Environmental impacts of consumption patterns in Switzerland and reduction potentials

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Key questions

- What are the total environmental impacts of consumption and how can they be allocated to consumption areas?
- What are the most important aspects within consumption areas?
- Which options exist for the reduction of environmental impacts due to consumption?
- Difficulties and rebound effects for implementation are not considered

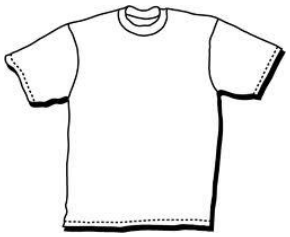
Background

- Different projects finances by
  - WWF Switzerland
  - Energieforschung Zurich – ewz-electricity supply Zurich
  - Swiss Federal Office for the Environment, FOEN
- Here we present our personal summary

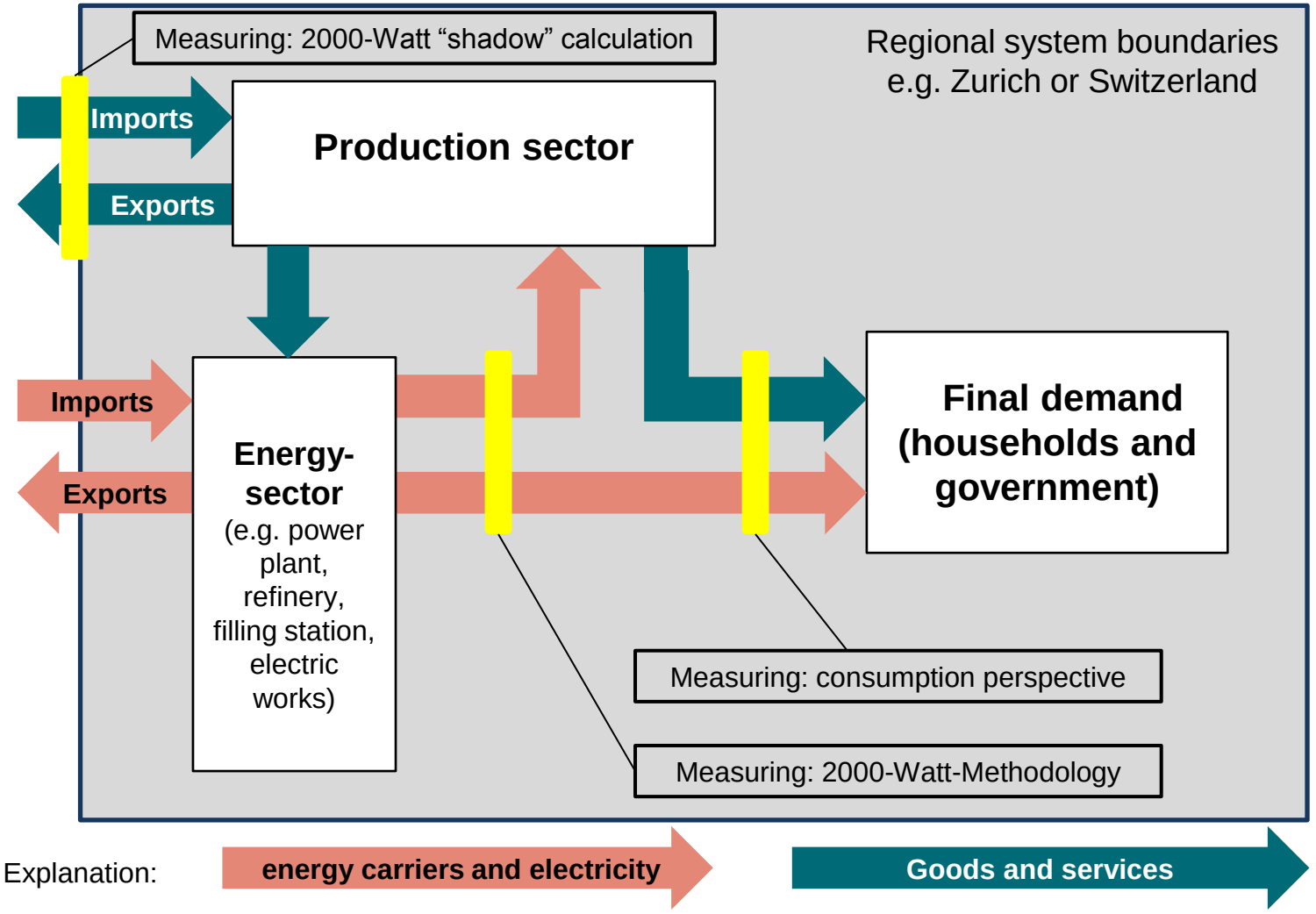
Environmental impacts of lifestyles

Public

Private



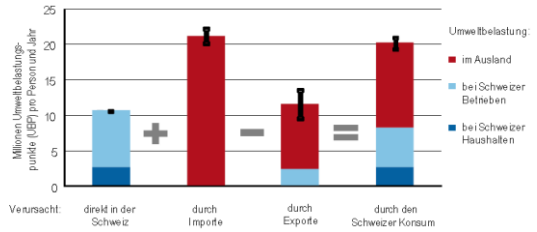
Consumption perspective and 2000-Watt



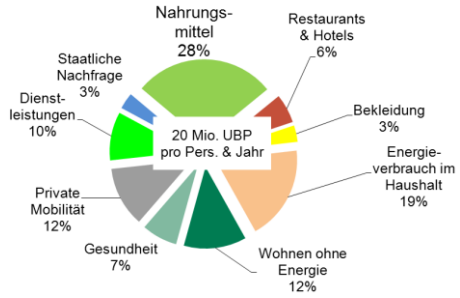
- Consumption perspective measures all impacts of final consumption
- 2000-Watt measures the impacts of energy uses in a regional perspective

