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Environmental impact of electronic and print media: Television, internet newspaper and printed daily newspaper

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Abstract

Over the last two years EMPA St. Gallen carried out two case studies on the environmental impact of electronic and print media. One of these LCA case studies is the comparison of television, internet newspaper, and printed daily newspaper. Media were compared with each other under the aspect of providing the daily news to the consumer.
Aim of this study was an in-depth examination of the environmental impact of the three media. This was achieved in particular by a careful specification of the reference unit and by testing the stability of the results using sensitivity analysis.

1. Introduction

At a first glance, use of electronic media seems to be associated with less material and energy flow when compared to print media, thus causing less environmental impact. Often this is taken as the final truth until it needs correction, like the dream of the paperless office, which was supposed to result from the introduction of computer and e-mail.

Aim of this case study was a close examination of the environmental impact caused by a popular example of use of electronic and print media — the provision of the daily news. This study set out to answer the following questions:

- Where are environmental hot spots located along the life cycle of television, internet newspaper, and printed daily newspaper when using them for the daily news?
- What recommendations can be given for the reduction of the previously seen environmental impact? For recommendations see the final report (Reichart 2001).

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2. Methods

2.1 Life Cycle Assessement: An introduction

Life Cycle Assessment (LCA) is a technique for assessing the environmental impact associated with products or services. LCAs are typically carried out in four phases:

1. It starts with the setting of goal and scope of the study. The latter consists of the definition of a reference unit, the setting of the system boundary, the setting of necessary assumptions - to state only the most important aspects.
2. Then, relevant in- and outputs of the product or service system are gathered. Data about resource consumption, emissions into air, water, and soil as well as waste is collected. Usually, this is done along the entire life cycle of a product or service, i.e. along production, use, and disposal including transportation.
3. Next step is the evaluation of the environmental impact associated with the considered in- and outputs.
4. Finally, results of the previous phases are interpreted.

In this study two internationally recognised assessment methods were applied, the Swiss method of environmental scarcity (Brand 1998) and the European Eco-Indicator 99 method (PRé 2000). Results are presented for the first method only as both methods lead to similar results and data requirements are fulfilled much better for the first assessment method than for the second.

The Ecoscarcity method takes into account pollutants into air, water and soil, as well as waste and depletion of scarce energy resources. All of these are multiplied by individual eco-factors. Results are added up to a single score in “ecopoints”. Each eco-factor is based on the ratio of the current situation of emissions or energy consumption in relation to a politically established target, which is valid for a defined geographical and temporal area. In this case (Brand 1998), it is Switzerland in the year 1997.

2.2 Reference unit of television, internet and printed newspaper

Television, internet newspaper, and printed daily newspaper serve different functions on the level of the individual consumer as well as on the level of society. Focus of this study was on the level of the individual. Therefore, functions on the level of society like providing values and norms, the construction of social reality, etc. were not taken into account. On the level of the consumer another simplification was made, by stating that the main purpose of the three media is providing information and entertainment while ignoring other functions, like structuring of the day.

Even if media are seen only from this perspective there are still large differences in presentation and thus in perception. While print and electronic newspaper offer text and pictures, television broadcasts are dominated by spoken language and film

sequences. There are even more differences in between newspapers, highly emotional boulevard papers with lots of coloured pictures and very serious papers with hardly any pictures at all. In order to handle some of the existing differences it was decided to split up the comparison into three approaches each from a different perspective. Two of these approaches are discussed here.

2.2.1 News item

Reference unit is "reading or watching a typical news item of at least national importance by an average[2] Swiss adult". The news item considered in any of the three media is about the same event. That way, a similar information content between media is taken as the reference. Media are compared by:

- Watching the news item during the main evening news broadcast "Tagesschau" on the Swiss-German TV channel „SF 1".
- Opening[3] and reading the news item in an internet newspaper.
- Reading the news item in a printed newspaper.

As a next step the "soft" description of the reference unit (functional unit in terms of LCA) was quantified. Here, length of time for reading or listening to the news item in electronic media was compared with the size of a newspaper cutting, which only counts half as newspapers are printed double-page (Table 1). In the case of the internet newspaper and the printed newspaper a news item was generated, which represents the middle in between a boulevard and a very serious newspaper.

