

The service industry: role for the national environmental footprint and challenges for analysis

81st LCA Discussion Forum
Wädenswil, 15. September 2022

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Environmental footprints of Switzerland

The original: Environmental footprints of Switzerland: Developments from 1996 to 2015

Frischknecht R., Nathani C., Alig M., Stolz P., Tschümperlin L., Hellmüller P. 2018: Umwelt-Fussabdrücke der Schweiz. Zeitlicher Verlauf 1996-2015. Bundesamt für Umwelt, Bern. Umwelt-Zustand Nr. 18811:131 S.

Challenge

- Update time series for most recent years
- Better represent the drivers of the Swiss environmental footprint



Environmental footprints of Switzerland

The update 2021/2022: Environmental footprints of Switzerland: Development from 2000 – 2018 incl. adjusted methodology

*Nathani C., O'Connor I., Frischknecht R., Schwehr T., Zumwald J., Peyronne J. (2022).
Umweltfussabdrücke der Schweiz: Entwicklung zwischen 2000 und 2018. Schlussbericht. Im
Auftrag des BAFU.*

- Years 2000 – 2018 (+ future years)
- New methodology



Footprint perspective (consumer perspective)

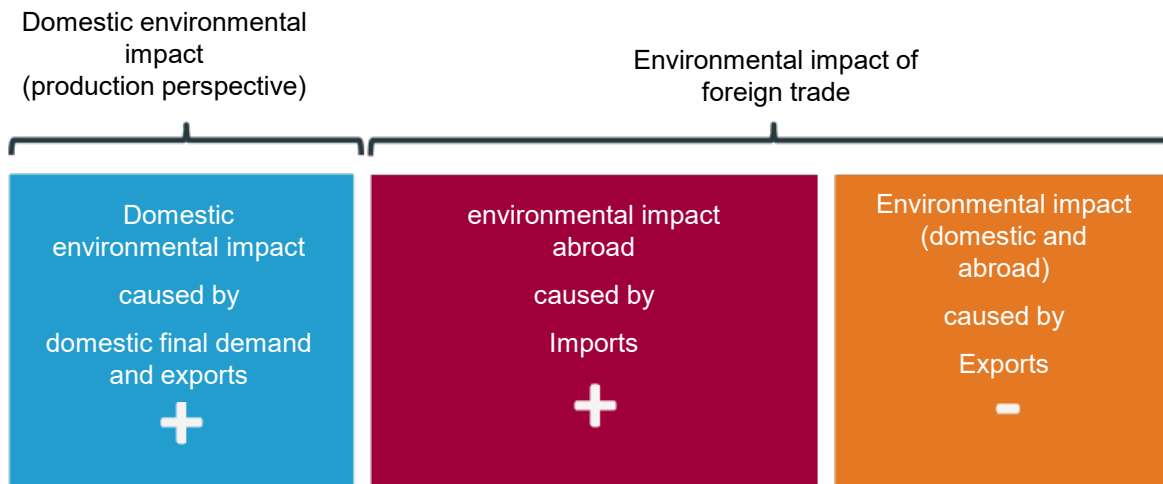


Footprint perspective (consumer perspective)

