CARBON STOCKS IN WOOD RAW MATERIAL
The primary raw material of newspapers is paper made of wood fibre. Wood is a renewable natural resource that binds carbon dioxide from the atmosphere. In addition to trees, forests also bind carbon dioxide through other vegetation and soil. Forests and soil also release carbon dioxide in connection with decomposition. Some of the carbon contained in wood is released during the paper production process, and the rest remains bound to the finished newspaper. The carbon that remains bound to the product is released when newspapers are incinerated or deposited in landfill sites. As paper decomposes in landfill sites, carbon dioxide is released to the atmosphere and some of which is re-absorbed by the Earth’s fossil and mineral resources. Discharges into water cause eutrophication.

OTHER ENVIRONMENTAL IMPACTS
In addition to the carbon footprint, it is also important to factor in any other potential environmental impacts of the production and use of newspapers. The carbon footprint of newspapers is mostly the result of the use of energy and fuels, but the use of energy also produces other emissions in addition to greenhouse gases, and these also contribute to the prevalence of acidification and particulates. Energy consumption also leads to depletion of the Earth’s fossil and mineral resources. Discharges into water cause eutrophication.

ASSUMPTIONS
The results given in the brochure are for a typical Finnish regional newspaper. The calculations are based on typical Finnish conditions, and no general conclusions can be drawn on the basis of the results as regards other countries or other types of products.
- The emissions described in the brochure have been calculated on the basis of 1,000 kg of newspapers. An individual newspaper comprises 48 pages (broadsheet) and weighs 200 g. Based on these assumptions, one tonne corresponds to approximately 5,000 individual newspapers.
- Paper production, printing, distribution, use, and recycling/landfilling take place in Finland.
- Newspapers are printed using coldset offset printing technology, which is one of the typical methods of producing newspapers. Printing inks contain both mineral and vegetable oils and include a combination of different kinds of offset inks.
- The paper on which newspapers are printed contains approximately 60% recycled fibre (sub produced of recycled paper), 35% virgin fibre (mechanical pulp), and 5% fillers (mineral materials).
- The calculations are based on information compiled on paper recycling by Finnish households and average waste treatment statistics, according to which 79% of newspapers are recycled, 16% end up in landfill sites, and 5% are incinerated, producing thermal energy.
- Recycled newspapers are reused as raw material for new newspapers.

Further information
The data and calculations presented in the brochure are based on the LEADER research project of VTT Technical Research Centre of Finland (2007–2010), which was carried out in collaboration with the Finnish Environment Institute (SYKE) and Metropolia University of Applied Sciences. The objective of the project was to examine the life cycle environmental impacts of different types of printed products by means of life cycle assessments. A further goal was to find ways to reduce environmental impacts and to increase awareness of these impacts. The project was sponsored by the Finnish Funding Agency for Technology and Innovation (Tekes), the Graphic Industry Research Foundation of Finland (GTTS), Metsäliitto Group, Myllykoski Corporation, UPM-Kymmene Corporation, and Stora Enso Group.


The Carbon Footprint of a Newspaper
www.vtt.fi
The range of emissions is the result of different models having been used to assess the conditions of individual landfill sites and the amount of landfill gases recovered.

The average landfill gas recovery rate (60%). Approximately 16% of newspapers end up in landfill sites after use, while 79% are recycled and 5% incinerated.

The life cycle phases included in the calculations are shown above. The following life cycle stages were not included in the examination: newspaper editing, business travel, manufacturing and maintenance of machines and buildings. Additionally, chemicals and raw materials used forming under 1% of the whole were excluded.

Carbon footprint calculations take into account the entire life cycle of newspapers.

**BASIC FACTS ABOUT CARBON FOOTPRINTS**

- Carbon footprint is a measurement of the greenhouse gases produced during a product’s life cycle.
- Greenhouse gas emissions produced during the life cycle of a typical Finnish newspaper include among others carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).
- Carbon footprints are expressed as a carbon dioxide equivalent (CO₂e), which is a measure used to describe how much global warming a given type of greenhouse gas may cause, using the functionally equivalent amount of concentration of carbon dioxide as the reference.
- Greenhouse gases in the atmosphere increase the temperature of the Earth similarly to the glass walls of a greenhouse. They allow short-wave solar radiation to pass through the atmosphere but trap long-wave energy reflected back from the Earth. The thicker the blanket of greenhouse gases, the more of the outgoing energy gets trapped and the greater the warming effect.
- Climate change is the result of a rapid rise in the concentration of greenhouse gases in the Earth’s atmosphere. According to the UN’s Intergovernmental Panel on Climate Change (IPCC), the most rapidly growing sources of greenhouse gases are energy production, transport, industry, housing, deforestation, agriculture, and buildings.

