

# Consumption based carbon accounting

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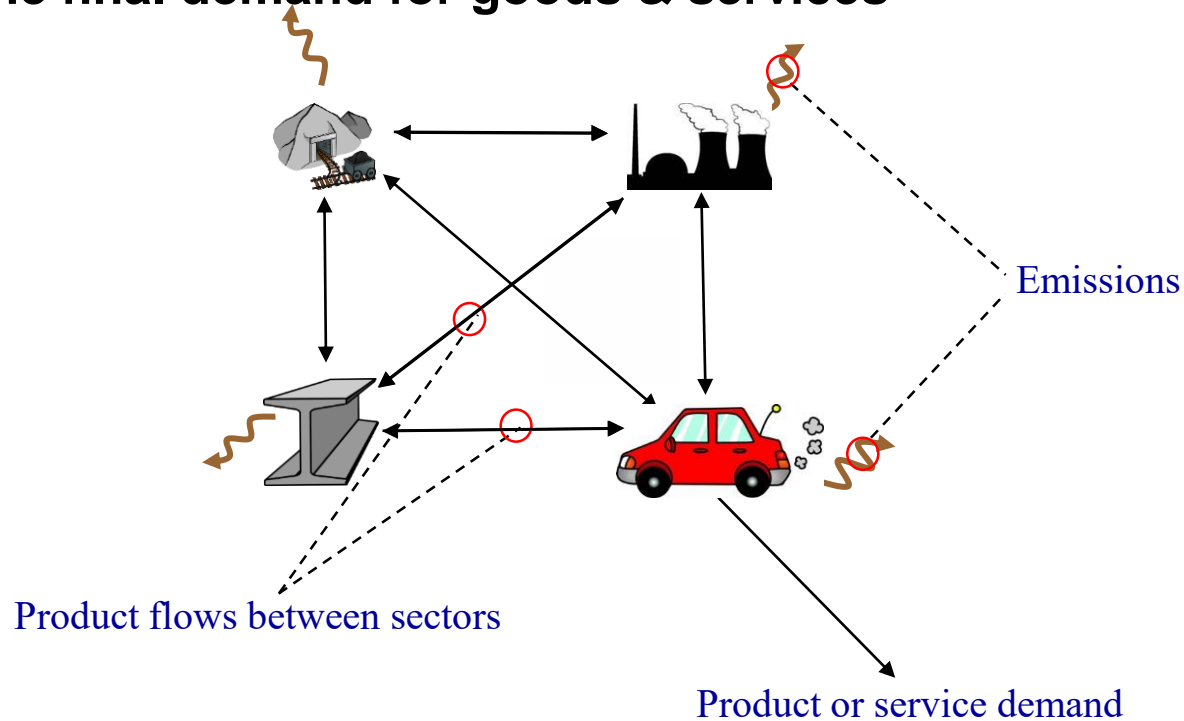


