

# CO<sub>2</sub>Shoe

Footwear carbon footprint



LIFE12 ENV/ES/000315

Coordinator:



**INESCOP**  
CENTER FOR TECHNOLOGY  
AND INNOVATION

Partners:



Confédération Européenne de L'Industrie de la Chaussure  
European Confederation of the Footwear Industry



Federación de Industrias  
del Calzado Español



centro tecnológico  
do calçado de portugal

## Background

The greenhouse effect is a natural phenomenon by which the so-called greenhouse gases (GHG), which are part of the atmosphere, absorb and emit infrared radiation, thus resulting in an elevation of the surface temperature of the Earth, without which life, as it is currently understood, would not be possible.

Nevertheless, since the first Industrial Revolution, there has been a steady increase in the amount of GHGs of anthropogenic origin released into the atmosphere, which is causing, an increase in the average temperature of the Earth and hence global climate change.

The most used tool for the quantification of greenhouse gases released into the atmosphere by a product, service or organisation throughout its lifecycle, is the carbon footprint calculation.

In the specific case of the footwear sector, companies did not know how to calculate the carbon footprint of their products. In addition, there was no tool available specific for the calculation of the carbon footprint of footwear.



## Project summary and objectives

The objective of the European project 'LIFE CO<sub>2</sub>Shoe – Footwear Carbon Footprint' was the development of the first IT tool for the calculation of the carbon footprint of footwear, taking the whole footwear lifecycle into account, i.e. a 'cradle to grave' approach that covers from raw material production to the end of life of a pair of shoes.

The CO<sub>2</sub>Shoe Project was coordinated by the Centre for Technology and Innovation (INESCOP) and another 5 partners from the European Union:

- Federation of Spanish Footwear Industries (FICE, Spain)
- European Confederation of the Footwear Industry (CEC, Belgium)
- Centro Tecnológico do Calçado de Portugal (CTCP, Portugal)
- C.G.S. di Coluccia Michele & C. sas (Italy)
- Leather Industry Institute (IPS, Poland)



## Methodology

The methodology used was based on the Technical Specification ISO/TS 14067 Carbon Footprint of Products.

A pair of shoes with its primary packaging (box) was defined as the functional unit. The system scope includes all the footwear and packaging lifecycle stages, as illustrated in the flow chart below:

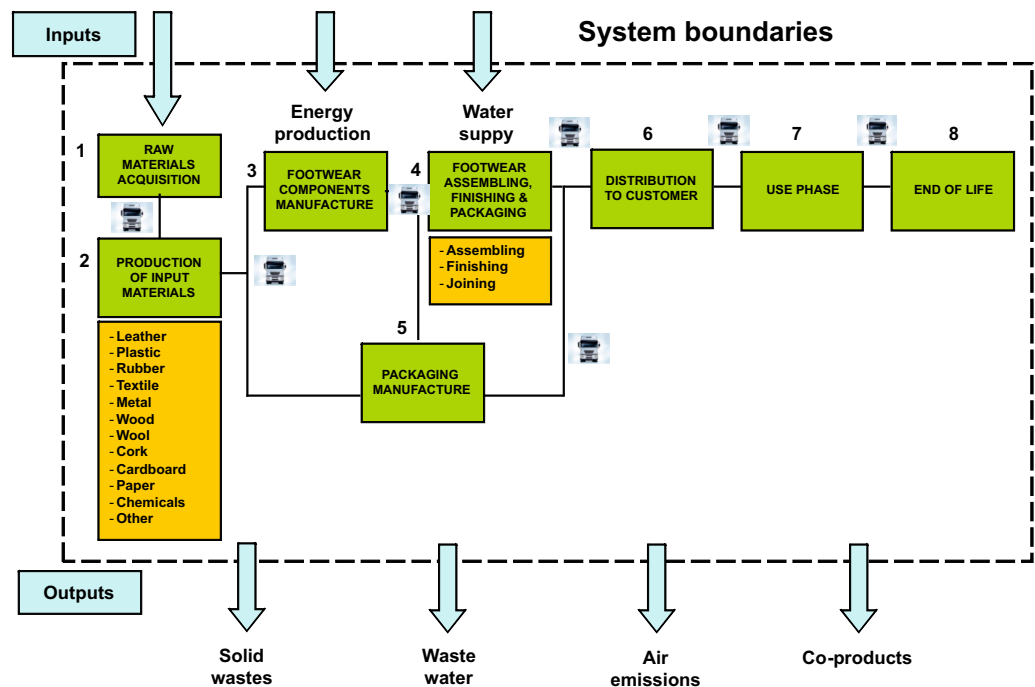


Figure 1. System's flow chart

The tool incorporates the main materials that can be employed in footwear production, as well as their corresponding emission factors.

An emission factor is a coefficient that converts activity data (for instance, energy consumption) into GHG emissions.

The calculation of the carbon footprint is quite user-friendly for companies, who just have to fill in an inventory table with the quantities of each material employed, and consumption of resources (water, energy, chemicals, etc.) throughout the manufacturing process. Then all this information is transferred to the tool, which gives the result of the carbon footprint calculation for the product under study expressed as CO<sub>2</sub> equivalents emitted by a pair of shoes.