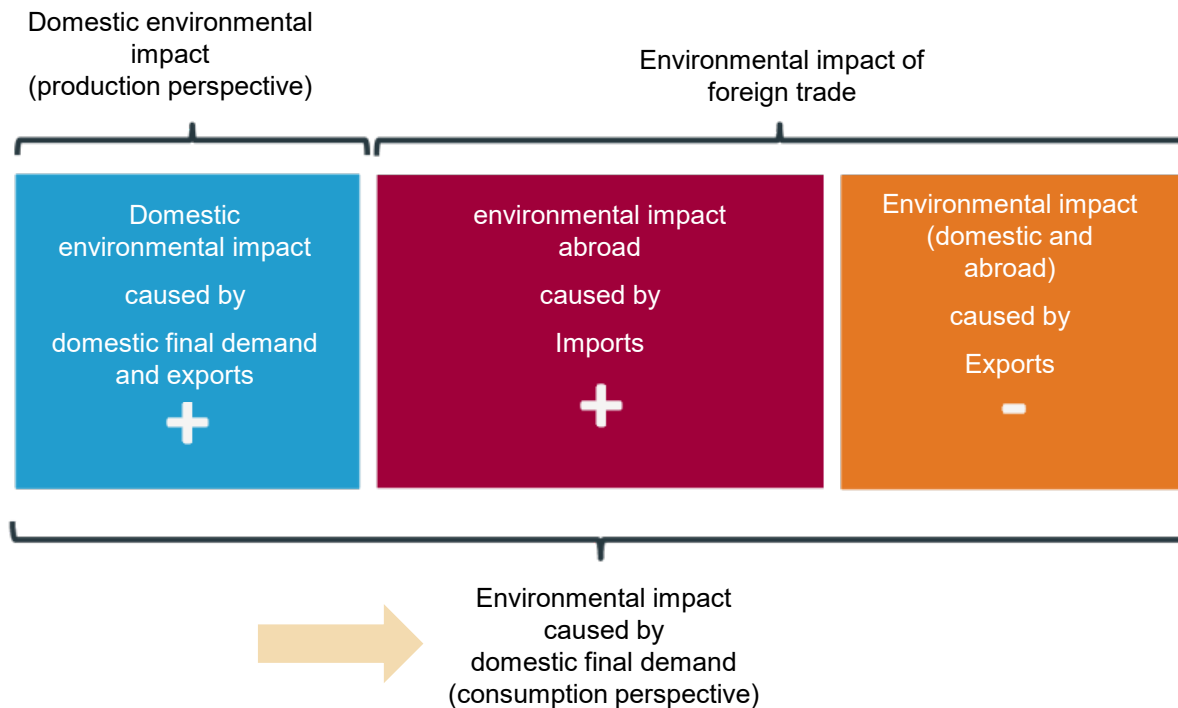
Domestic environmental
impact
(production perspective)



Footprint perspective (consumer perspective)



Footprint perspective (consumer perspective)



Methodology

New

linking an environmentally oriented input-output model for Switzerland with a life cycle assessment of the imported products

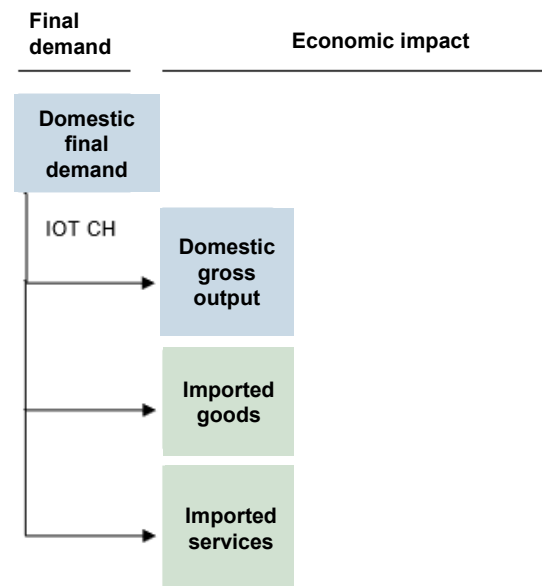
(new: IO-TRAIL, before TRAIL)

Methodology

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linking an environmentally oriented input-output model for Switzerland with a life cycle assessment of the imported products

(new: IO-TRAIL, before TRAIL)

