



Carbon footprint – a new challenge for the leather industry

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9 billion people will live on this planet by 2050
67% of the world population will live in cities by 2025
50% more primary energy will be needed in 2030
1.2 billion cars will be in use by 2020

Growing & Ageing population; Urbanisation; Globalisation & Developing Markets; and Energy Demand & Climate Protection – these are the megatrends that will pose major challenges for all of us.

And the chemical industry has solutions to manage these challenges. Taking these challenges into consideration, sustainability is a core strategy for BASF to integrate into all its business and value chains.

Global Climate Change and CO₂ emissions

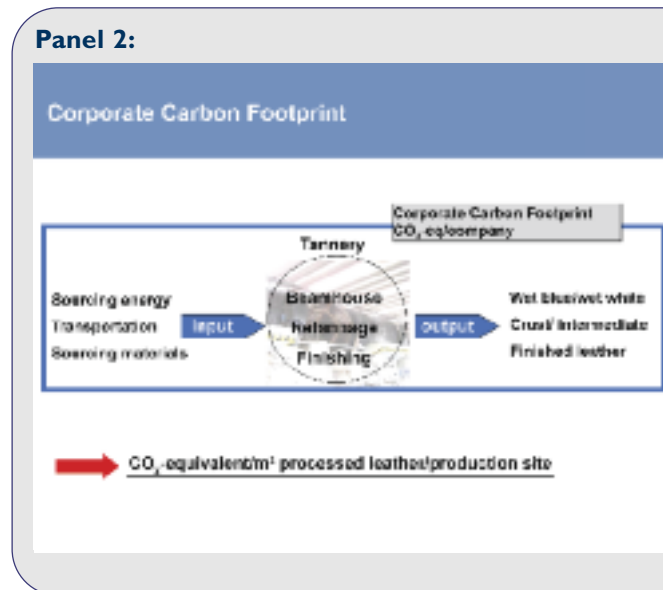
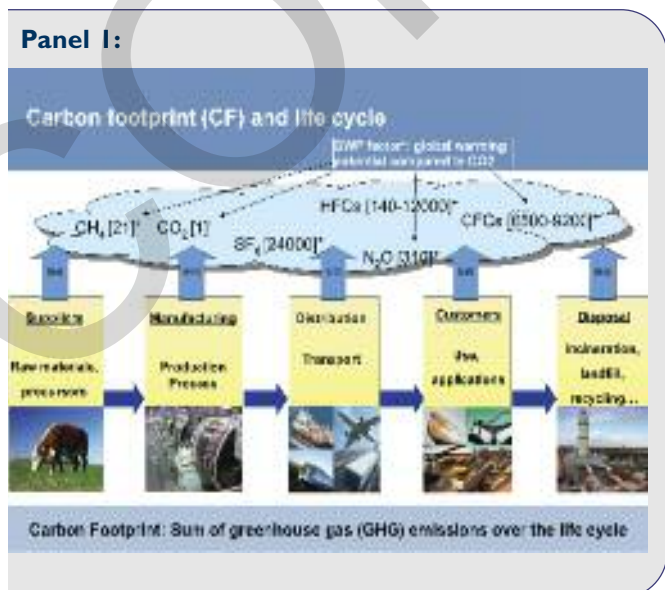
The recent rapid climatic changes are evident, and they can have a significant impact on our daily lives, cutting across geographic boundaries around the globe. The effects could be considerable – increasing the probability of unusual or 'freak' climatic phenomenon and 'natural' disasters. Other phenomena such as exceptional snowfall in New Zealand, severe floods in Thailand, Indonesia, and the Philippines, as well as hurricanes in North America, sandstorms in China, and continuous rainfall in South America could also have been influenced by climate

change, although it is impossible to link single events clearly with these phenomena.

Global climate change has been shown to be predominately caused by emissions of greenhouse gases to the atmosphere, which are generally and somewhat erroneously referred to as 'CO₂ emissions'. In addition to carbon dioxide, other greenhouse gases such as methane and nitrogen oxides are also major culprits. However, CO₂ is used as the reference and the global warming potential of other gases is expressed relative to CO₂. For this reason, the carbon footprint is defined as the sum of all greenhouse gas emissions of a product, a company or an organisation over its entire life cycle, expressed as CO₂.

Innovative Climate Protection Solutions to reduce Carbon Footprint

BASF was the first company to provide a comprehensive carbon footprint report and the company is committed to establishing a global standard for carbon reporting. This is in order to make the assessment of greenhouse gas emissions





generated by companies along the value creation chain informative, practical and uniform.

In 2010, BASF achieved significant reductions in greenhouse gas emissions from its own production, from 31.1 million tons in 2009 to 25.2 million tons in 2010. The company's innovative climate protection solutions across all industries helped customers to reduce their CO₂ footprint by 322 million tons.