Main stages for the calculation

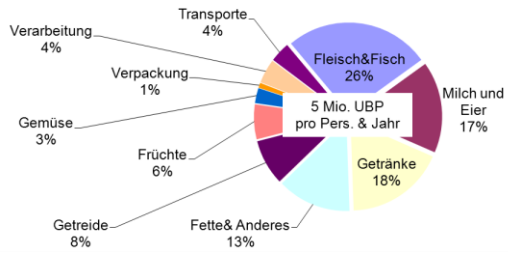
1. Total impacts CH



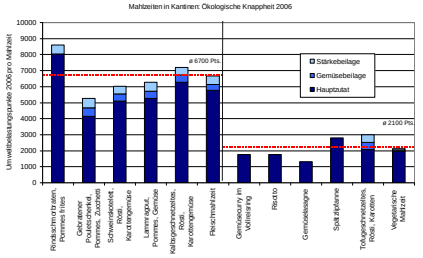
2. Share of consumption areas



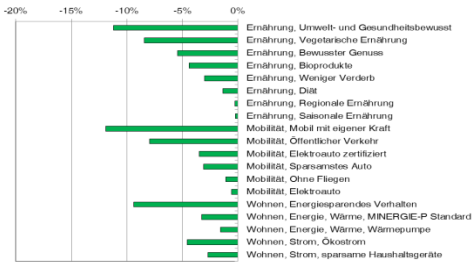
3. Further analysis



4. Reduction potentials



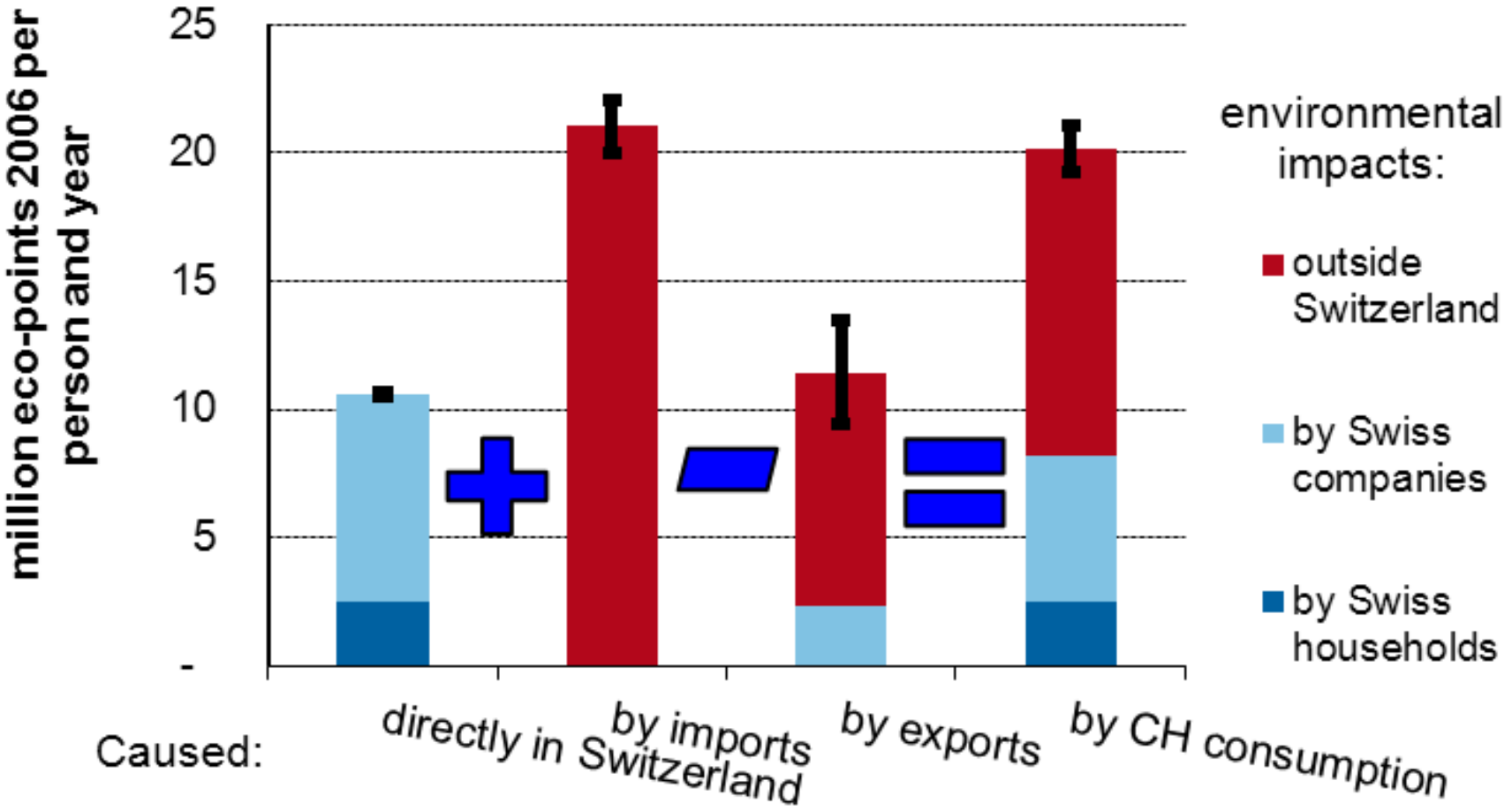
5. Total potentials



TOTAL IMPACTS IN SWITZERLAND

MEAN FIGURES OF SWISS EE-IOA AND SIMPLIFIED "LCA&TRADE" APPROACH

Total balance of Swiss impacts



- Imports cause 60% of environmental impacts due to Swiss consumption

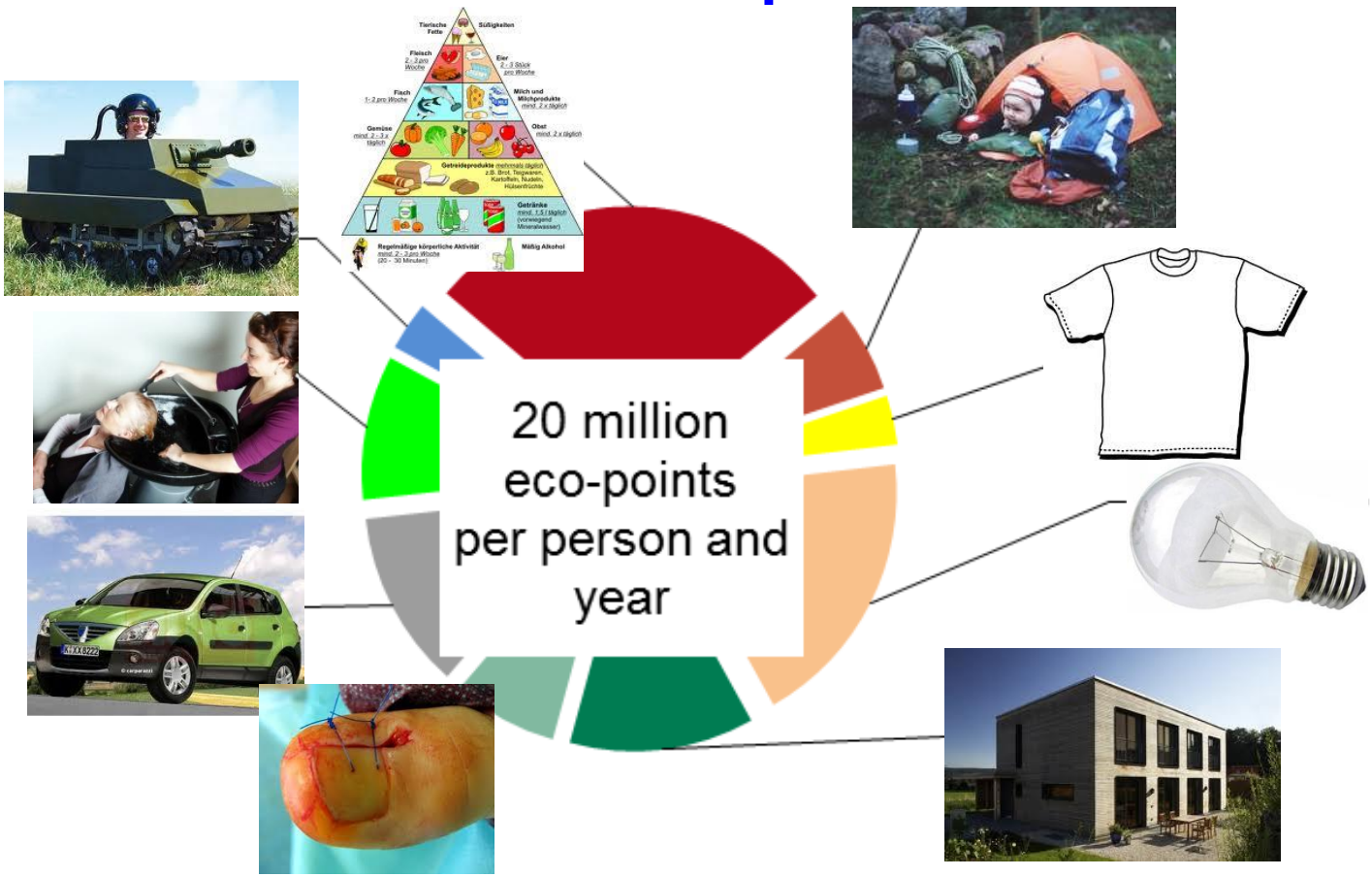
Key figures per capita and year for Switzerland

