Life Cycle Assessment

of Zagreb, National Championships in Sprint
for cadets, juniors, and seniors

15/17 September 2023

DECK
Developing Environmental Circular Knowledge

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What is a Life Cycle Assessment?

Life Cycle Assessment (LCA) is a methodology to assess the overall environmental burden associated to the whole life cycle of a product or service. It is generally considered the most reliable tool to assess properly the sustainability of a product.

LCA CAN HELP IN:

- comparing different alternatives in the product life cycle (i.e., packaging solutions, logistics, energy sources, raw materials and supply chain processing, use phase and or end of life)
- identifying environmental "hotspots" (where "it matters most"), allowing the selection of effective actions aimed at lowering the environmental footprint of a product

TODAY, LCA IS DEFINED IN TWO ISO STANDARDS:

- **ISO 14040:2006**
  Environmental management
  Life cycle assessment
  Principles and framework
- **ISO 14044:2006**
  Environmental management
  Life cycle assessment
  Requirements and guidelines

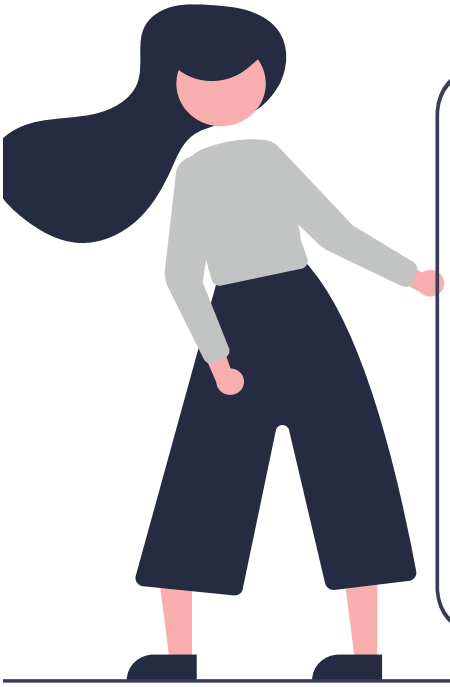
ISO 14040
defines LCA as the "compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle"

Methodology & Regulations

The current study is based on and takes into account the Product Environmental Footprint (PEF) Method to measure and communicate the life cycle environmental performance of products.

The European Commission in 2013 published the Recommendation 179/2013/EC (now updated with the Recommendation 2021-9332) that contains the guidelines of the LCA methodology to be applied to a product/service or to the activities carried out by an organization in order to communicate their potential life cycle environmental impact.

LCA is an iterative process, which consists of 4 main phases:



- Goal and scope definition
- Inventory analysis (Life Cycle Inventory - LCI)
- Impact assessment (Life Cycle Impact Assessment - LCIA)
- Interpretation of the results.

Goals

The **Goal** of this study is to identify the environmental footprint of a canoeing and kayaking competition with regards to Zagreb, National Championships in Sprint for cadets, juniors, and seniors, 15/17 September '23.

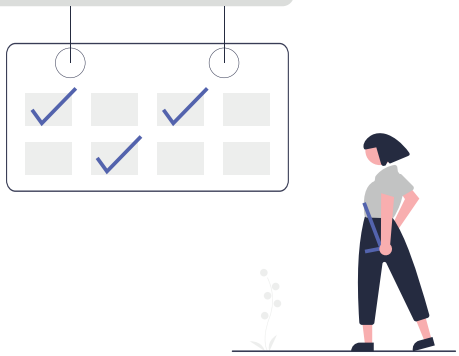
The main aim of the study is to **understand the most impactful processes**, so-called "**hotspots**", associated with the professional canoeing and kayaking competition, in order to identify opportunities to lower the overall environmental footprint, by means of **improvement** actions.

This study has been carried out in the frame of DECK project funded by the EC with Erasmus+ Programme.