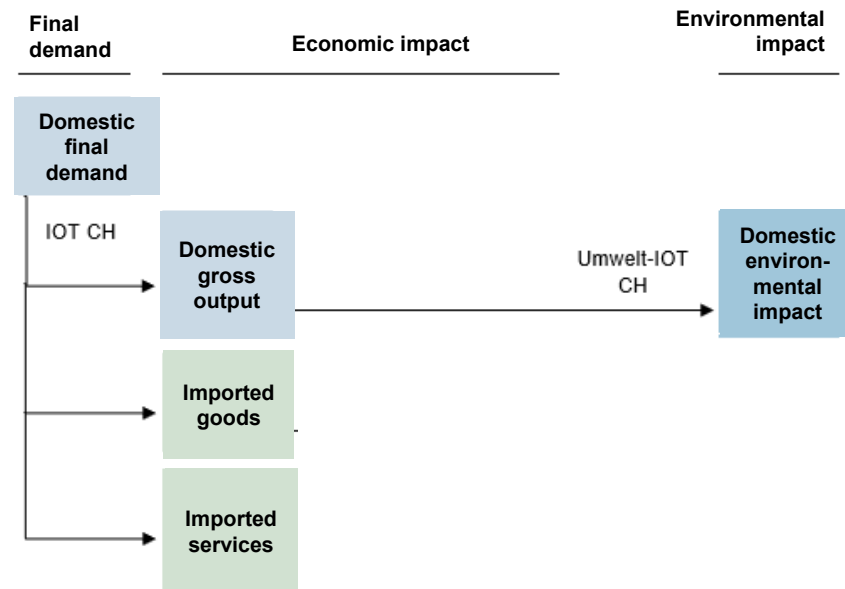


Methodology

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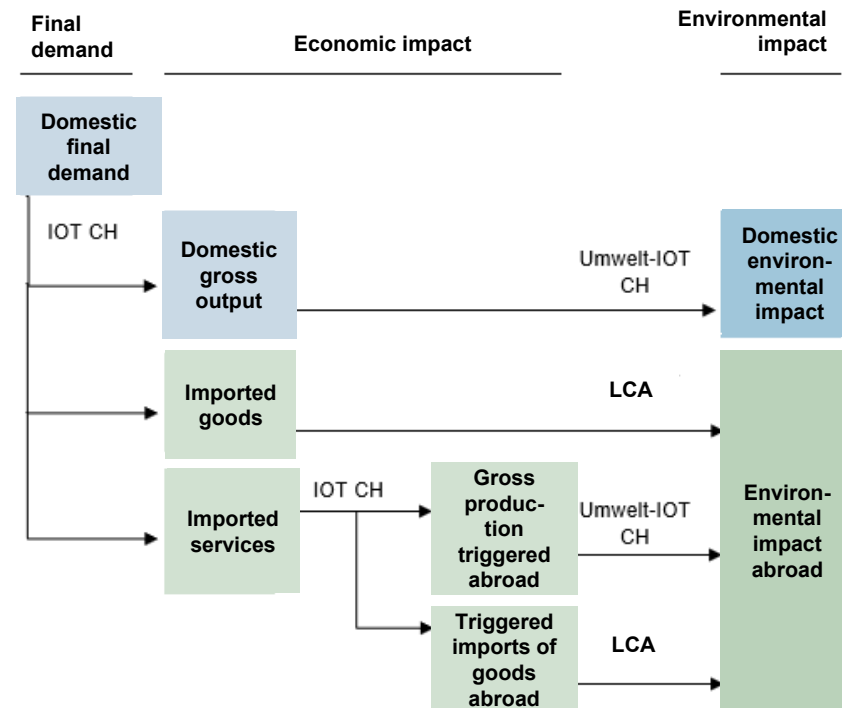


Methodology

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linking an environmentally oriented input-output model for Switzerland with a life cycle assessment of the imported products

