C3A Annual Symposium
December 2-6, 2024
World Bank Paris

Research Segment

Session 7: Consumption, labor, and distributional aspects of a just transition

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& Angela Modica Scala (WB/C3A, IUSS Pavia)

6th December, 2:00pm-3:30pm,
Conference Room B

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Joint Research Centre
JRC

EU Consumption and Domestic Footprint: supply chain environmental assessment for EU policy

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Table of contents

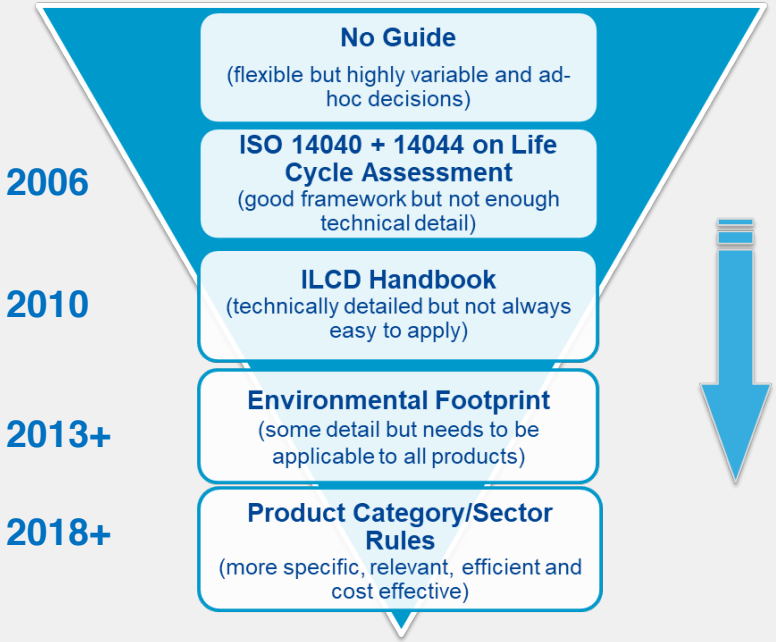
1

Life Cycle Assessment for EU Policy

What is Life Cycle Assessment?

- **Environmental impact focus:** Integrated and systemic environmental assessment of product across supply chain
- **Cradle-to-grave approach**: distinction of supply chain in life cycle phases (e.g., resource extraction, use, end of life)
- **Interdisciplinary at its core:** every Life Cycle phase links to a detailed supply chain of that phase (e.g. energy, material, natural resources, land use, emissions to air, soil, and water) and associated environmental impacts
- **Fit to different policy needs:** results can be normalized and weighted to e.g., planetary boundaries, economic metrics

Implementation of Life Cycle Assessment in EU policy?