Functional Unit

The Functional Unit of the study is Zagreb, National Championships in Sprint for cadets, juniors, and seniors, 15/17 September '23, which includes a:

Timeframe of **3 days** (the whole duration of the event)



Athletes 217

Support staff (coach, trainers..): **53 people**

General staff: 25 people

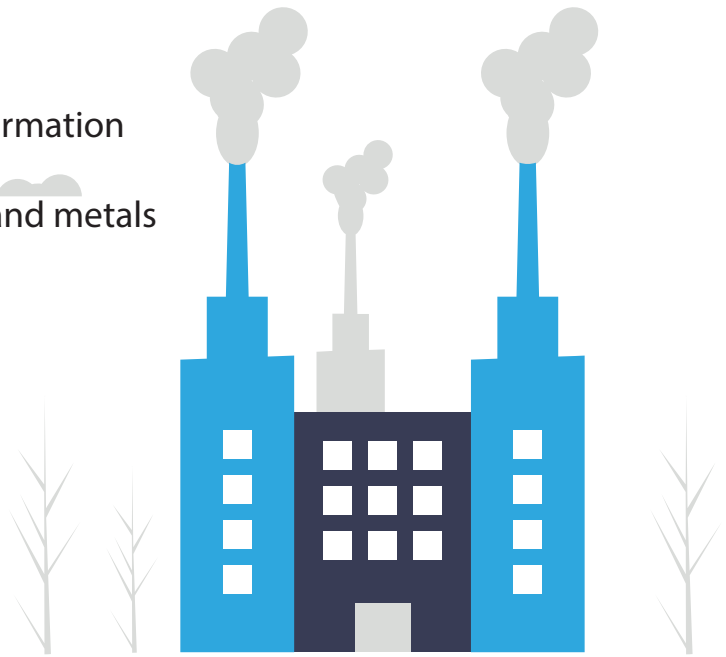
20 Supporters (total for the whole event)

Impact categories

Environmental Footprint (EF) Impact categories represent the environmental problems of interest to which the results of the life cycle inventory analysis can be assigned.

Following are the impact categories included in the EF v3.1 method and considered in the analysis.

- Acidification
- Climate change – Total
- Climate change - Biogenic
- Climate change - Fossil
- Climate change - Land use and transformation
- Ecotoxicity, freshwater
- Particulate matter
- Eutrophication, marine
- Eutrophication, freshwater
- Eutrophication, terrestrial
- Human toxicity, cancer
- Human toxicity, non-cancer
- Ionising radiation
- Land use
- Ozone depletion
- Photochemical ozone formation
- Resource use, fossils
- Resource use, minerals and metals
- Water use



System Boundaries

For the LCA of Canoe competition, the following sections have been considered:

- Temporary Infrastructure
- Temporary Infrastructure Maintenance
- Utilities
- Food & Beverage
- Packaging F&B
- Transport Equipment & clothing
- Ticket & Promotional materials
- Waste
- Mobility
- Accommodation

Results

The PEF results are calculated with the LCA software **SimaPro 9.5.0.0** and the **Environmental Footprint (EF 3.1) method.**

EF 3.1 method is the impact assessment method developed by European Commission during the EF Transition Phase.

All the data have been collected directly by the **Croatian Canoe Federation,** while all the life cycle secondary datasets used in the model belongs to the Ecoinvent 3.9 and Agribalyse databases.

Results Focus on relevant categories

For each relevant impact category identified, the percentage impact contributions of the different stages have been calculated.