	Consumption perspective	2000-Watt current situation
Tonnes CO_2-eq	12.8	8.6
Watt	8'250	6'300
eco-points	20 Million	~ 8.5 Million

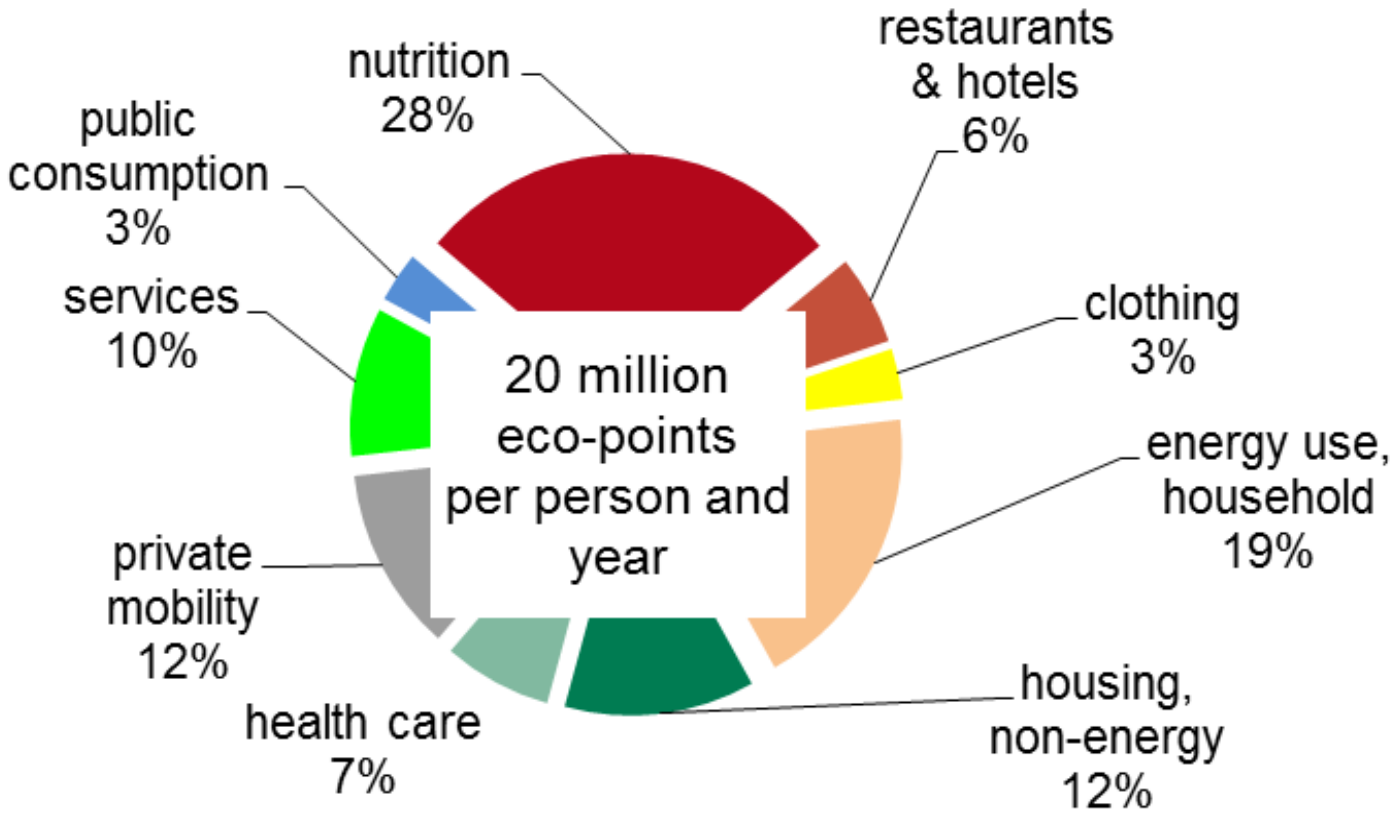
- Considerable differences because of different system boundaries

SHARE OF CONSUMPTION AREAS
CALCULATION WITH SWISS EE-IOA

Share of consumption areas

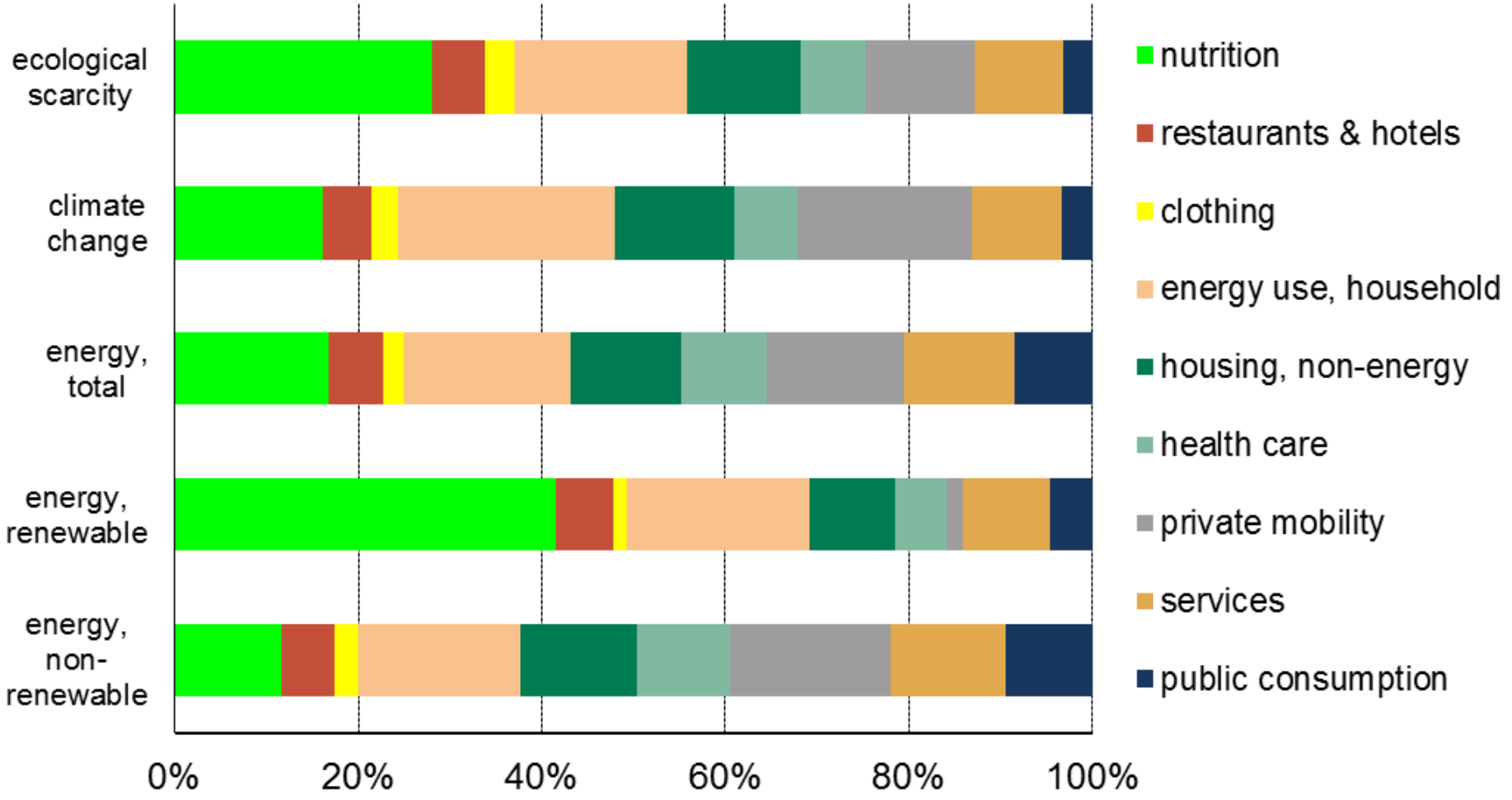


Share of consumption areas



- Nutrition is the most important consumption area
- 60% of environmental impacts in nutrition, energy use and mobility