In principle, every branch of industry is affected by discussions concerning carbon footprints, but the automotive industry is very much the focus of these challenges. Internal combustion engines are responsible for a large proportion of CO₂ emissions. This is reflected in the efforts of many motor manufacturers to develop alternative means of propulsion that are as close as possible to being carbon neutral. If the whole automotive value chain is analysed, it can be estimated that approximately 80% of its carbon footprint is accounted for in the active use phase, that is, when the vehicle is being driven. Five per cent of carbon emissions are generated when the vehicle is disposed of and 15% when it is manufactured.

In Germany and some other countries, manufacturers already inform consumers about the CO₂ that is emitted in the active use phase in g/CO₂ per km. In future, motor manufacturers will collect information on the CO₂ emissions of all the components and they will need to request this information from their suppliers. The leather industry will therefore need to respond to the challenge of quantifying CO₂ emissions per m² of leather.

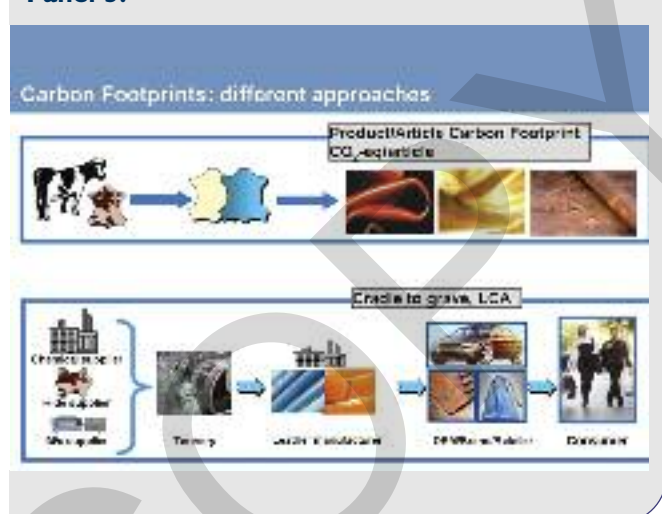
Disposal of the hides generates additional CO₂ emissions and utilising them to manufacture leather products for other applications would be a more sustainable alternative.

There are different approaches to evaluate the carbon footprint of leather articles. One approach would be to determine the carbon footprint of every type of leather manufactured by the tannery. This method is cumbersome and requires much time and effort, which makes it unfeasible. Another approach is the cradle-to-grave approach, which is to perform an entire lifecycle assessment, covering all the stages of the product life from raw material to disposal. This approach is complicated and impractical for use in the leather industry.

Currently, the most practical solution would be to calculate the corporate carbon footprint (CCF) by measuring the greenhouse gases emitted at each production site, then expressed as the CO₂ equivalent. This figure can then be expressed relative to the surface area of the leather that is produced in the tannery. The final figure is an average for each production site, which is certainly enough to satisfy the requirements of the automotive industry and the shoe industry.

The scope of the CCF has to be clearly defined, i.e. it needs to specify exactly which statistics from the production plant are included in the calculation. The German Leather Federation has developed a method (ECO₂L-Label) which is currently being introduced. This offers tanners a rather simple means of measuring a clearly defined, standardised carbon footprint. The ECO₂L-Label might be adopted as an international standard.

Panel 3:



The Carbon Footprint

Several different approaches can be taken to define and quantify the carbon footprint of leather. In principle, the carbon footprint of leather ought to be calculated for the whole of its lifecycle. Because leather is made from hide - which is obtained as a by-product of meat production - the carbon footprint of cattle-breeding needs to be taken into account, in particular, the methane gas that is generated as a fermentation product in the digestive systems of ruminants.

Because the raw hide is clearly a by-product of the production of meat and milk, it is not directly responsible for the methane that is emitted as the result of raising cattle.

Nevertheless, it has not yet been clearly defined how these emissions should be allocated in the production of leather.

The factors for determining the carbon footprint of leather

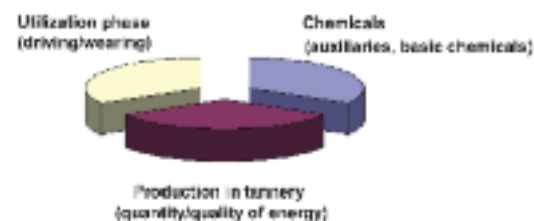
In principle, a distinction needs to be made between three separate segments:

1] *The production of the leather in the tannery (see ECO₂L-Label):*

In particular this includes the type and quantity of energy consumed in the tannery and in the transport and disposal of goods. This phase is well covered by the new label.

Panel 4:

Carbon footprint – impact on leather



→ Complex system: each segment needs separate approach



2) *The production of chemicals:* This includes both the basic chemicals as well as the specialties that are applied to the leather during the manufacturing process. Theoretically, the individual carbon footprint of each chemical substance would have to be quantified and then expressed relative to the area of the leather. This would require a tedious effort and would involve high costs because of the large number of different chemical products that are applied. Therefore this is not the most ideal approach.