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Methodology

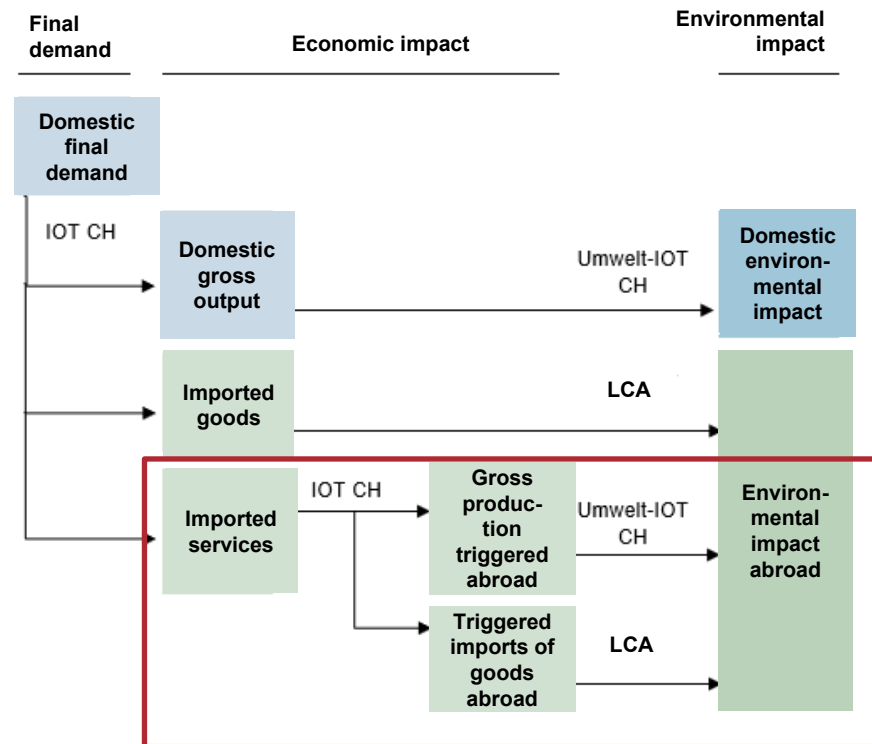
System boundary of services

- **Main principle:** The footprint of domestic services includes the emissions
 - during operation in CH
 - during production of domestic goods and services purchased to provide the service
 - During production of imported goods and services purchased to provide the service
 - Minus share of service that is exported
- **Eliminate double counting:** the production of goods such as planes, food, etc. itself is reflected by other branches and are therefore not included in the footprint of the e.g. transport services or trade services

Methodology

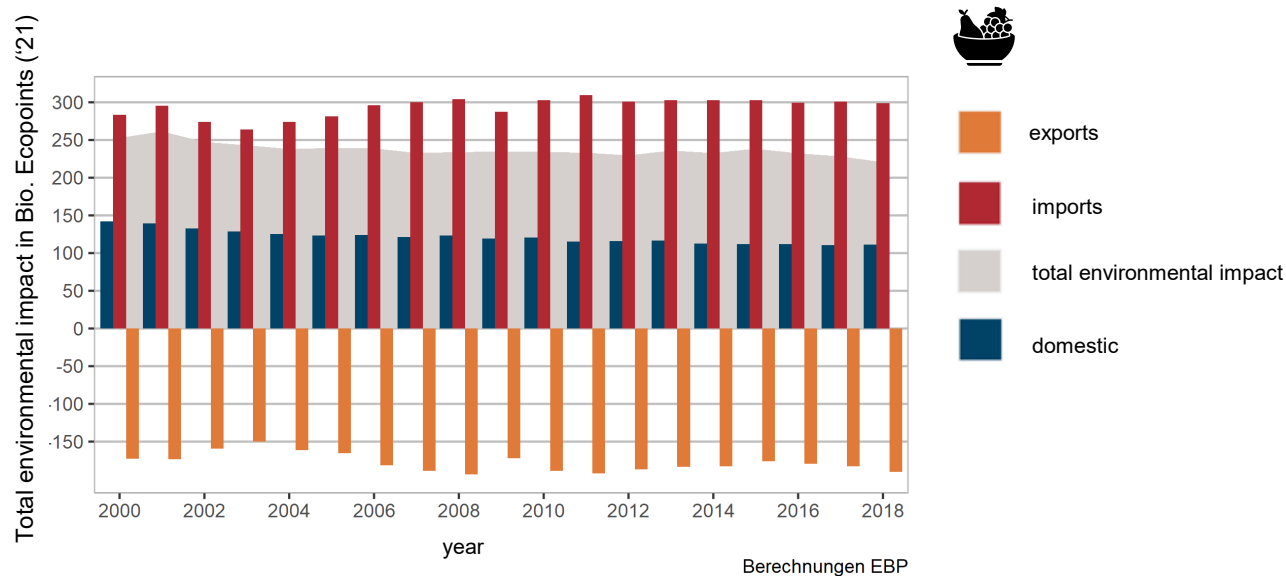
Imported services

- We know the import of services. However, we model them as if they were “produced” in Switzerland (mini IO-TRAIL)
- Only one iteration