Different indicators and share of final consumption areas



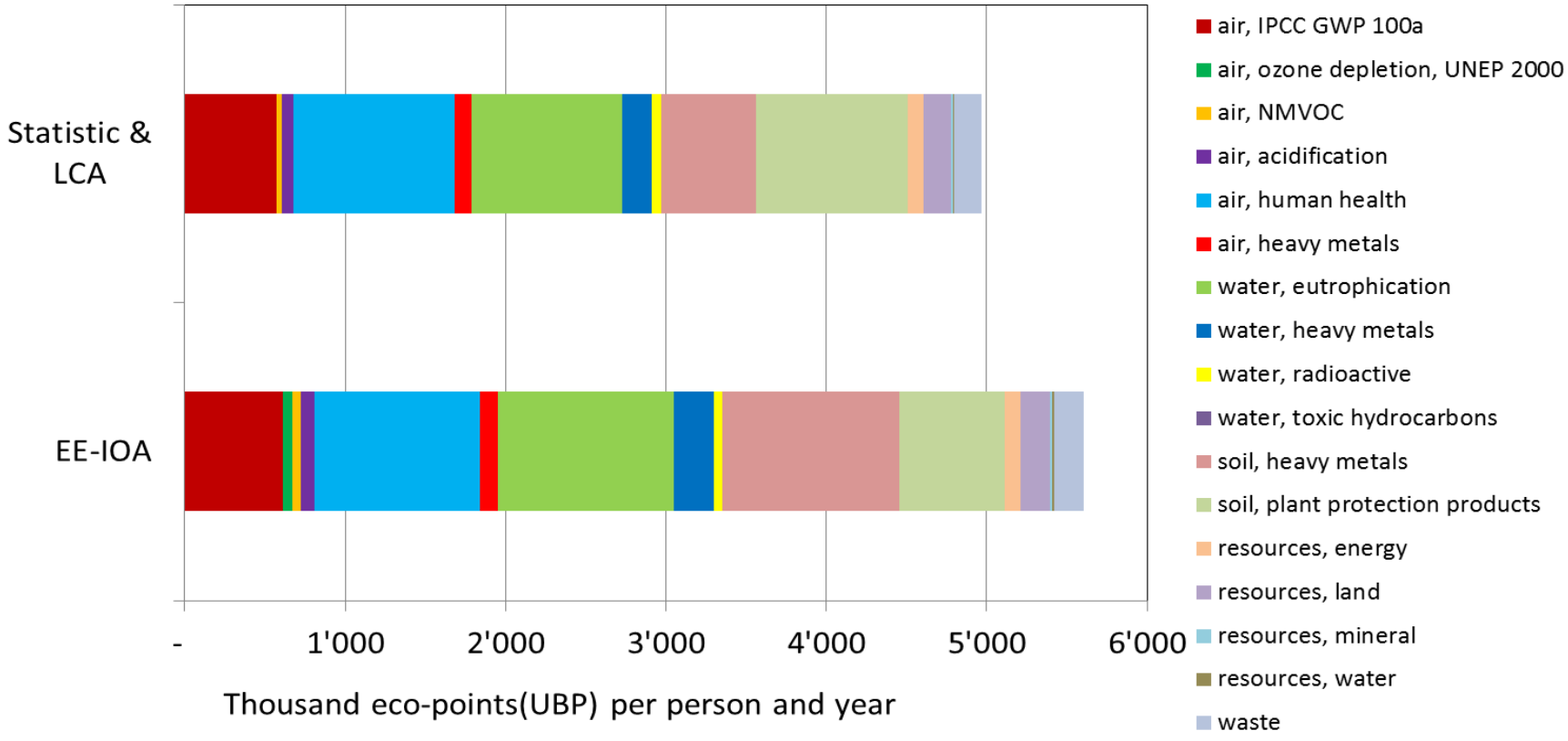
- Energy and GHG indicators underestimate the contribution of nutrition