2.2.2 Daily news

Reference of this comparison is "the consumption of the daily news by an average Swiss adult", in the sense of "being informed". This implies, that daily news via TV means more national or international news and no local news, vice versa for the newspaper. Media are compared by:

- Watching the evening news including the weather forecast on the main evening news broadcast "Tagesschau" on the Swiss-German TV channel „SF 1".
- Reading an internet newspaper.
- Reading a thin boulevard newspaper ("Blick").
- Reading a serious, voluminous newspaper ("Neue Zürcher Zeitung").

Reference units were quantified by length of time for the TV-broadcast, average time spent on the homepage of a daily newspaper as well as physical existence of

[2] Average in the sense of intellectual abilities, like reading speed.
[3] Starting from the homepage of the newspaper.

either newspaper while accounting for an average of 2.3 readers per newspaper (WEMF 2000a) (Figure 1).

Table 1:
Functional units of the three approaches.

	Television	Internet Newspaper	Newspaper
News item	3 min	1.5 min	250 cm^2 Average Newspaper
Daily news	25 min	10 min	43% size Thin + big newspaper

2.3 Product system and system boundary

User of the media is the already mentioned average Swiss adult. It was assumed that the user is living in an average household, where media are used in an average way. The household owns a TV and a computer. Both media are specified as follows:

- TV: Middle class, colour TV, 72 cm diagonal, 8 years of life, 4.2 hours on per day (94 W), 17.8 hours stand-by (5 W).
- Computer: Modern, middle class desktop computer, 4 years of life, 2 hours on per day (145 W), off for the rest of the time.

In contrast to both electronic media, specification of print media changes between approaches. It is a cutting of a newspaper with average paper quality in the first approach and two specific newspapers in the second approach: “Blick” as a thin boulevard newspaper and “Neue Zürcher Zeitung” as a voluminous paper (Table 1).

All of the mentioned media are investigated along their entire product life including transportation processes. Even the operation of infrastructure is taken into account, like data transfer via internet, operation of the telephone network, production of TV-shows and operation of a satellite receiver.

For reasons of simplification journalism and the transportation processes linked to it are not included in the system boundaries.

The electricity mix associated with power consumption needs further mentioning. The relevant national electricity mix, depending on the location of power consumption, was assumed. In the case of the production of print media this is the Scandinavian, German, or Swiss electricity mix. In the case of the production of electronic media it is the average European electricity mix. For use phase the Swiss electricity mix was assumed, as use of media is supposed to take place in Switzerland. For use phase a sensitivity analysis was conducted.

3. Results and Discussion

3.1 News item

Reading a news item in the internet newspaper causes more environmental impact than listening to a news item on TV or a cutting of a newspaper (Figure 1). About half of the environmental burden of the online paper is caused by the production of the computer. The other half results from use phase, especially from the operation of the telephone network and internet data transfer, which account for about 80 percent of that environmental impact. The running of the computer itself causes only a fifth of the impact during use phase. The TV has less environmental burden in relation to the computer. The smaller impact during production phase is due to the fact that a TV is used much longer and more intensively than a computer, which results in less impact per time used.

Drawback of this comparison is the fact that at present, parts of a newspaper cannot be bought.