Climate Change Kg CO2 eq

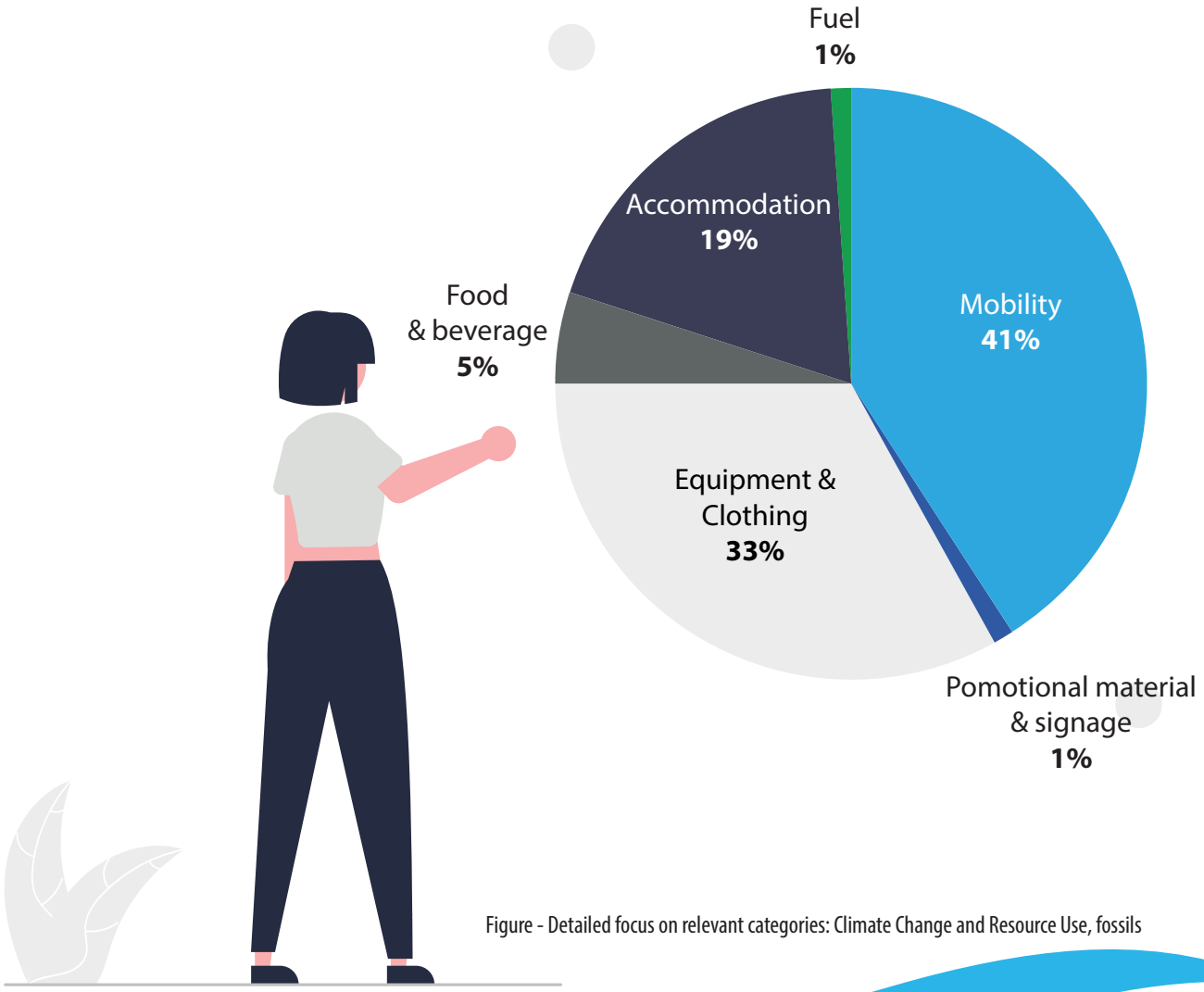


Figure - Detailed focus on relevant categories: Climate Change and Resource Use, fossils

Results Focus on relevant categories

The figures show a focus on the first two relevant impact categories: **Climate Change** and **Resource Use** (fossils).