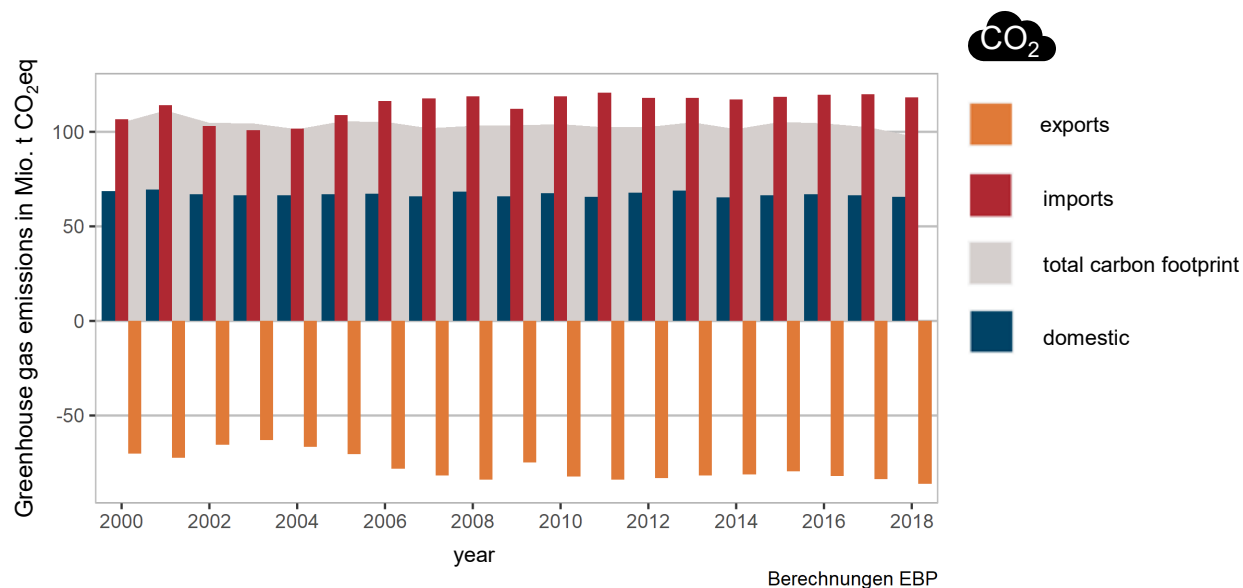
Main results – total environmental impact

The total environmental footprint, the domestic environmental impact, as well as the import- and export-related environmental impacts 2000 - 2018



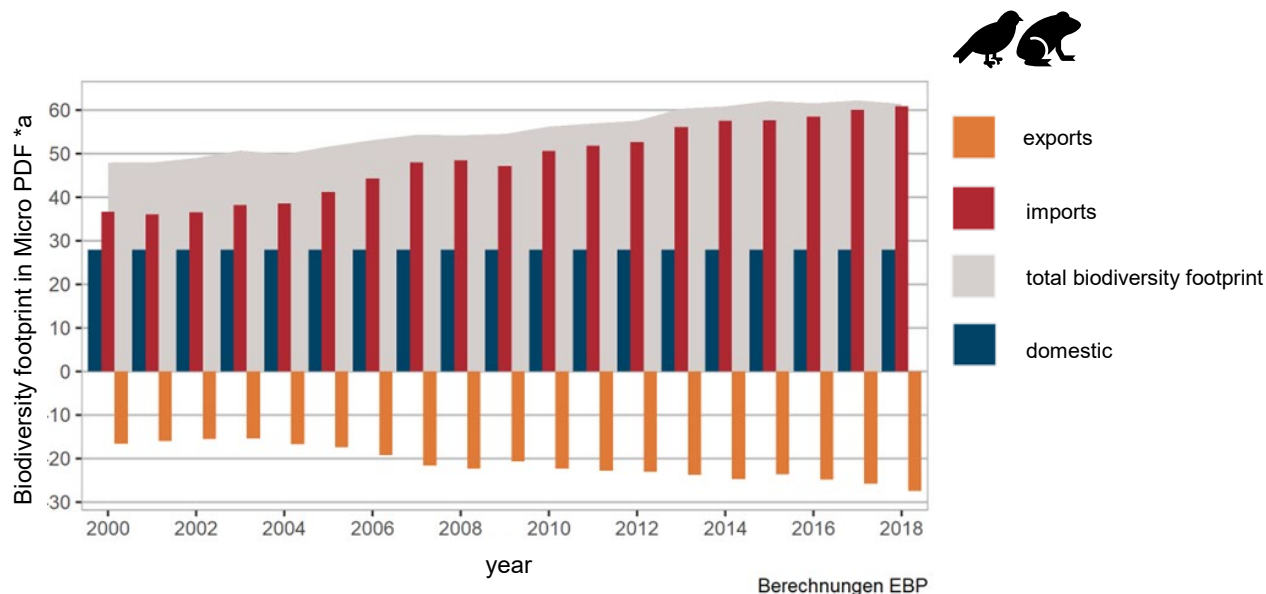
Main results – carbon footprint

The carbon footprint, the domestic carbon footprint, as well as the import- and export-related carbon footprint 2000 - 2018



Main results – landuse related biodiversity footprint

The biodiversity footprint, the domestic biodiversity footprint, as well as the import- and export-related biodiversity footprint 2000 - 2018