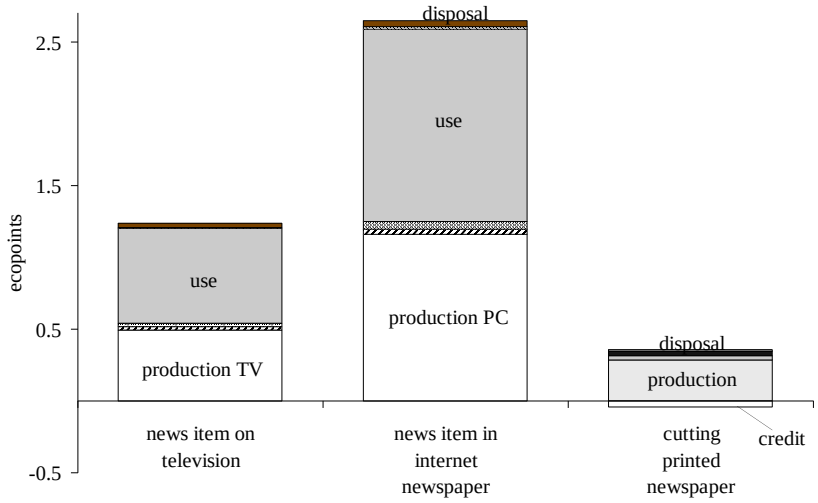

Figure 1
Environmental impact of the reading or listening to a news item.

3.2 Daily news

Seen from the perspective of consuming the daily news as a whole, a newspaper causes more environmental impact than reading an online paper or watching the news broadcast on TV (Figure 2). In the case of the newspaper the environmental impact is still higher than electronic media, regardless if a thin or large paper is read or whether there are 2.3 readers per newspaper or less. Reason for the high environ-

mental impact of the newspaper is the energy intensive production of pulp and paper.

In reality, parts of an online newspaper are frequently printed on a private printer. Therefore this was tested in a sensitivity analysis. About twenty extra ecopoints have to be added, if three pages of an internet newspaper are printed (Figure 2). In the case, the environmental impact of the internet newspaper is in the same range than reading a thin newspaper[4]. The shown increase for the printing is again due to the production of pulp and paper and not due to the private printing process.

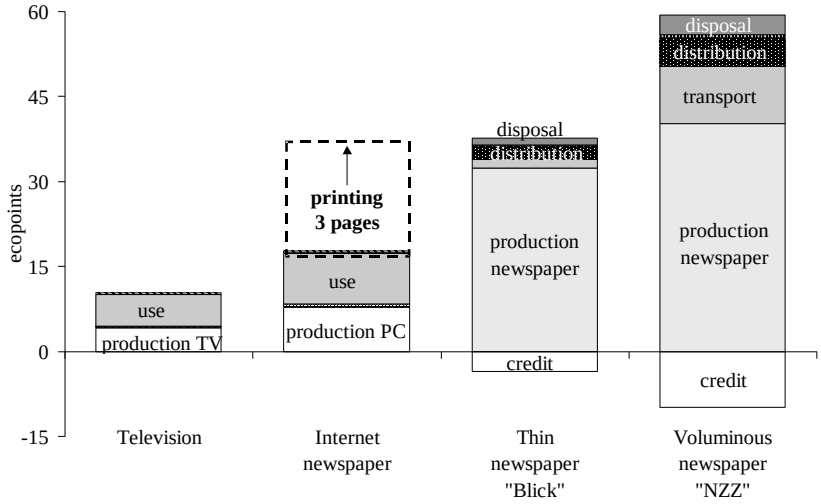

Figure 2
Environmental impact of the consumption of the daily news including the option of printing online information.

In real life, length of time for consuming the daily news or other sorts of information varies a lot in between media and consumers. This was tested in a sensitivity analysis. As long as watching television does not take more than 80 minutes the environmental burden is smaller than reading a thin newspaper[4] (Figure 3). It only takes about 20 minutes of internet surfing to be in the same range of the environmental impact of a thin newspaper. In this case length of time for reading a newspaper is irrelevant, because physical existence of the newspaper is the only important factor.

Sensitivity of the results was also tested for location of media use i.e. the assumed electricity mix during use phase. The Swiss electricity mix for use phase was replaced by the average European electricity mix. This replacement represents the use of media in many European countries. The exchange of the electricity mix results in

[4] Under the assumption of 2.3 readers per newspaper.

a tripling of the environmental burden of electronic media in relation to the reference setting (Figure 4). Now even watching television causes nearly the same environmental impact than reading a thin paper.