Resource use, fossils MJ

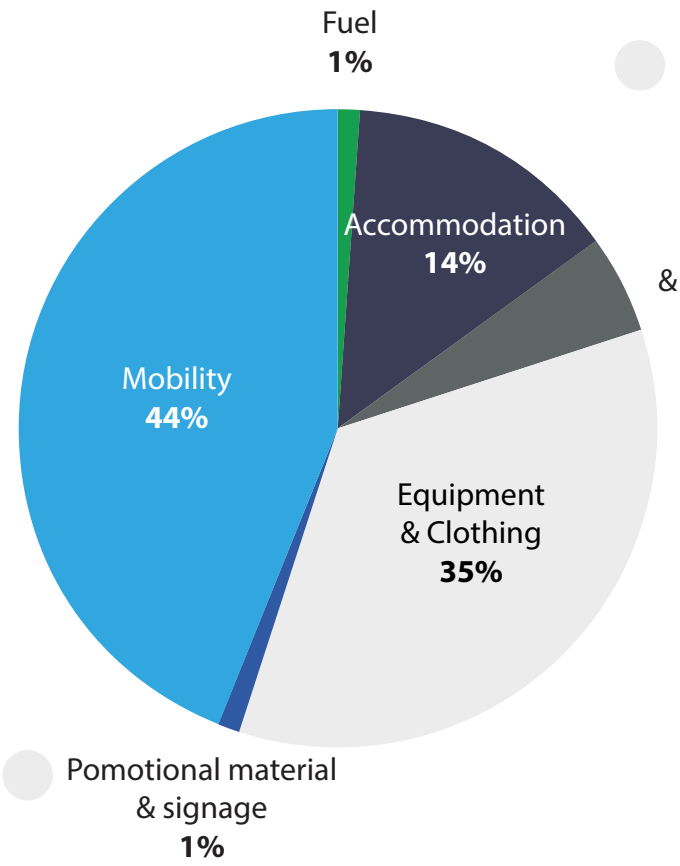


Figure - Detailed focus on relevant categories: Climate Change and Resource Use, fossils

Results
Environmental footprint

More than 38% of the overall footprint is represented by Mobility of athletes, Staff and Supporters.