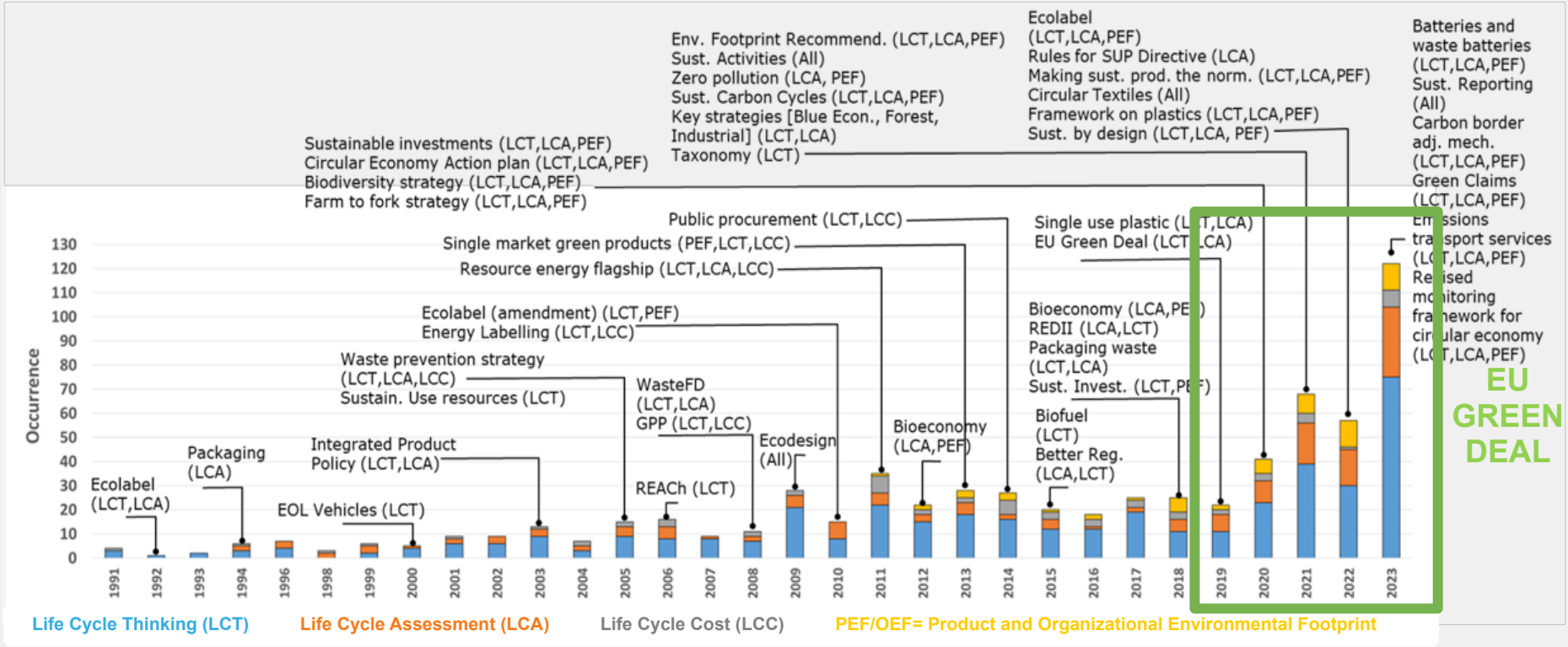
Increasing

- reproducibility
- comparability
- consistency

By providing

- technical detail
- choices that limit variability
- clear guidance

Trend in use of LCA for EU policy



Source: Updated from Sala et al. (2021).

LCA work at the JRC

EU policy frameworks

Zero pollution and chemical strategy

Sustainable Development Goals

Bioeconomy

Biotechnology act

Biodiversity strategy

Food systems

Circular economy

Life Cycle Assessment

Environmental Footprint method
Comparing product A and product B

Consumption & Domestic Footprint models
Macro-scale assessment of EU consumption and production

Consumer Footprint Calculator
Assessing impacts of individual consumption

2

Environmental Footprint **method** & Consumption and Domestic Footprint **models**

Environmental Footprint – 16 impact categories

Environmental Impact of products via modelling

List of thousands of substances, emissions resource use (e.g. energy, water)

16 Impact categories of the Environmental Footprint method

Consumption and Domestic Footprint models

Consumption Footprint model

Selection of representative products

- **Food** (45 products)
- **Mobility** (34 vehicles)
- **Housing** (30 archetypes)
- **Household goods** (37 products)
- **Appliances** (18 products)

Annual consumption statistics of products

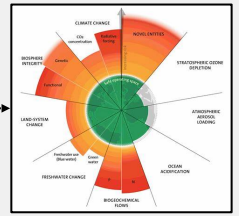
Quantification of the consumption intensity of each **representative product**:

- Apparent consumption = production + imports – exports
- Modelling of entire sector (i.e., housing, mobility)

Data from, e.g., Eurostat, FAOstat, literature.