Accordingly, studies are currently being conducted at BASF to find a pragmatic solution to assess the influence of chemicals on the corporate carbon footprint objectively. Generally, it can be assumed that modifying the production process by following the recommendations below will have a positive effect on the carbon footprint of chemical substances.

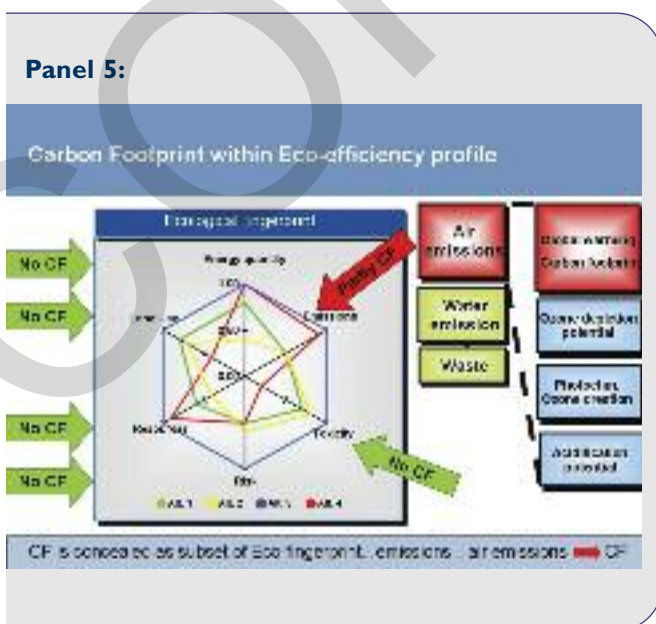
- Optimised production of processes chemicals.
- Production processes in the tannery should be continually revised and modified in order to reduce water and energy consumption.

3) *The use phase:* This relates to the CO₂ that is emitted during the working life of the leather. We need to work very closely with the automotive manufacturers to get this information.

At the moment, we do not have all the information necessary to get an absolute figure for the CO₂ emissions from leather and how these three loosely defined segments – production, chemicals and use – interact. However, it can be assumed that the results can vary widely from tannery to tannery depending on the type of energy that is used (fossil fuels or regenerative energy) and the manufacturing process.

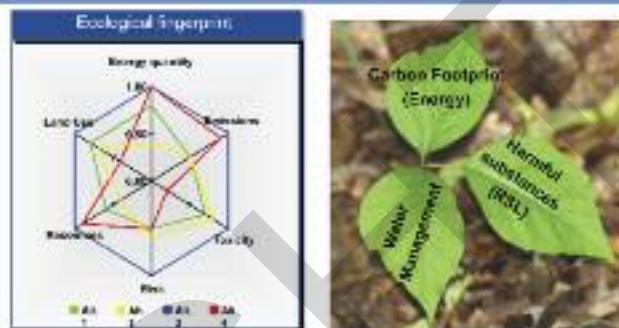
Wider ecological issues

If we consider the leather within a much wider context, such as the ecological fingerprint, most of the relevant environmental factors do not relate directly with the carbon footprint. This is because the carbon footprint primarily covers airborne emissions



Panel 6:

Eco-profile of leather



that are caused by the consumption of energy. Furthermore, the absolute figures for the quantity of energy consumed do not necessarily correlate with the CO₂ emissions.

Clearly, the first step is to evaluate the source of energy (fossil, regenerative, CO₂ neutral) before the CO₂ emissions can be calculated. But we should also be mindful of the fact that whenever carbon footprint values are used, there are other emissions that play an important role in the production. In addition to CO₂, this includes wastewaters and solid waste: many different aspects have to be considered when the sustainability of a product or a process is evaluated.

The sustainability of leather

A distinction has been made between three separate segments where the sustainability of leather can be assessed.

Apart from the carbon footprint, which is essentially concerned with energy use, sustainability needs to take other issues into account. This includes water management – water consumption and effluent treatment – and toxicity, and the presence of harmful substances (RS = restricted substances).

Theoretically, it would be possible to produce leather with an optimum carbon footprint but without adequate facilities for treating the wastewater: the leather might also contain large quantities of harmful substances. Hence, this leather would not fulfill the sustainability criteria. This is often overlooked when the leather value chain is assessed and the carbon footprint is used to emphasise the 'green' credentials of the product. The wider environmental impact needs taking into account.

In this context the carbon footprint is an important factor for assessing the sustainability of leather production, but it is not the only factor that has to be considered.

Nevertheless, it is essential that an internationally recognised standard – a so called Product Category Rule (PCR) for calculating carbon footprint values – is made available in order for a valid comparison to be made of the carbon footprints of different tanneries.

The leather industry needs to take an active approach to these issues so that it can portray leather as being a sustainable product that has several environmental advantages. This is the only way to ensure that leather is a sustainable product that can continue to be marketed as a premium resource along the value chain. ☺