**ENERGY PRODUCTION AND CONSUMPTION IN A KEY ROLE**

Emissions resulting from the use of purchased electricity in paper production and printing are responsible for approximately 50% of the carbon footprint of a typical Finnish regional newspaper. The size of the carbon footprint therefore depends especially on the sources of energy used to produce electricity. Emissions resulting from energy production have been calculated on the basis of a five-year average of Finland’s energy production. The production of electricity can be broken down to different sources of energy as follows: renewable sources of energy (29%), fossil fuels (42%), and nuclear power (21%).

If all of the purchased electricity required for the production of newspapers constituted what is known as ‘green electricity’, the carbon footprint of a typical Finnish newspaper would be approximately 40% smaller. In addition to greenhouse gas emissions, different forms of energy production also have many other environmental impacts that are not included in carbon footprint calculations.

**REDUCING THE CARBON FOOTPRINT**

As the producer is not always able to influence the production of purchased electricity and heating energy, the best way to reduce the carbon footprint is to lower energy consumption and increase energy efficiency. Other important ways to reduce the carbon footprint include reducing the amount of raw materials and using materials more efficiently.

Readers can reduce the climatic effects of newspapers by sorting their waste more efficiently. Climatic effects of consumption by Finnish households in 2005 was relatively small (approximately 1%), while the biggest climate impacts were attributable to housing (28%), food products (16%), and transport (13%). (Seppälä et al. 2009)

**SO HOW DOES THE CARBON FOOTPRINT OF A TYPICAL FINNISH NEWSPAPER COMPARE?**

- The total greenhouse gas emissions caused by the production and use of one tonne of printed newspapers amount to approximately 891–1,066 kg (CO₂e). The carbon footprint of an annual subscription (356 issues) of daily newspapers therefore amounts to approximately 75 kg CO₂e and that of a single newspaper to approximately 210 g.
- The carbon footprint of an annual subscription of daily newspapers is equivalent to the greenhouse gas emissions of a journey of 456 kilometres in a new car (CO₂e = 164 g/km). Based on the above calculations, the greenhouse gas emissions produced over the entire life cycle of a single newspaper are therefore equivalent to a car journey of approximately 1.3 kilometres.
- The contribution of newspapers, books, and other paper products to the climate impacts of consumption by Finnish households in 2005 was relatively small (approximately 1%), while the biggest climate impacts were attributable to housing (28%), food products (16%), and transport (13%). (Seppälä et al. 2009)
Carbon footprint calculations take into account the entire life cycle of newspapers.

The life cycle stages included in the calculations are shown above. The following life cycle phases were not included in the examination: newspaper editing, business travel, manufacturing and maintenance of machines and buildings. Additionally, chemicals and raw materials used forming under 1% of the whole were excluded.

**Carbon footprint of newspaper**

**Total 1066 kg CO₂ eq. /1000 kg newspapers**

**Carbon footprint of a typical Finnish newspaper**

**Compare?**
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**REDUCING THE CARBON FOOTPRINT**

As the producer is not always able to influence the production of purchased electricity and heating energy, the best way to reduce the carbon footprint is to lower energy consumption and increase energy efficiency. Other important ways to reduce the carbon footprint include reducing the amount of raw materials and using materials more efficiently.

Readers can reduce the climatic effects of newspapers by sorting their waste more thoroughly, thereby reducing the number of newspapers that are taken to landfills with household waste.

**COMPLEX COMPARISONS**

The results of carbon footprint calculations depend on the assumptions and information used. Calculations produced for different kinds of products or using different methods cannot be compared with each other. Due to differences in energy production, variations between different countries can also be considerable. Moreover, other environmental impacts should also be considered when calculating the carbon footprints of different products or product groups.

**The range of emissions is the result of different models having been used to assess the conditions of individual landfill sites and the amount of landfill gases recovered. The lower end of the scale represents well-maintained landfills where almost 90% of landfill gases are recovered, while the higher end of the scale represents the average landfill gas recovery rate (80%). Approximately 16% of newspapers end up in landfill sites after use, while 70% are recycled and 5% incinerated.**
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Some of the carbon contained in wood is released during the paper production process, and the rest remains bound to the finished newspaper. The carbon that remains bound to the product is released when newspapers are incinerated or deposited in landfill sites. As paper decomposes in landfill sites, carbon dioxide and methane are formed, some of which are released to the atmosphere and some of which are recovered.

**OTHER ENVIRONMENTAL IMPACTS**

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