Domestic Footprint model

Collection of **statistics and modelled data** on EU territorial emissions and environmental pressures by EU country

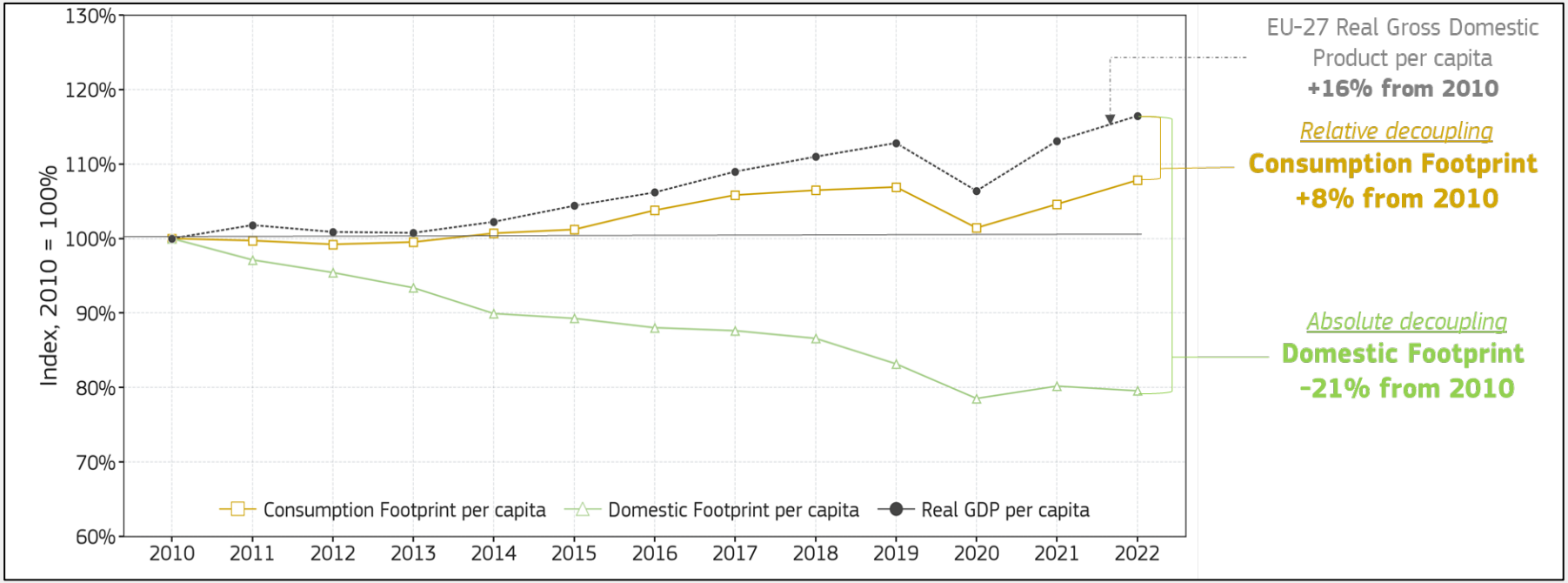


Source: EC-JRC, European Platform for Life Cycle Assessment https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html

3

Monitoring environmental impact of EU-27 household consumption (2010-2022)

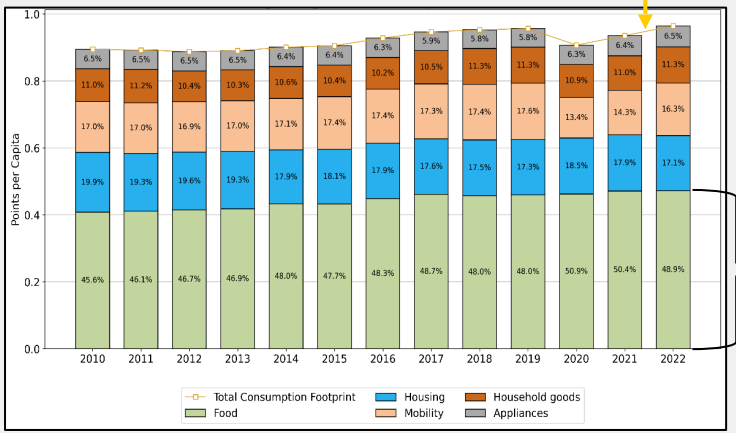
Is EU consumption decoupling from growth?