FURTHER ANALYSIS OF CONSUMPTION AREAS

TOP-DOWN AND BOTTOM-UP

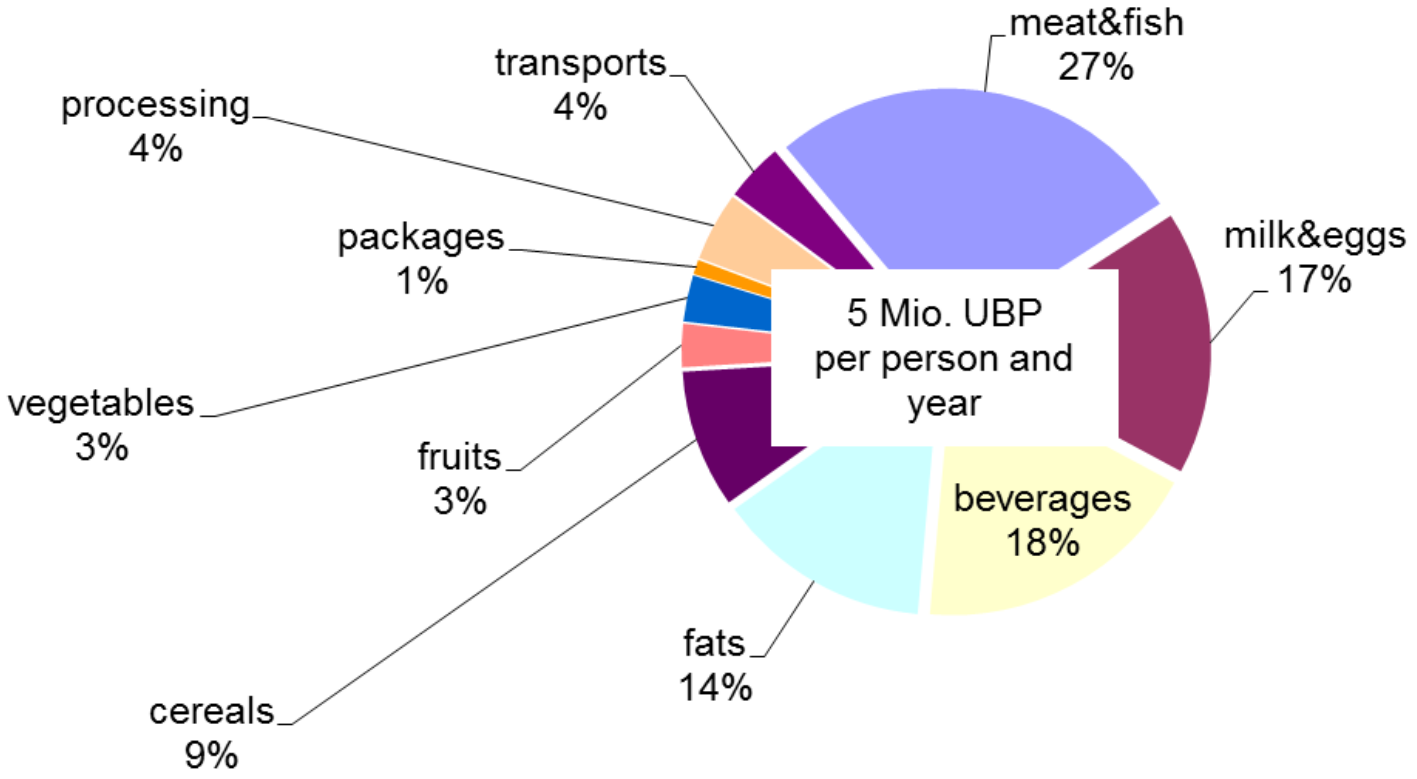
ASSESSMENT WITH LCA AND COMPARISON WITH EE-IOA

Environmental impacts of food purchases



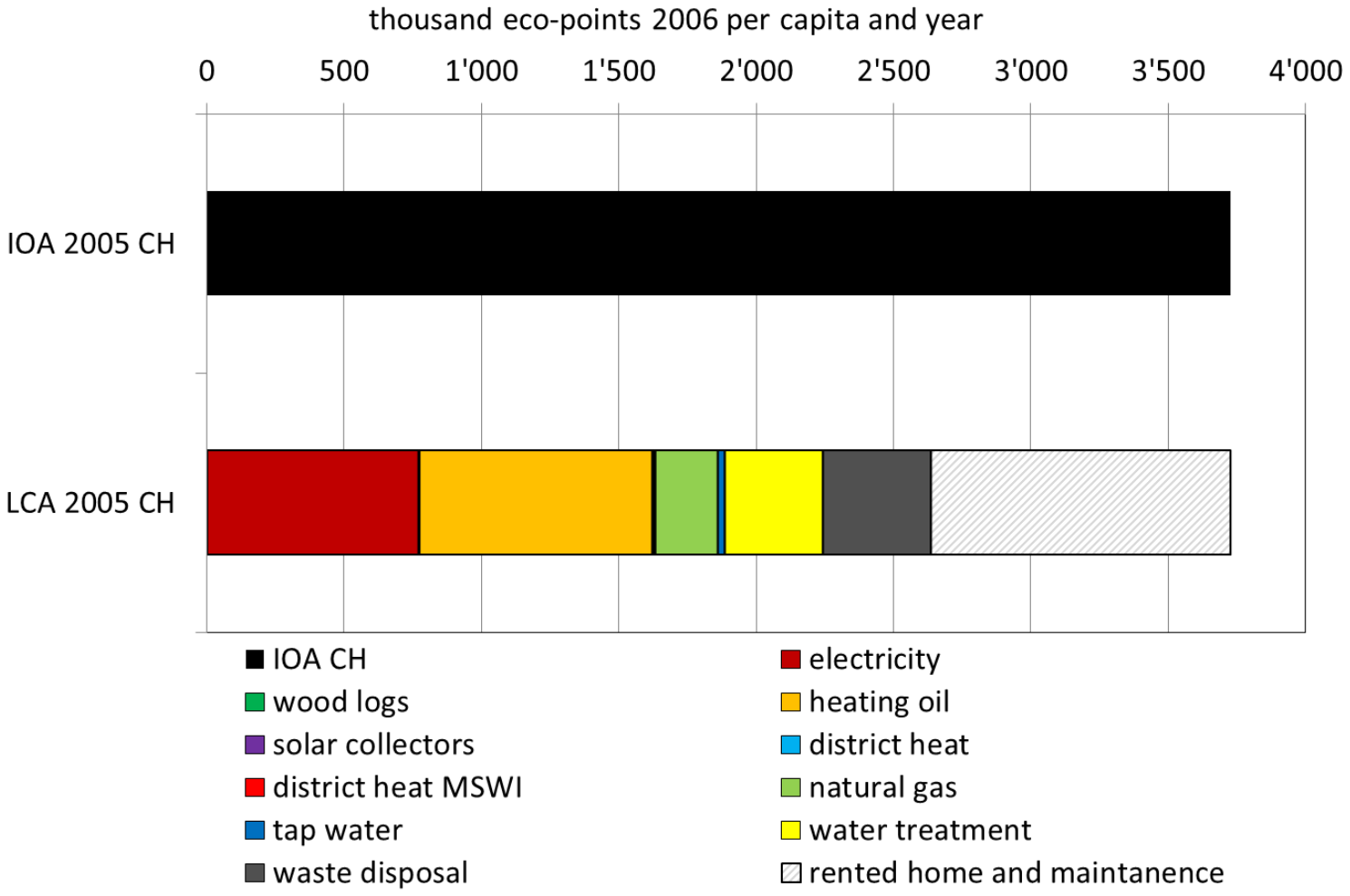
- Top-Down and bottom-up come to comparable results
- Further analysis of consumption areas based on LCA and statistics

Product groups within nutrition



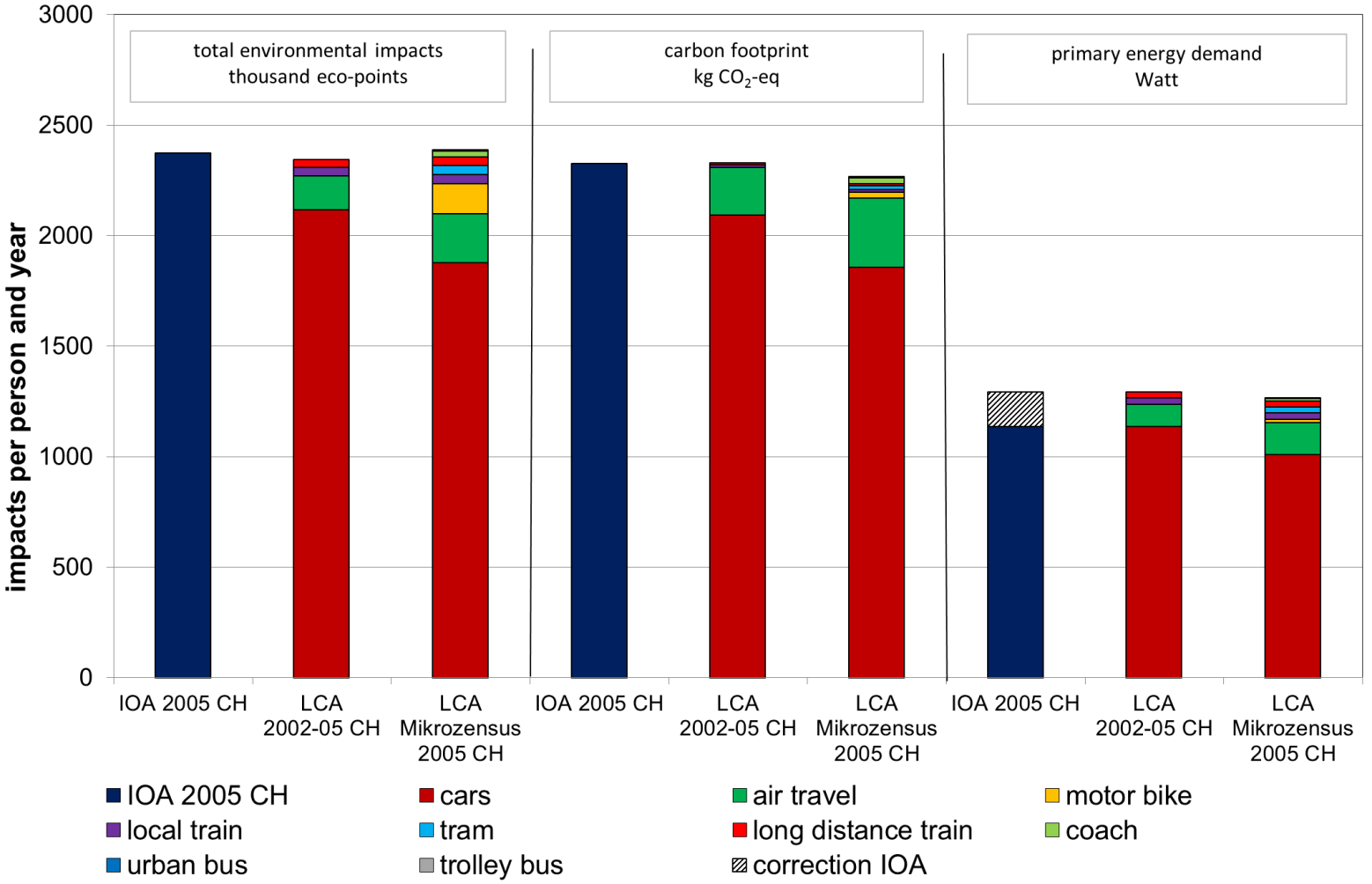
- Meat and animal products cause 44% of total impacts
- Wine, coffee and beer are important for beverages