# Structure

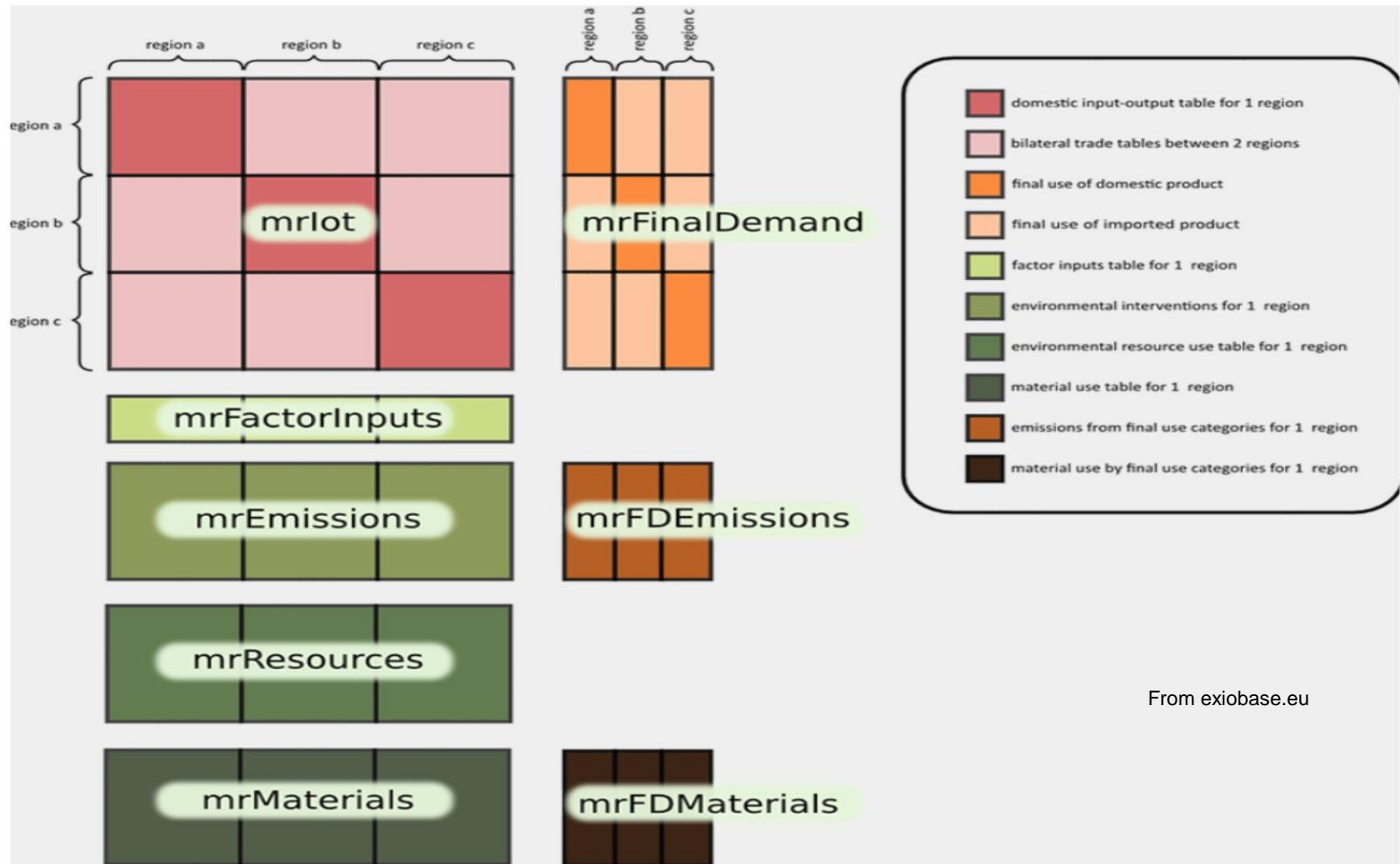
1. Methods to arrive at Consumption based accounts
2. EU footprints and emissions embodied in trade
  - Variability of EU footprints
3. Drivers of change
4. Focus on embodied emissions
  - Relevant Industries and Consumption categories

## Consumption based carbon accounting (CBCA)

- assigns the emission associated with production to the final demand for goods & services