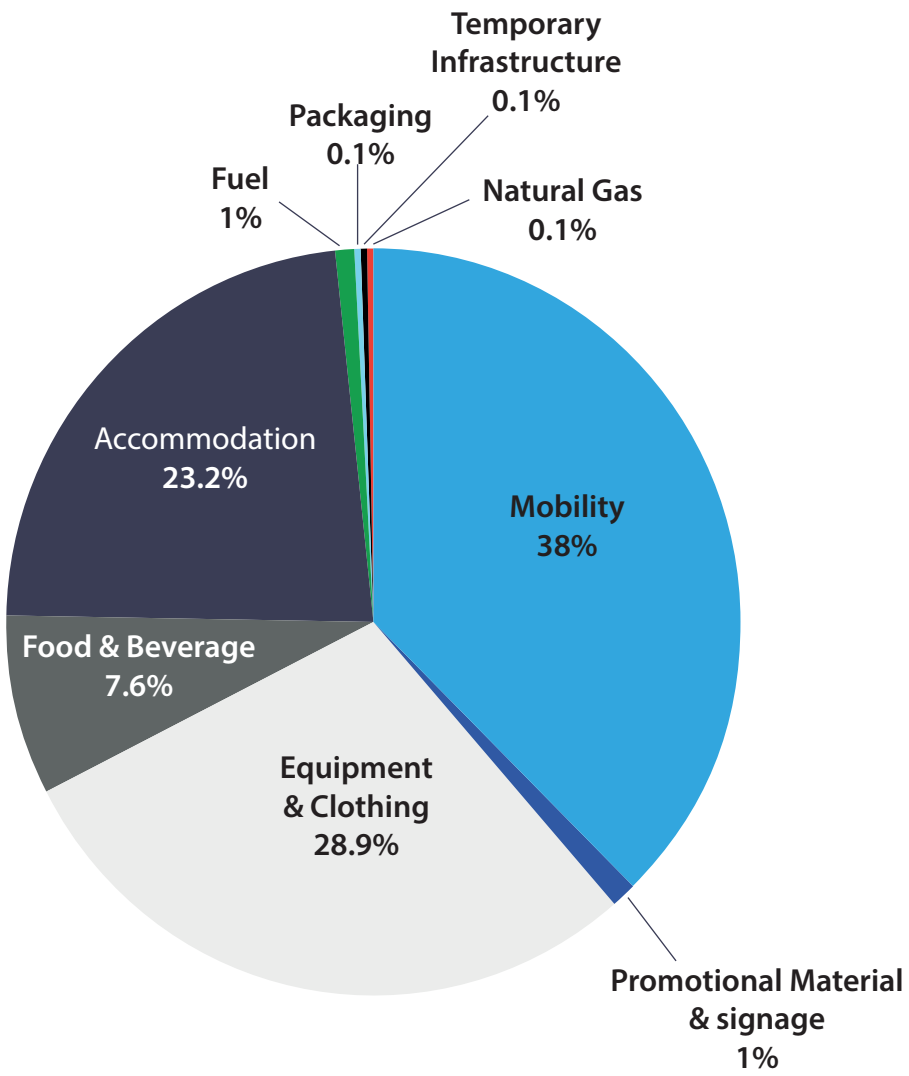


Figure - Weighted results: % contribution of each life cycle phase

Results
Focus on Mobility

Focusing on Mobility, Athletes Mobility (63%) is the most impactful sub-section of transport.

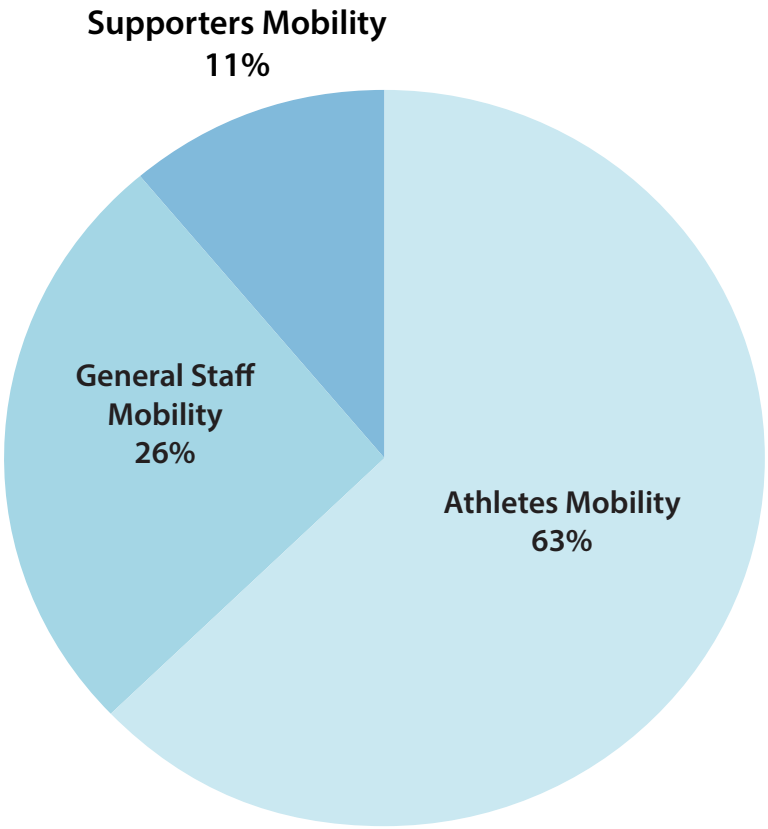


Figure - Weighted results for total mobility: % contribution divided between Athletes, General Staff and Supporters' Mobility

Results – Data Quality

The assessment shows that 90% of impacts are defined by at least good data quality.

Still a significant (10%) share of data are of fair quality.