Source: EC-JRC, European Platform for Life Cycle Assessment https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html

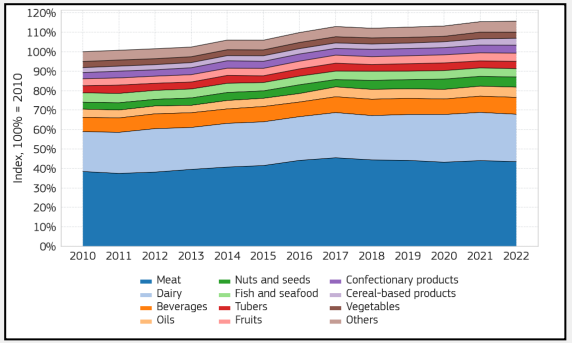
Environmental impact by product and life cycle stage

EU Consumption Footprint per capita

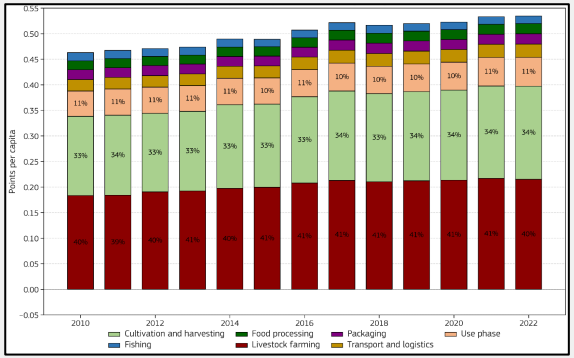


Hotspot of impacts is food

Food impact by product category

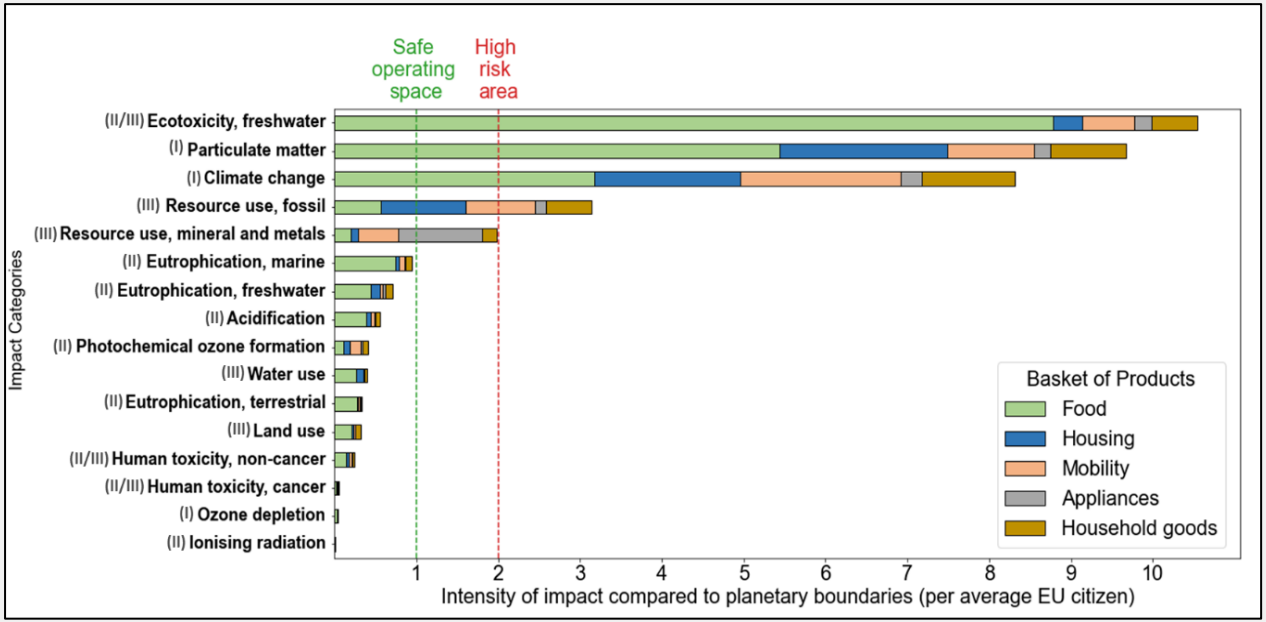


Food impact by Life cycle stage



Source: EC-JRC, European Platform for Life Cycle Assessment https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html