Analysis of household energy use



- Electricity and heating oil are most important energy carriers

Analysis of mobility



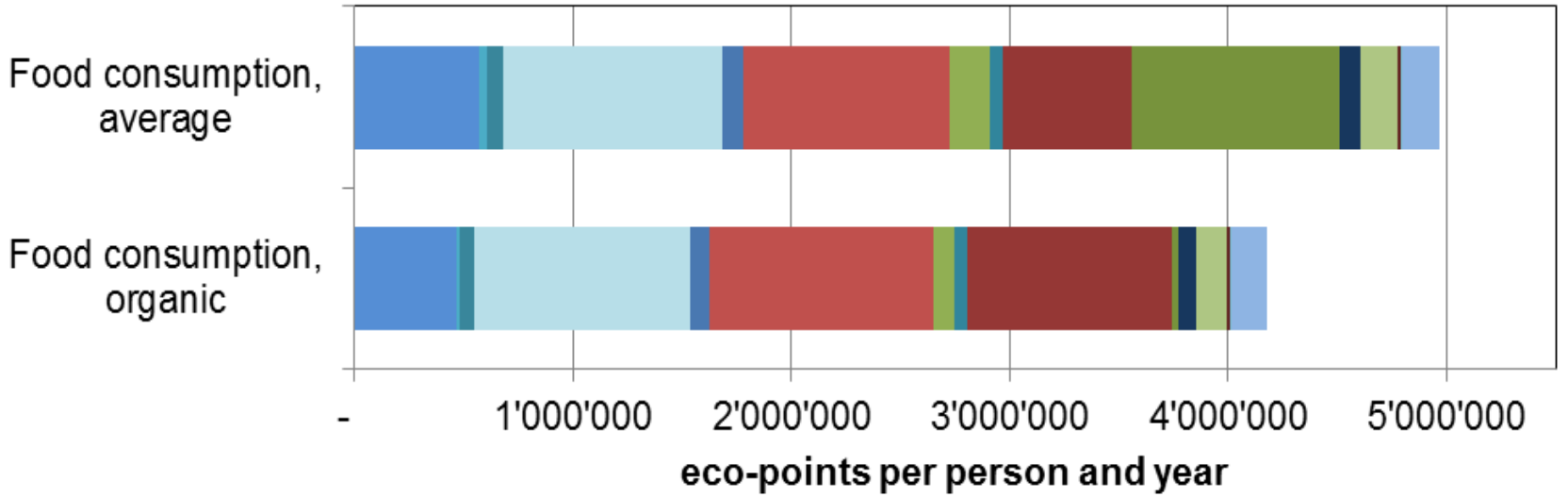
- Car driving is the most important issue

REDUCTION POTENTIALS

ANALYSIS OF SINGLE CHANGES IN LIFESTYLES

EXAMPLE FOR BUYING ORGANIC FOOD PRODUCTS

Organic products



- air, IPCC GWP 100a
- air, ozone depletion, UNEP 2000
- air, NMVOC
- air, acidification
- air, human health
- air, heavy metals
- water, eutrophication
- water, heavy metals
- water, radioactive
- water, toxic hydrocarbons
- soil, heavy metals
- soil, plant protection products
- resources, energy
- resources, land
- resources, mineral
- resources, water use
- waste

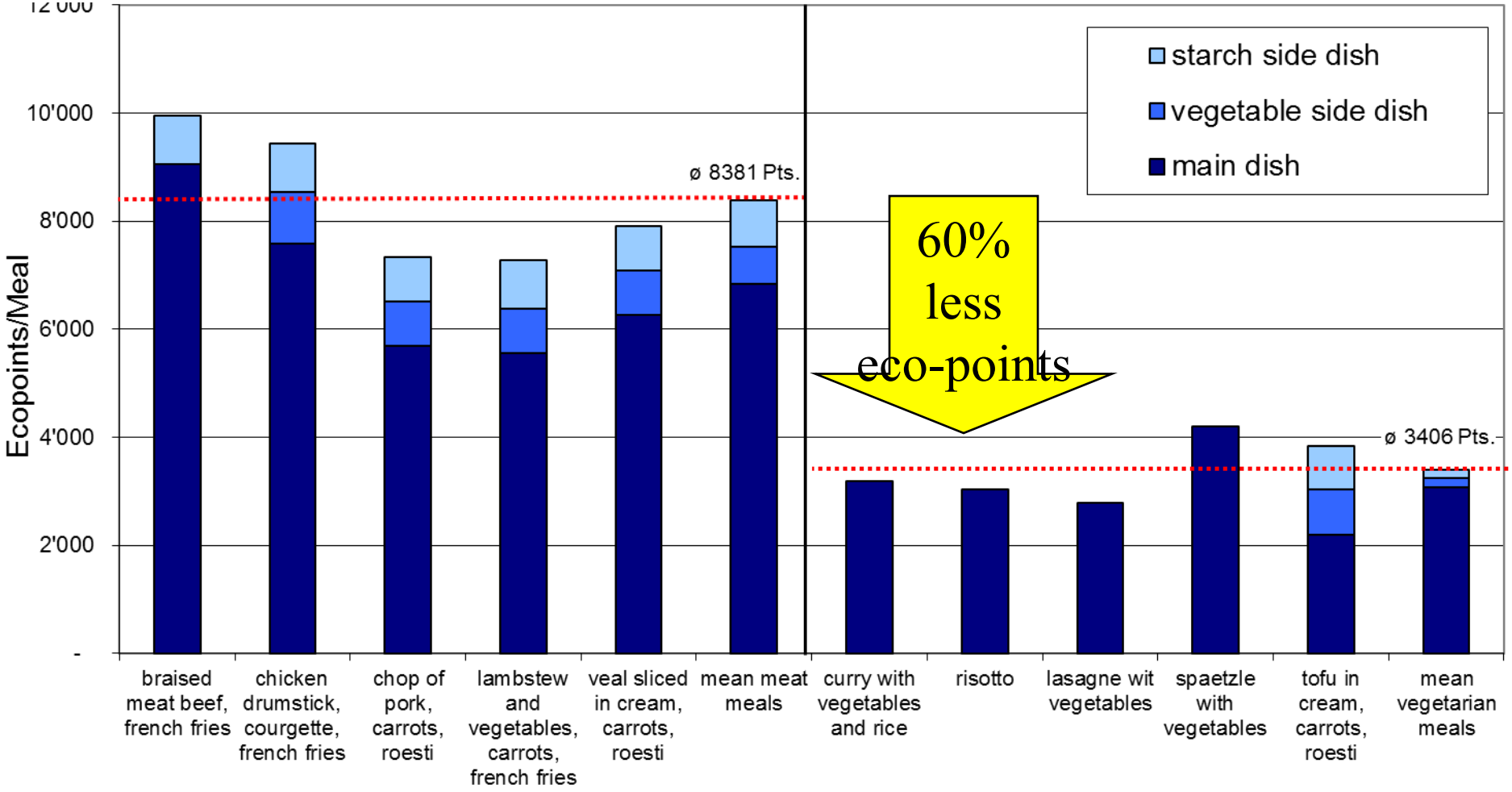
➢ Reduction potential about 16% if only organic food is bought