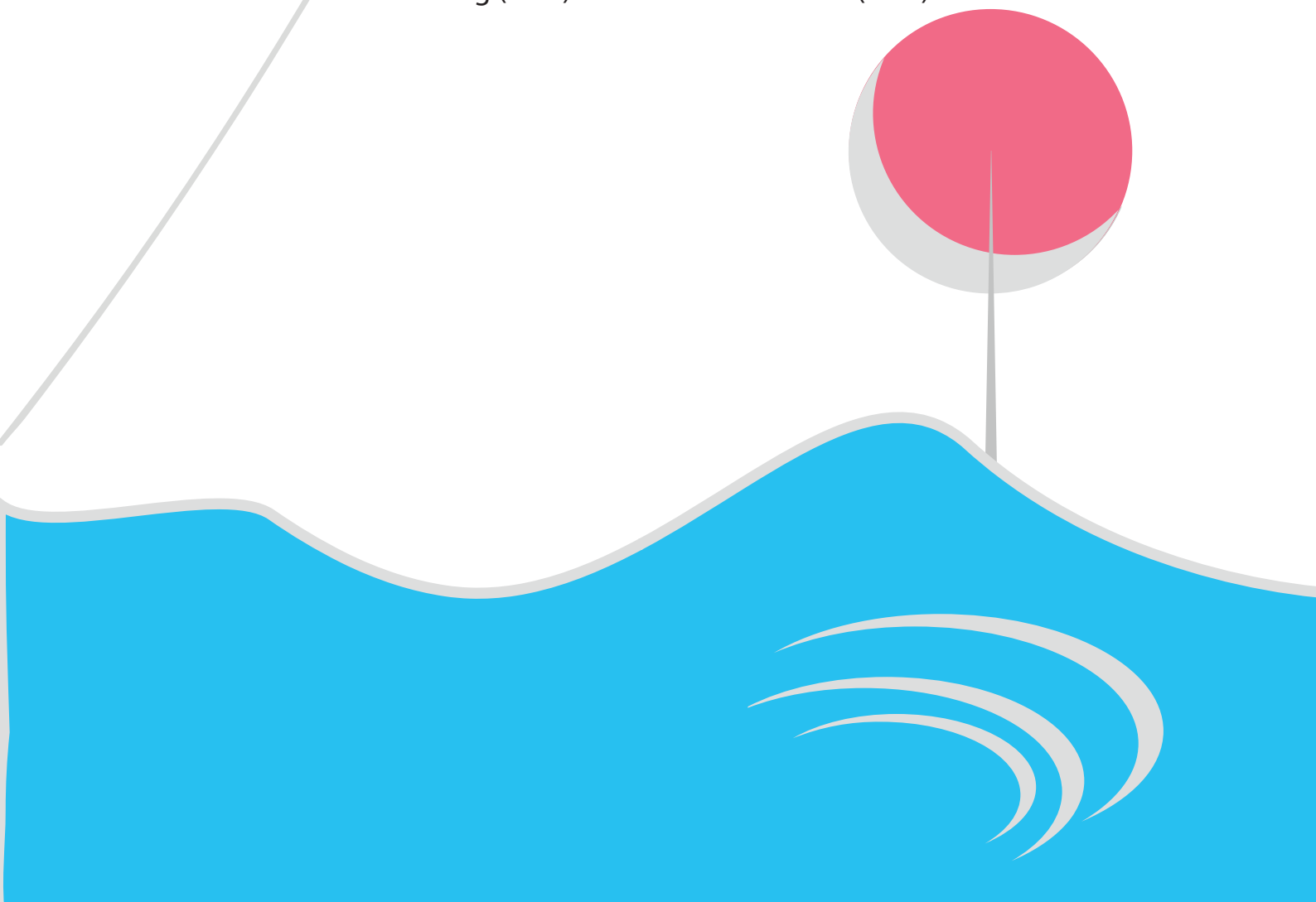
This shall be taken into consideration in the interpretation of the results, especially for the contribution of the food and beverages and waste processes, where several components have been modelled with secondary datasets – not specific.

Results – Conclusions

- **Climate Change**, **Resource Use**, **fossils**, have to be considered the first two **most relevant impact categories**

- Considering all life cycle stages, **Mobility (38%), Equipment&Clothing (28.9%) and Accommodation (23.2%)** represent the most impactful stages

- With reference to **Carbon Footprint**, Mobility is confirmed as **most relevant contributor (41%)** to the impact category indicator (Climate Change- kg CO2 eq.), followed by Equipment&Clothing (33%) and Accommodation (19%)



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Study carried out by the Institute of Management of S. Anna School of Advanced Studies. The results are based on the data provided by the Croatian Canoe Federation.

http://deckproject.eu

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