Consumption Footprint

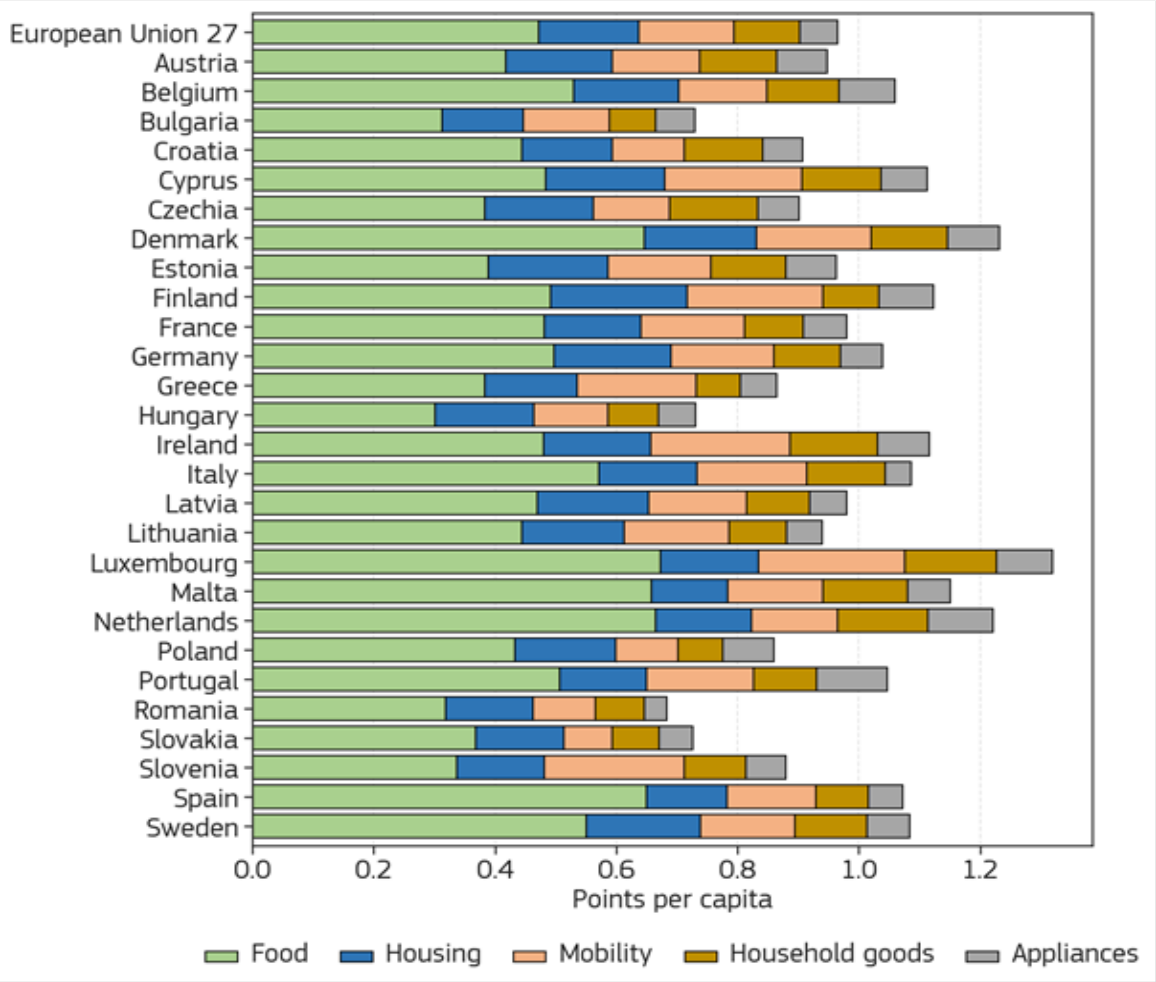


A substantial share of the impact of EU consumption occurs beyond EU borders

Source: EC-JRC, European Platform for Life Cycle Assessment https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html