Methodological challenges of the study

- Large amount of data to be processed
- Modelling imported services: They are modelled as if they were produced in Switzerland (“mini IO-TRAIL”)
- Take care to have no double counting (e.g. don’t count food in gastronomy and food in food production twice)
- Combination of economic and physical allocations methods: domestic emissions are allocated based on monetary values (IOT), LCA of imported goods based on mixture of economic and physical allocation

Overview of the service industries

The services include:

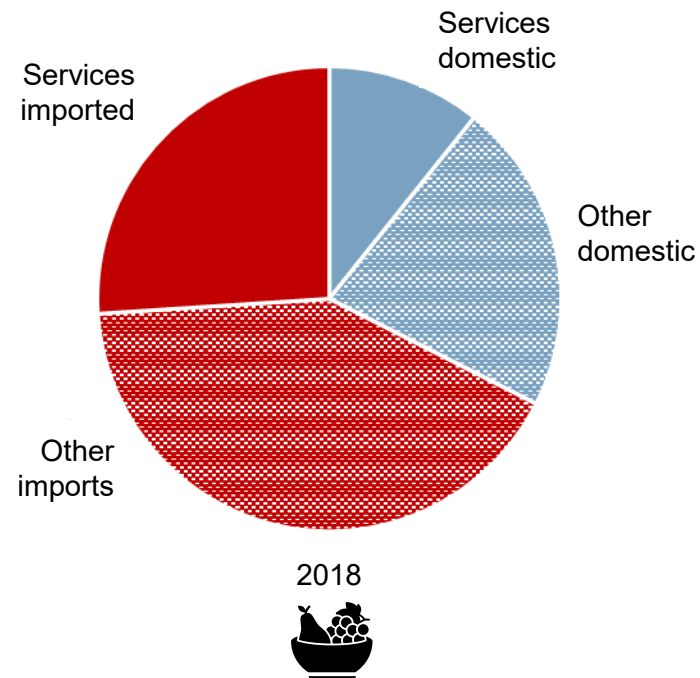
- Trade
- Hospitality services
- Transport services
- Public services, education
- Health services, social services
- Other services (telecommunication, finances, insurances, etc)

Relevance of services – total environmental impact

Services contribute **37% to the total environmental impact** of Switzerland, of which 26% occur abroad

Multiple contributors... Important:

- Hospitality services
- Human health services
- Transport services
- Public administration services
- Education services

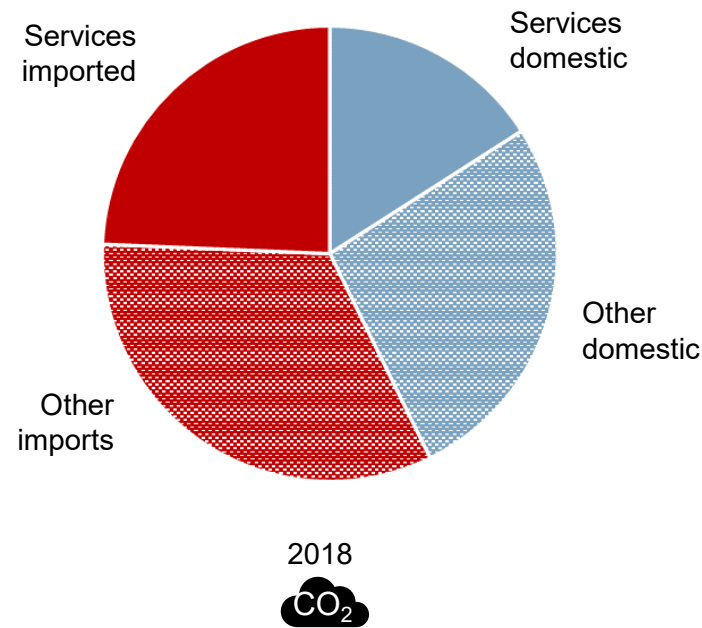


Relevance of services – carbon footprint

Services contribute **40% to the carbon footprint** of Switzerland, of which 24% occur abroad

Multiple contributors... Important:

- Transport services
- Human health services
- Hospitality services
- Public administration services
- Education services