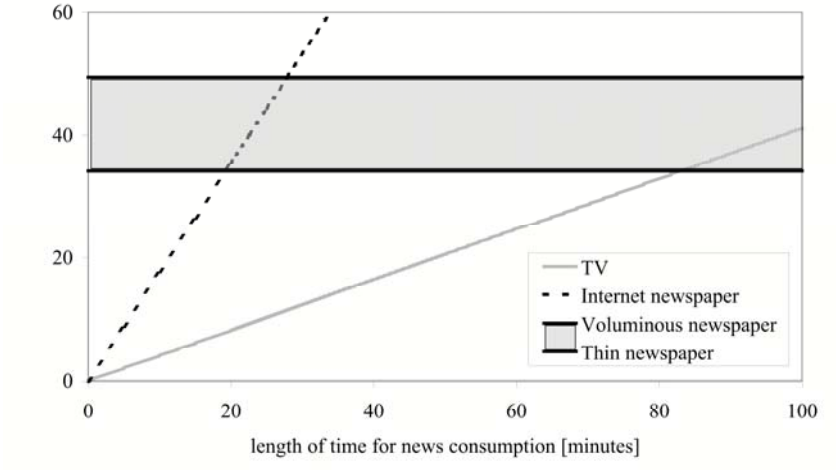

Figure 3
Influence of length of time for news consumption on the environmental impact.

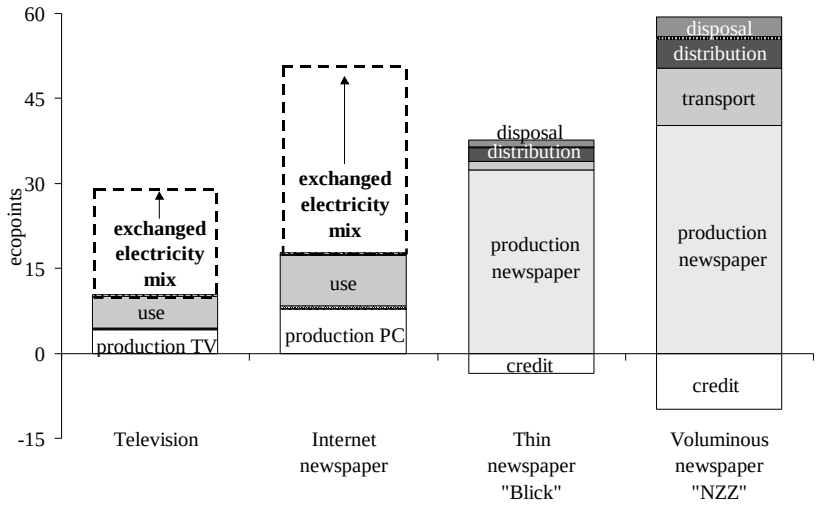

Figure 4
Influence of the electricity mix on the environmental impact of the consumption of daily news.

4. Conclusion

The environmental advantage of the printed newspaper seen in the first approach "news item" remains on a theoretical level, as parts of a newspaper cannot be bought.

Therefore results of the second approach gain more weight. Use of electronic media, like TV or internet only lead to less environmental impact in relation to print media, if a set of conditions are fulfilled:

1. No online information is printed.
2. Use of electronic media is limited in time and directed towards specific goals.
3. Power consumption is based to a large extend on renewable energy sources. This still holds true for Switzerland, where a large amount of the national electricity mix is generated from renewable energy sources.

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Bibliography

Brand, G., Braunschweig, A., Scheidegger, A., Schwank, O. (1998): Bewertung in Ökobilanzen mit der Methode der ökologischen Knappheit – Ökofaktoren 1997. Bundesamt für Umwelt, Wald, Landschaft (BUWAL), Schriftenreihe Umwelt Nr. 297, Bern

Jedele (1999): Personal communications 25.6.1999 with Mr. Jedele, publidata of SRG, Bern

PRé (2000): The Eco-indicator 99. A damage oriented method for Life Cycle Impact Assessment. Methodology Report. Published electronically under URL: http://www.pre.nl

Reichart, I.; Hischier, R. (2001): Vergleich der Umweltberlastungen bei Benutzung elektronischer und gedruckter Medien. EMPA-Bericht Nr. 253, EMPA, CH-9014 St.Gallen

WEMF (2000): MA Comis 2000. Published electronically under URL: http://www.wemf.ch/de/produkte/comis.html

WEMF (2000): MACH Basic 2000, Zürich