The calculation tool is able to identify the production processes with the greatest impact, which helps footwear manufacturers implement mitigating measures (e.g. using water-based adhesives, selecting recyclable or biodegradable materials, using more efficient lighting and/or heating systems, etc.) to improve their environmental impact.



## Archieved results

The new carbon footprint calculation tool was implemented in a first pilot action on 36 footwear styles produced by SMEs of the European Union, obtaining an average value of **10.6 kg CO<sub>2</sub>e** per pair of shoes, although the results of each style may vary according to its composition, material origin and weight, among other factors.

Figure 2 shows the average carbon footprint values per production stage obtained in the first pilot action. According to these results, components manufacture is one of the stages that contribute most to the total carbon footprint of the footwear style analysed.

Then the participating companies received guidance on the various possibilities for improvement with a view to reducing the carbon footprint of their footwear styles.

Once the suggested improvements had been implemented, a second pilot action was conducted on the footwear styles. The results obtained at this stage showed an average value of **9.6 kg CO<sub>2</sub>e** per footwear style. On an overall basis, the carbon footprint decreased by almost **6%** in the footwear styles under study.

### CFP results per stages (%)

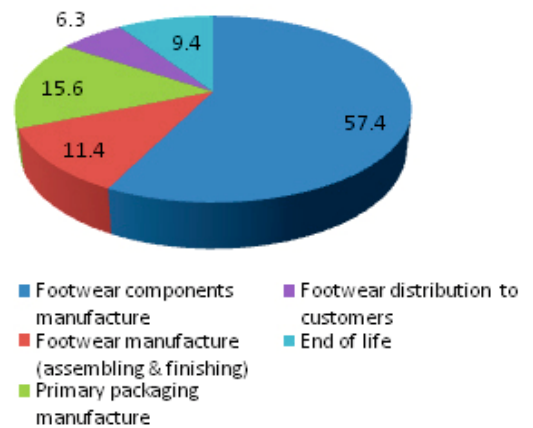


Figure 2. Average contribution of each stage to the carbon footprint after the first pilot action

Figure 3 shows the average carbon footprint values obtained in each pilot action and the percentage of improvement achieved in the second pilot action.

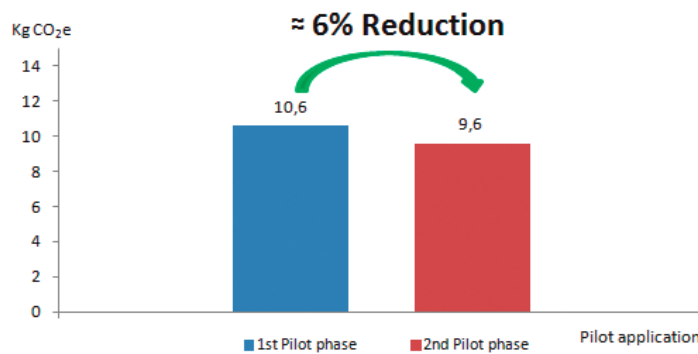


Figure 3. Comparative chart showing the carbon footprint average results before and after having implemented mitigating measures



## Long term benefits



### Environmental benefits

Considering that every year about 920 million pairs of shoes are produced in the EU (Source: World Footwear 2016), a 6% reduction in emissions in the EU could imply the reduction of 513,700 tonnes of CO<sub>2</sub>e/year.

Also, if these figures were extrapolated to the global footwear production (about 23,000 million pairs of shoes/year), a 6% reduction in emissions could imply the reduction of 12,842,400 tonnes of CO<sub>2</sub>e/year.

In this sense, the calculation of the carbon footprint of footwear contributes to the fight against climate change.



### Socio-economic benefits

- Allows the reduction in costs thanks to the optimisation of production processes, resources and consumption.
- Reinforces the product, brand or company image.
- Increases sales and employment opportunities, and can even be an advantage in public procurement processes.
- Allows the incorporation of eco-design aspects in footwear manufacture, which can lead to reductions in production costs.



# CO2Shoe

Footwear carbon footprint

## Partners:



Confédération Européenne de L'Industrie de la Chaussure  
European Confederation of the Footwear Industry



Federación de Industrias  
del Calzado Español



centro tecnológico  
do calçado de portugal

## Coordinator:



**INESCOP**

CENTER FOR TECHNOLOGY  
AND INNOVATION

📍 Polígono Industrial Campo Alto - 03600 Elda - España

☎ + 34 965395213 ✉ medioambiente@inescop.es

🌐 [www.inescop.es](http://www.inescop.es)

### PROJECT DETAILS:

Acronym: CO2Shoe

Reference: LIFE12 ENV/ES/000315

Start date: 01/10/2013

End date: 31/05/2017

Duration: 44 meses

Total budget: 750.468€

EC contribution CE: 50%

Website: [www.co2shoe.eu](http://www.co2shoe.eu)

“The CO2Shoe project has been carried out with the contribution of the LIFE financial instrument of the European Union.”