4

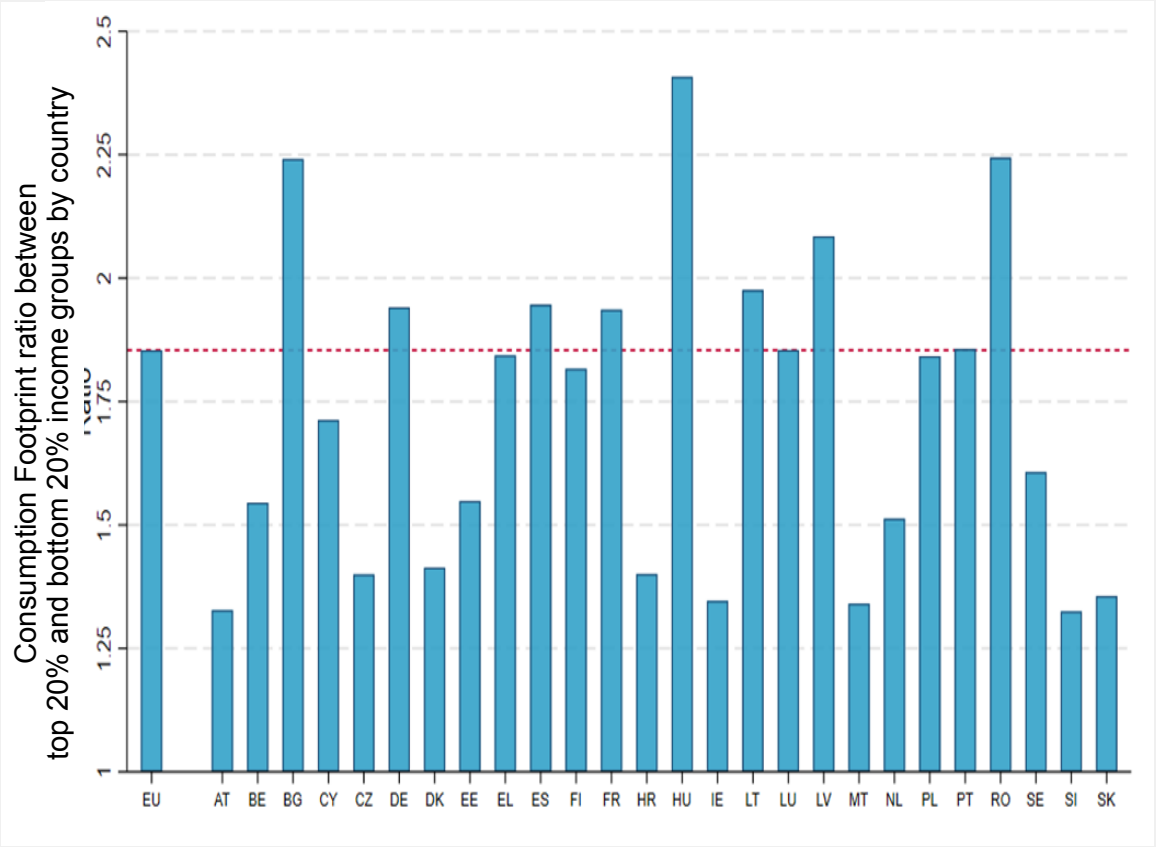
Inequality in Consumption Footprint between EU Member States



Environmental impacts by EU Member State

- Consumption Footprint supports analysis per EU Member State
- Food remains the greatest contributor to impacts across countries.

Source: EC-JRC (2024). European Platform for Life Cycle Assessment https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html



Inequality of Footprint between income groups in EU countries

- **Mapping products in the CF** with **consumption expenditures in Household Budget Survey** - to test inequality of footprint between income groups in countries
- Results show a **1.85 x gap** in footprint **between top 20% richest** and **lowest 20% poorer income groups**, with significant variability across countries.