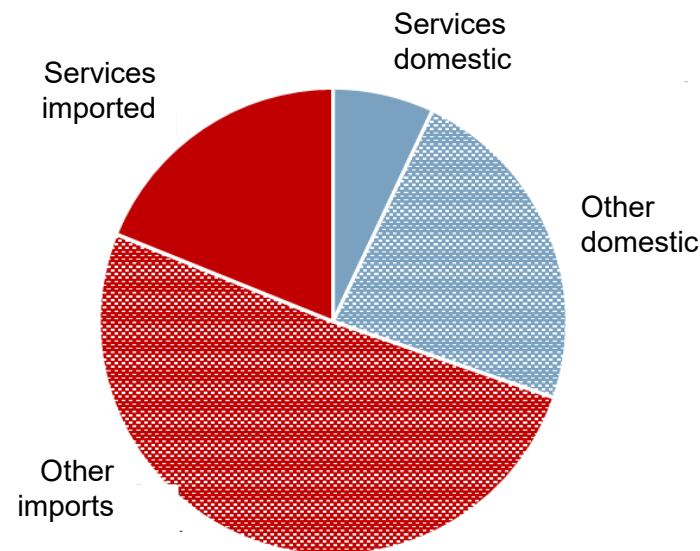


Relevance of services - land-use related biodiversity footprint

Services contribute **26% to the land-use related biodiversity footprint** of Switzerland, of which 19% occur abroad

Multiple contributors... Important:

- Hospitality services
- Human health services
- Public administration services



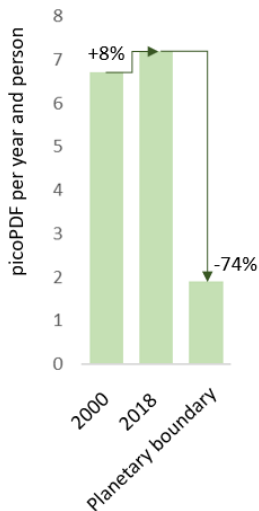
2018



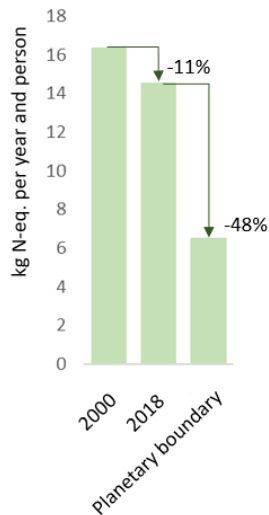
Need for action



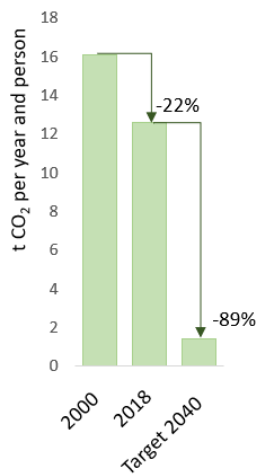
Biodiversity footprint



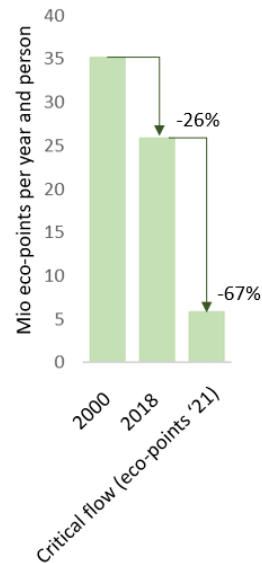
Eutrophication footprint



Carbon footprint



Total environmental impact



How to reduce the footprint of services?

The Swiss footprint caused by the final demand for services is relevant and needs to be considered when discussing footprint reductions.

The Swiss footprint of services can be improved either

- by demanding more sustainable services
 - by reducing the footprint of service companies / their products. Measures should reduce the footprint without reducing the business case / output (-> decoupling!)
- meaningful comparative LCA needed to compare and choose best options
- Challenge: how to define the functional units and system boundaries of services

Challenges

Examples

- **Marketing:** When reducing the emissions of marketing activities, next to emissions of the actions itself also the “marketing effect” (> conversion!) needs to be included in the functional unit



- **Investments:** When assessing the impact of buildings, emission intensities are typically reported per area.



- However, area used and living quality is just as relevant
- different perspectives clash: individual vs public

- **Service business models:** Switch from “per piece” to “service provided over e.g. 10 years”



Do we discuss the right questions today?

Relevant services

- Human health services → discussed today
- Hospitality services → hotspots are known, the challenge is the change
- Transport services → hotspots are known, the challenge is the change
- Public administration services → discussed today
- Education services → covered by public services (?)

→ Looks good! 😊

Thank you for your attention 😊

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