external visitors in the web site of LEADER project shows that the topic is of interest for several parties. The number of visits during the first 4 months of the page was just over 400 done by 330 different visitors. Normally there was less than 15 visits each week, but after the press release of the project results there is clear peak of four weeks having about 50 visits each week. The fact sheets have been accessed altogether 209 times.

From what type of companies the visitors came was also analysed. Most of the visits were from paper companies (29%), research and education (24%) and authorities and interest groups (16%). Only 10% of the visits were from printing companies. Majority of the visit were from Europe, but also cities from Asia and North and South America can be found from the list.

Conclusions

The challenge of how to succeed in communicating the environmental sustainability of printed products was taken seriously during the LEADER project. Additionally to the research reports also fact sheets were developed together with the industry representatives for the business to business communication within the value chain. It was important to define the target group clearly, because the tool for communication is different to each target group.

LCA is a complex tool and it is demanding to describe it in a simple manner for non-experts. Breaking the message to smaller parts could help the communication. Carbon footprint is easier to understand, though background information and case description needs to be presented also with those results.

Even though the communication in the fact sheets was hoped to be more compact and easy to read, LCA standards require a set of information that should be presented with the results. The case assumptions and system boundaries have such a strong influence on the result that they have to be presented too.

The transparency of the results and calculations was considered important. It brings credibility and it also enhances the wider use of the results. VTT as a research party and the source and publisher of the results was also considered to add credibility.

Overall the fact sheets were considered as a good working tool for communication within the value chain. They were also used widely as an internal tool for familiarizing personnel with environmental sustainability.

References

- [1] Seppälä, J., Mäenpää, I., Koskela, S., Mattila, T., Nissinen, A., Katajajuuri, J.-M., Härmä, T., Korhonen, M.-R., Saarinen, M. & Virtanen, Y. Suomen kansantalouden materiaali- ja ympäristövaikutusten arviointi ENVIMAT-mallilla. Suomen ympäristö 20/2009. Suomen ympäristökeskus, Helsinki.
- [2] Pihkola, H., Nors, M., Kujanpää, M., Helin, T., Kariniemi, M., Pajula, T., Dahlbo, H. & Koskela, S. Carbon footprint and environmental impacts of print products from cradle to grave – Results from the LEADER project (Part 1). Espoo 2010. VTT Research Notes 2560. 208 p. + app. 35 p
- [3] Pihkola, H., Federley, M., Nors, M., Dahlbo, H., Koskela, S. & Jouttijärvi, T. Commuting environmental impacts of print products – Results from the LEADER project. (Part 2). Espoo 2010. VTT Research Notes 2561. 64 p. + app. 3 p.
- [4] Van de Velde L., Verbeke W., Popp M., Van Huylenbroeck G. The importance of message framing for providing information about sustainability and environmental aspects of energy. Energy Policy 38 (2010) pp. 5541-5549.

Author Biography

Merja Kariniemi received her M.Sc. degree in Graphic Arts Technology from Helsinki University of Technology in 1997. During 12 years she worked at KCL in different research and expert positions and in customer related positions. KCL was a research company of the Finnish paper industry. Since the merging of KCL and VTT in 2009 Mrs. Kariniemi has worked as a Senior Scientist at VTT. Now she is working in a national level printing and paper industry consortium project called Lean Development with Renewable Resources

Minna Nors, received her M. Sc (Tech.) degree on year 1995 in Graphic Arts Technology from Helsinki University of Technology, where she worked one year. In 1997-2003 she worked at Stora Enso Oulu mill in printing laboratory and laboratory manager positions. She joined KCL in 2003 working in different research and customer related positions until 2009. Currently she is the Project Manager of LEADER –project and works as Research Scientist at VTT Sustainability assessment. Her work includes also research on sustainable print media, customer relationship management and organizing VTT seminars concerning LCA and its' applications.

Maija Federley, M.Sc. (Tech.), is a senior scientist at VTT. After graduation from Helsinki University of Technology in 1996 she worked in the field of process modeling and analysis at KCL, the research company of the Finnish paper industry. In 2005 she joined the research group studying future use of paper based materials. Since that, she has been involved in projects that are focused on user-centric development of new product concepts for media and technology enhanced learning. Her other areas of interest are human-technology interaction and trends in consumers' media use practices.