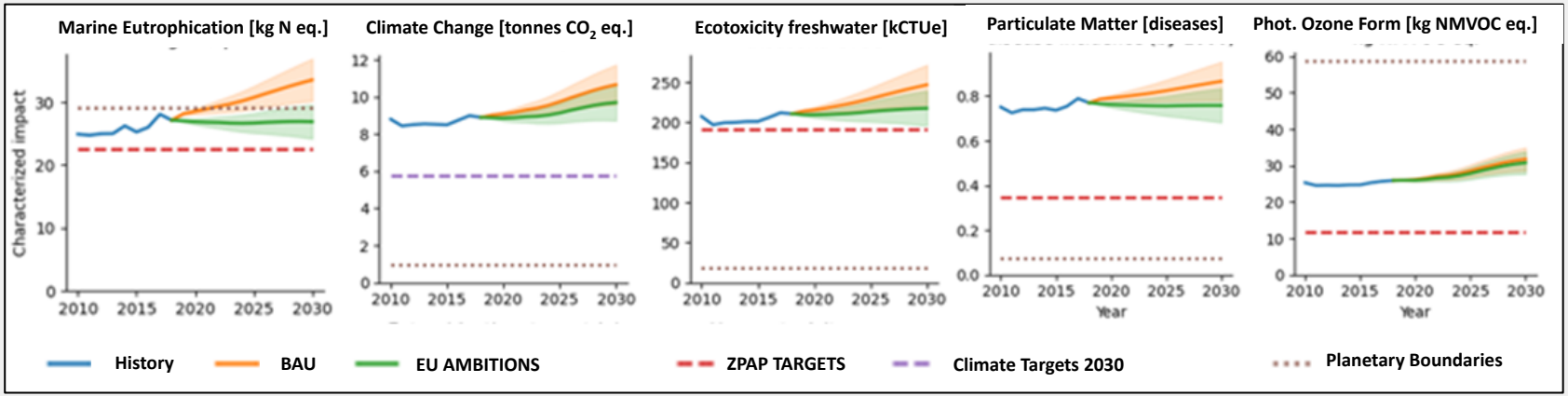
Source: Ciccolini et al (2024)