Reduction potential – organic products

Organic products	reduction potential	total potential	Land	Source	Estimation
Consumption area	**nutrition**				
Total environmental impacts	**-15.9%**	**-4.5%**	**CH**	**Own calculation**	**Organic production, no heated greenhouses and no air transported goods**
Primary energy demand	**-6.2%**	**-1.0%**	**CH**	**Own calculation**	**Organic production, no heated greenhouses and no air transported goods**
	-33.0%		AT	Fazeni 2011	100% organic production in AT
	-4.0%		CH	Faist 2000	Additional impacts of transports are estimated with 1%, but not included
	-1.7%		CH	Jungbluth 2003	100% organic, extra transports
	-20% - 56%		CH	Mäder et al. 2002	
Carbon footprint	**-18.2%**	**-2.9%**	**CH**	**Own calculation**	**Organic production, no heated greenhouses and no air transported goods**
	-33.0%		AT	Fazeni 2011	100% organic production in AT
	-10% bis -30%		DE	Grießhammer 2010	Organic vegetables
	-6.0%		CH	Jungbluth 2003	100% organic, extra transports

- Own calculations and literature research for the estimation
- 15.9% less environmental impacts (reduction potential)
- Total potential = Reduction potential * Share of consumption area
- 4.5% total potential for reductions

Vegetarian diet



- Vegetarian diet reduces the environmental impacts considerable

Reduction potential – Vegetarian diet

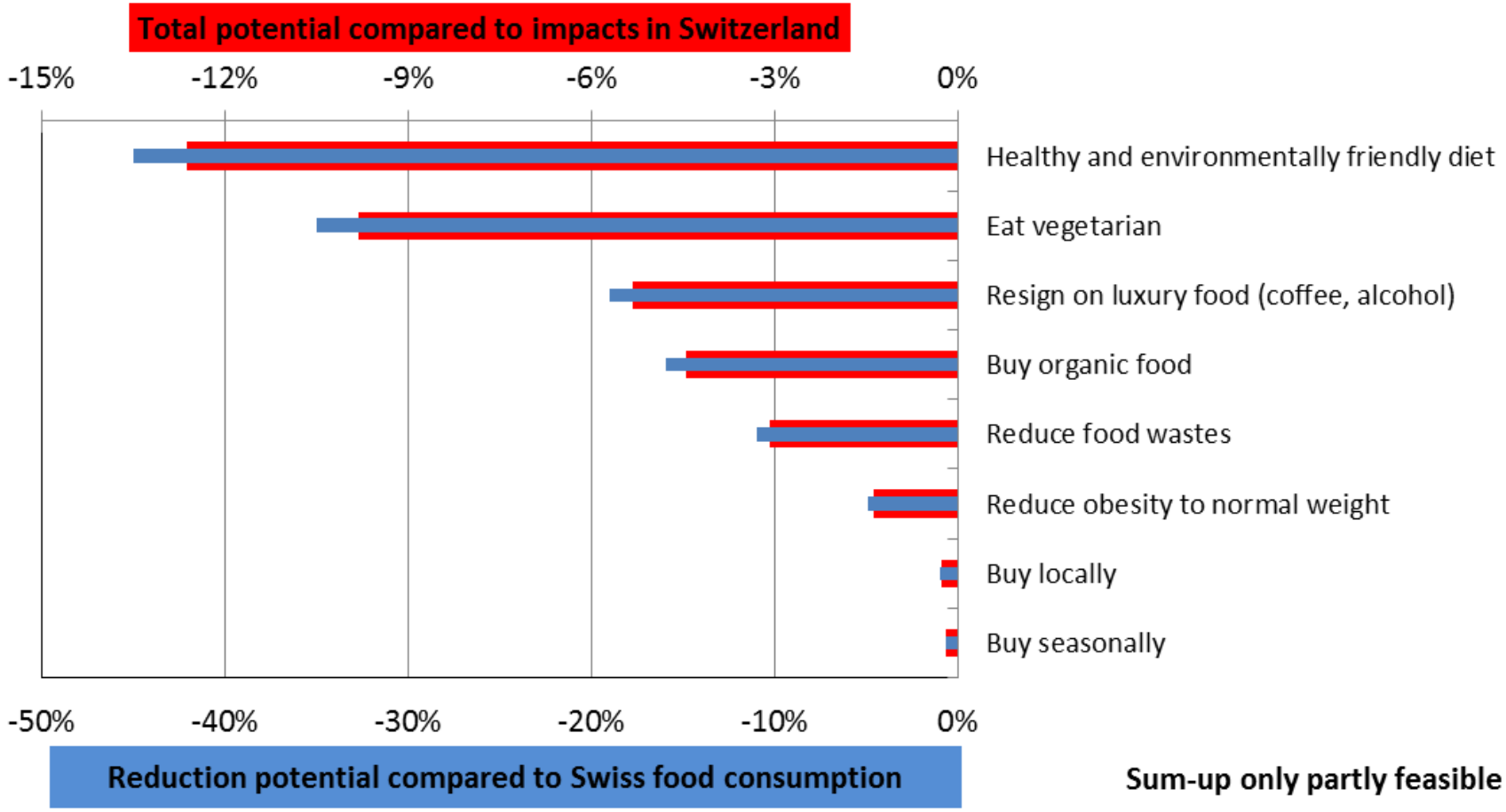
Bioprodukte	Reduktionspotenzial	Gesamtpotenzial	Region	Quelle	Annahmen
Konsumbereich	**Ernährung**				
Umweltbelastung, CH	**-15.9%**	**-4.5%**	**CH**	**Eigene Berechnung**	**Bioproduktion, kein Gewächshaus und Flugware, zusätzliche Transporte**
Primärenergieverbrauch, CH	**-6.2%**	**-1.0%**	**CH**	**Eigene Berechnung**	**Bioproduktion, kein Gewächshaus und Flugware, zusätzliche Transporte**
	-33.0%		AT	Fazeni 2011	100% Bioproduktion in AT
	-4.0%		CH	Faist 2000	Zusätzliche Transporte zum Import nicht berechnet. Diese dürften etwa 1% ausmachen
	-1.7%		CH	Jungbluth 2003	100% Bioproduktion, zusätzliche Transporte
	-20% - 56%		CH	Mäder et al. 2002	Nur landwirtschaftlicher Anbau in Fruchtfolge weniger Produkte ohne Verarbeitung, Transport, etc.
CO2-eq, CH	**-18.2%**	**-2.9%**	**CH**	**Eigene Berechnung**	**Bioproduktion, kein Gewächshaus und Flugware, zusätzliche Transporte**
	-33.0%		AT	Fazeni 2011	100% Bioproduktion in AT
	-10% bis -30%		DE	Grießhammer 2010	Biogemüse statt konventionel
	-6.0%		CH	Jungbluth 2003	100% Bioproduktion, zusätzliche Transporte
Landnutzung	18.8%		CH	Eigene Berechnung	Fast ausschliesslich Bioproduktion
	14.3%		CH	Jungbluth 2003	100% Bioproduktion, zusätzliche Transporte
	30.0%		CH	Faist 2000	100% Bioanbau
	20.0%		CH	Mäder et al. 2002	Bioanbau statt IP
	32.0%		DE	Seemüller 2000	100% Bioanbau

