

220 grams textile, 11 kilograms CO₂ The Carbon Footprint of clothing

10.75 kg CO₂ and other greenhouse gases – that is the Product Carbon Footprint of a white long-shirt made of 100% cotton and a net weight of 220 grams. The Carbon Footprint is 50 times higher than the net weight of the long-shirt. In other words, it is equivalent to a 40 kilometer drive by car. Or, the carbon emissions of five long-shirts fill a 20' standard container.

What is the Product Carbon Footprint?

The Product Carbon Footprint indicates all greenhouse gas emissions along the complete life-cycle of a product, which implies especially extraction of raw materials, production, transportation, distribution, use-phase and disposal.

This is a result of a joint research project by Systain and the Otto Group for determining the Carbon Footprint of three selected textiles. The venture project was part of an overall project of the Federal Environment Ministry of Germany, the Federal Environment Agency and the German Oeko-Institute on Carbon Footprint methodology and communication. Data were collected in Asia as well as Germany. After data validation the results were analyzed and scenarios were modeled to identify reduction potentials.

The long-shirt has travelled quite a long way: from the cotton field in the U.S. to the production units in Bangladesh up to the shipment of the product to Germany and finally to the customer, who ordered the article. This distance amounts to more than 35,000 kilometres – almost one trip around the world.



The offered long-shirt

One important outcome of the project: representing nearly one third, the largest portion of the Carbon Footprint is linked to the use phase of the long-shirt. 55 wash cycles were assumed. Emissions by the proportions of using the dryer and ironing were also presumed according to statistical data. The Carbon Footprint for the use-phase depends significantly on the concrete washing temperature, the energy efficiency of washing machine and dryer, the load degree when washing and drying and the frequency of automatic drying. If the dryer is used for each laundry of the long-shirt the Carbon Footprint of the use phase rises by three times from 3.3 kg CO₂e to more than 10 kg CO₂e. The message: consumers can make a considerable contribution to reduce the Carbon Footprint of textiles by their individual behavior.



The ready made garment unit for the long-shirt in Bangladesh

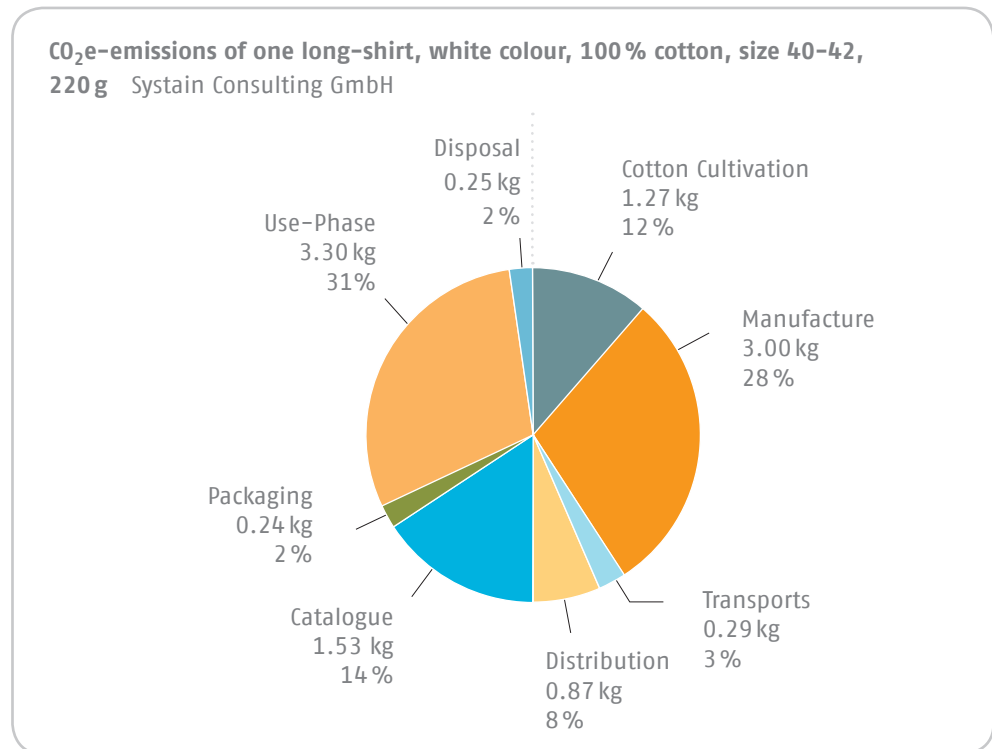
Which emissions are included?

Besides CO₂ all other greenhouse gases were included as for example methane or nitrous oxide. The latter results from fertilizer use for cotton cultivation. Nitrous oxide has a global warming potential (GWP) that is approx. 300-times higher than the effect by CO₂. Consequently, the Carbon Footprint is indicated by kilogram CO₂-equivalents (CO₂e).

Regarding the production-phase of the long-shirt, greenhouse gases result especially from spinning and dyeing. Due to lacking grid supply in Bangladesh, the suppliers generate most of the electricity they need onsite. Natural gas is the common energy source for generators and boilers in Bangladesh, since the country has large domestic gas reserves. The specific CO₂e-emissions by using natural gas are lower than using oil or coal as energy source.

Even though the huge distance, the long-shirt or rather its components was shipped, transport-emissions accumulate to just 290 grams CO₂e, a quite low portion. However, if the longshirt is transported by air-freight from Asia to Europe, instead of regular sea-freight, the emissions for transportation would rise to 4 kg CO₂e. The distribution processes in Germany cause more CO₂-emissions than the transport-chain to the German market: 870 grams CO₂e. A considerable amount of these emissions is caused by returns, which account for approx. 470 grams CO₂e.

Although retail companies cover only a small fraction of the Product Carbon Footprint, there are various potentials and options to reduce the level of emissions related to the product: ranging from optimizing energy consumption in the supply chain, renewable energies, green logistics up to awareness raising among consumers.



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