5

Examples of scenario analyses with the Consumption Footprint

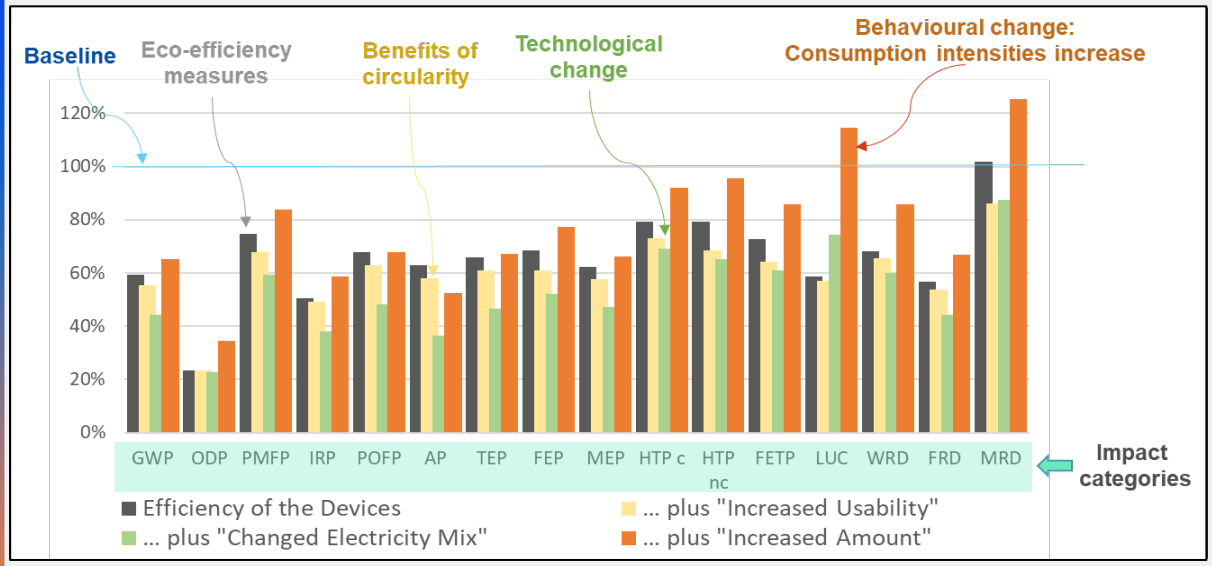
Example for Zero Pollution Action Plan

- Consumption Footprint is an official indicator for both **Monitoring** and **Outlook 2030** of the **EU Zero Pollution Action Plan**.
- The model **disaggregation supports testing of specific policy targets** (e.g., pesticide reduction, electric vehicles' market expansion, housing renovation) across every area of consumption (food, housing, mobility, appliances, goods) simultaneously.
- In 2022, scenarios showed that **more effort from EU policy is needed to get close to or below planetary boundary limits**, and to **EU zero pollution targets**.



Source: JRC (2022). Zero pollution outlook 2022.

Example: Eco-efficiency scenarios on Appliances – Ceteris paribus…



- …**eco-efficiency** measures shows **positive effects** on environmental impacts **across most** (not all) impact categories
- **…circular economy measures appears to have positive effects** (e.g. recycling, etc)
- …change in **electricity mix** can generate **trade-offs between impacts** (see land use, use of resources)
- ..possible **rebound effects from demand** can increase impacts further despite of technology improvements

Source: Hischier et al (2020)

6

Conclusion
& key messages

Conclusion and take-home messages

- → The **Environmental Footprint (EF) is the official recommended Life Cycle Assessment (LCA) method of the European Commission**, assessing impacts on **16 environmental impact categories**.

- → The **Consumption Footprint** model shows that the EU is **a net importer of environmental impacts which occur elsewhere outside the EU.**

- → The average **Consumption Footprint for the EU as a whole exceeds planetary boundaries for 5 out of 16 impact categories**: freshwater ecotoxicity (by a factor of 10), particulate matter (factor 9) and climate change (factor 8), fossil fuel resource use (factor 3) and mineral resource use (factor 2).

- → The **areas of consumption with greater impact across EU-27 are food** (49% of total impacts), **housing** (17%) and **mobility** (16%).

- → **Effective decarbonisation strategies in developed and developing economies should address multiple environmental impacts (e.g., decarbonisation, pollution, toxicity, resource use) simultaneously, to unveil trade-offs in environmental impacts**. The EF method gives comprehensive inputs to this type of holistic decision-making.

- → **The EF method and the CF model support the analysis of footprint inequalities across countries and income groups**, and show that the top 20% richest of the EU population emits 1.85 times more than EU lowest income 20%.

Q&A
Discussion

24

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Thank you

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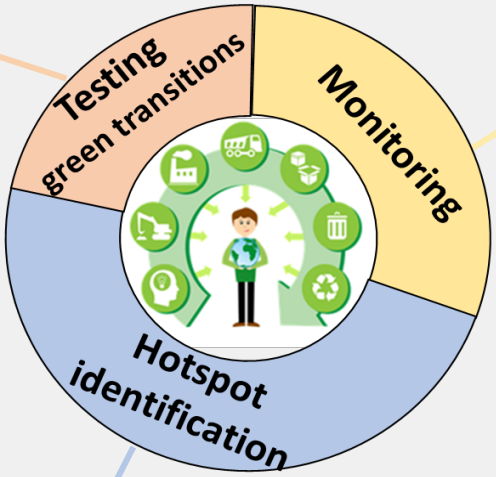
Consumption Footprint in EU Policy

Zero Pollution Outlook

Impact assessment 2030 climate targets

Impact assessment Food waste targets



8th Environment Action Programme

Zero Pollution monitoring

Circular Economy Action Plan

Resilience dashboards

Sustainable Development Goals

Food system monitoring

Impact assessment for Ecodesign for Sustainable Product Regulation(ESPR)

Source: https://eplca.jrc.ec.europa.eu/ConsumptionFootprintPlatform.html