- Estimation 30% less environmental impacts on food consumption
- Total potential = Reduction potential * Share of consumption area

TOTAL POTENTIALS

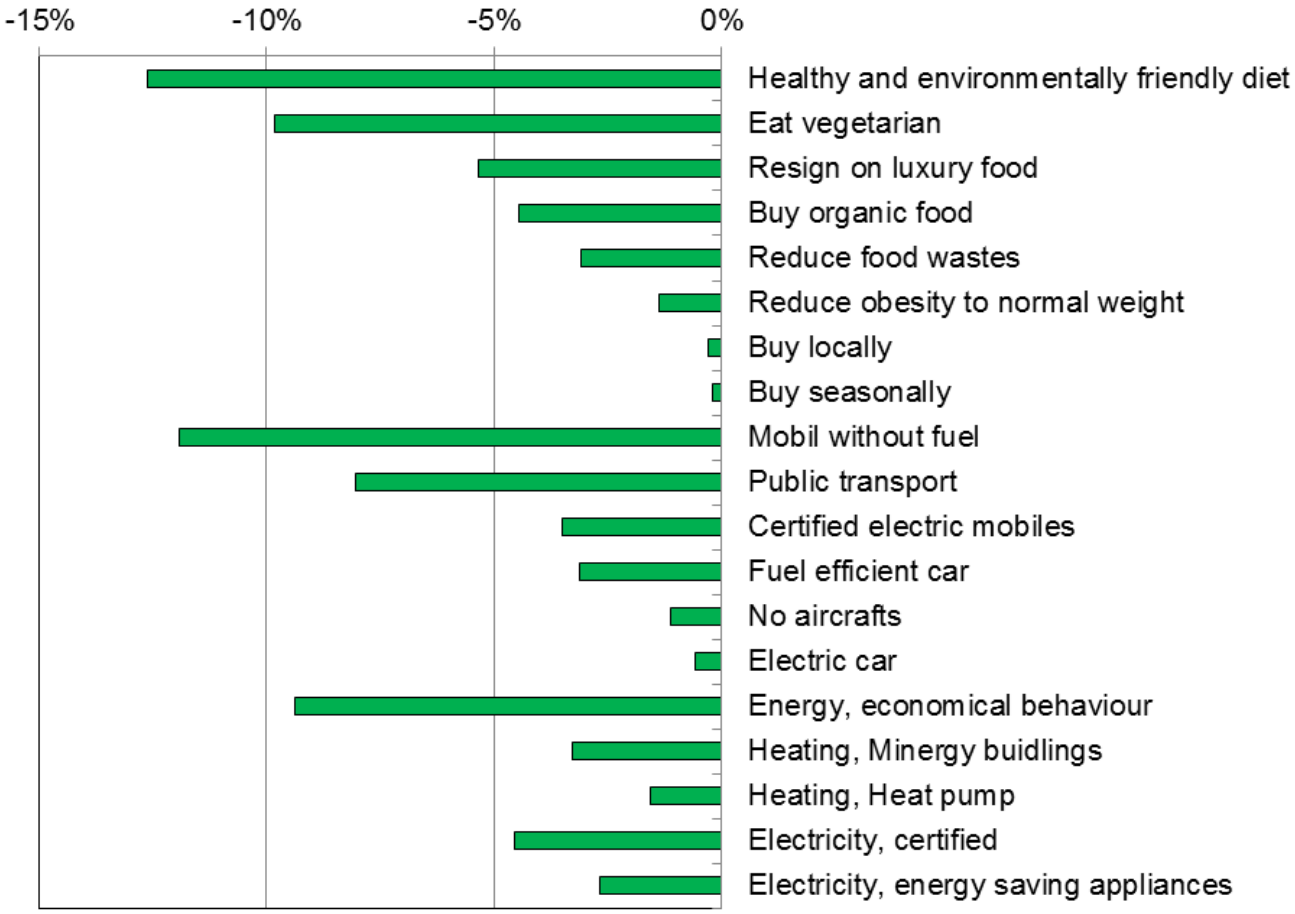
ANALYSIS FOR THE PRESENT SITUATION IN SWITZERLAND

Total potential for reduction of impacts



- Most relevant is a reduction of animal products
- Buying local/seasonal low potential because only vegetables and fruits affected

Summary of total potentials



- Vegetarian diet and substantial reduction of mobility demands have highest potentials
- Sum-up only partly possible

Reduction targets for environmental impacts

- Political targets according to ecological scarcity method 2006: - 38% for domestic situation or - 63% without exporting environmental impacts
- Reaching world average with ecological scarcity: -47%
- Ecological footprint concept: - 64%
- 2000-Watt: -68% on energy and – 88% on CO2-eq

➢ At least -40% reduction of environmental impacts necessary

Sum of total reduction

Indicator	Total environmental impacts	Carbon footprint	Primary energy demand
Total (per capita and year)	20'000'000	12.8	8'250
Nutrition	28%	16%	17%
Total potential nutrition	**-22%**	-12%	-11%
Private mobility	12%	19%	17%
Total potential mobility	**-12%**	**-19%**	**-17%**
Energy use households	19%	24%	25%
Total potentials energy use	**-15%**	**-23%**	**-23%**
Share of 3 areas of consumption	59%	59%	59%
Total potential, 3 areas of consumption	**-49%**	**-54%**	**-51%**
Total, reduced (per capita and year)	10'223'846	6	4'047

- In theory it seems possible to achieve ambitious reduction targets
- In practice this encounters substantial changes of personal life styles

Summary

- Our methodology allows to investigate and compare the impacts of behavioural changes in all areas of consumption
- Most important are the areas of nutrition, mobility and energy use in households
- Combination of EE-IOA for broad overview and LCA for detailed analysis
- The highest potentials exist for a vegetarian diet, reduction of mobility and energy savings in households

Thanks for financial contributions:
WWF Switzerland
Energieforschung Zurich – ewz-electricity supply Zurich
Swiss Federal Office for the Environment, FOEN

Further information about the projects
www.esu-services.ch/projects/lifestyle/

WWF Footprint calculator to be updated with the data
www.footprint.ch

Download of the background study and electronic data
www.esu-services.ch/projects/ioa/

ESU data-on-demand for imported goods
www.esu-services.ch/de/daten/datenverkauf/

Discussion forum LCA on life styles
www.esu-services.ch/news/df/#c833

- The relevance of single decisions has to be taken into account