# Multi-regional Input-Output

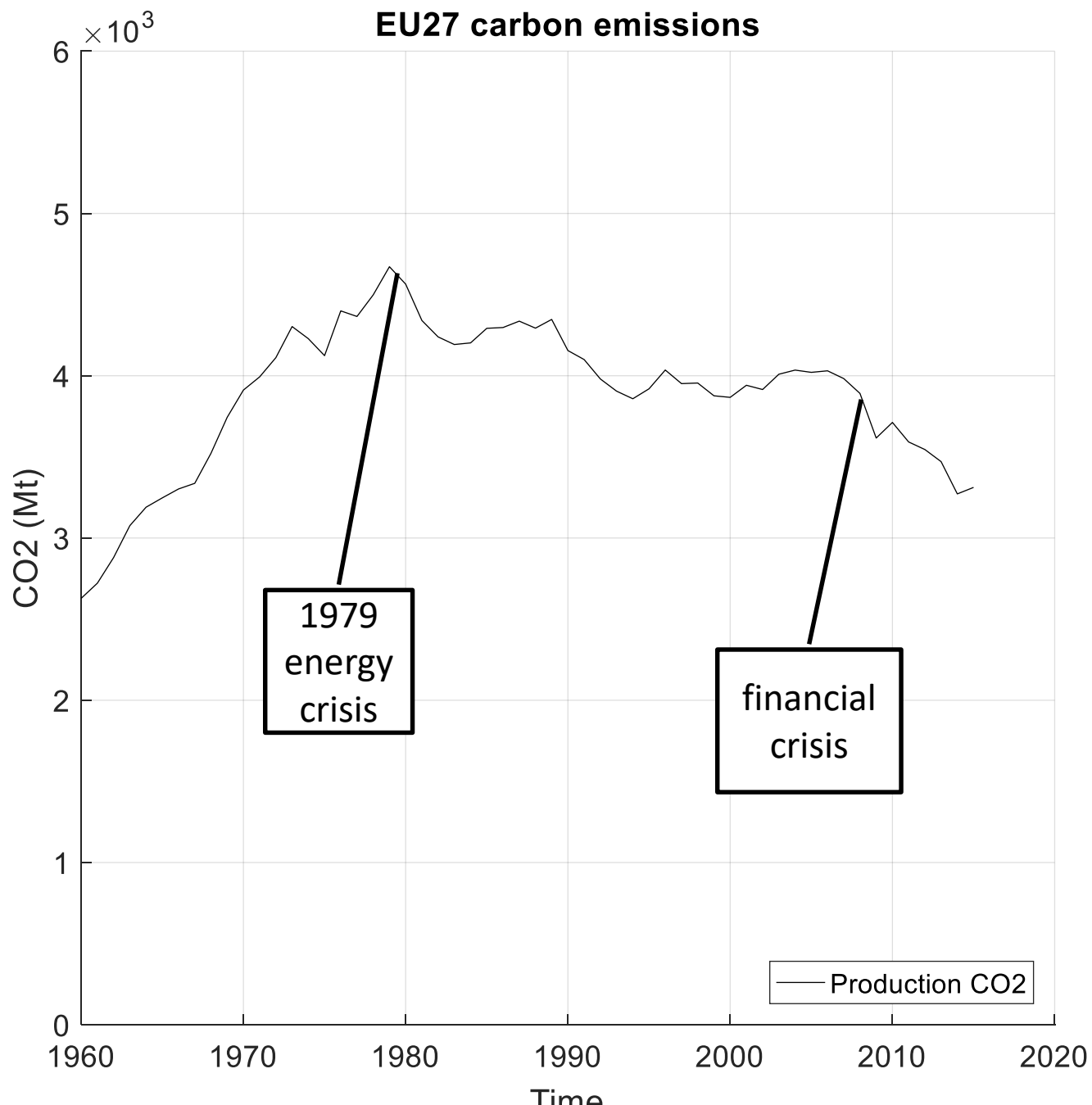


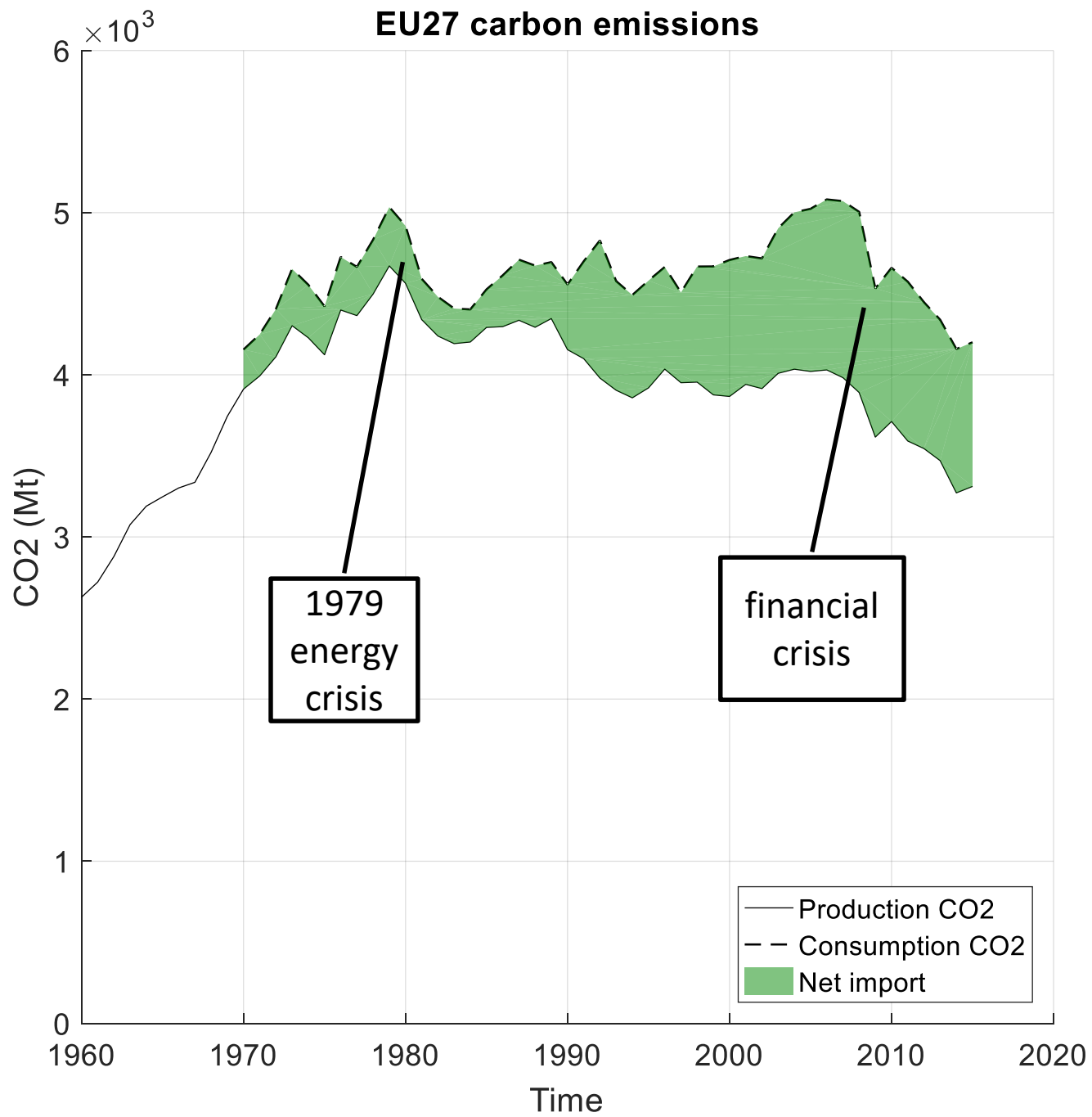
From exiobase.eu

# Strengths & Weaknesses of MRIO

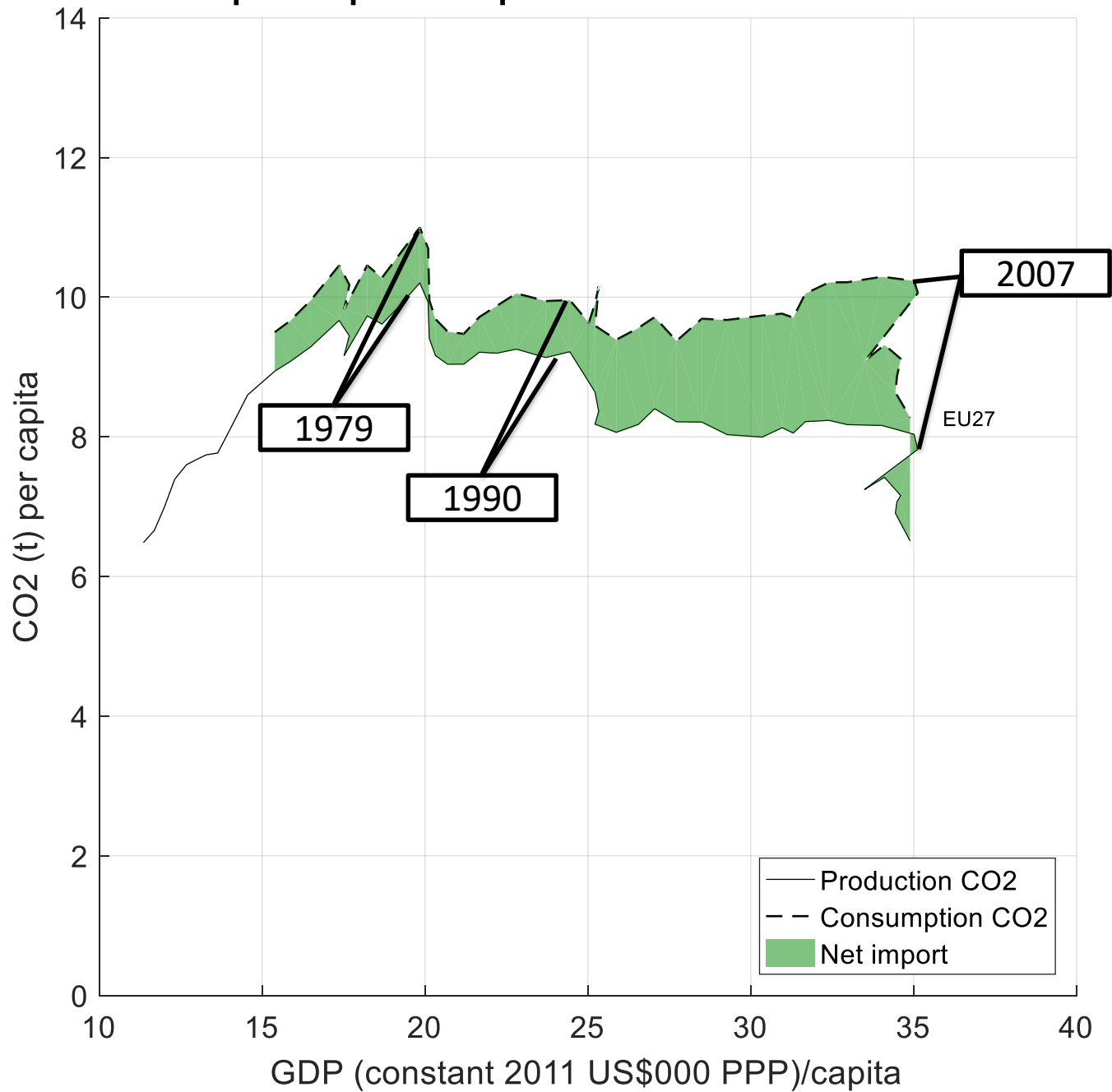


- Strengths
  - Coverage of goods and services
  - Data is available for most regions of the world – multi-regional analysis captures trade & onward processing.
  - Base dataset for all economy-wide models
- Weaknesses
  - Product level aggregation
  - Good data in monetary units, but less data on physical quantities of consumption (e.g. \$ of expenditure on cars, but not # of cars)
  - Treatment of products outside the economy/technosphere
  - Inter-temporal concepts (e.g. capital, ILUC)





# EU Carbon footprint per-capita vs GDP

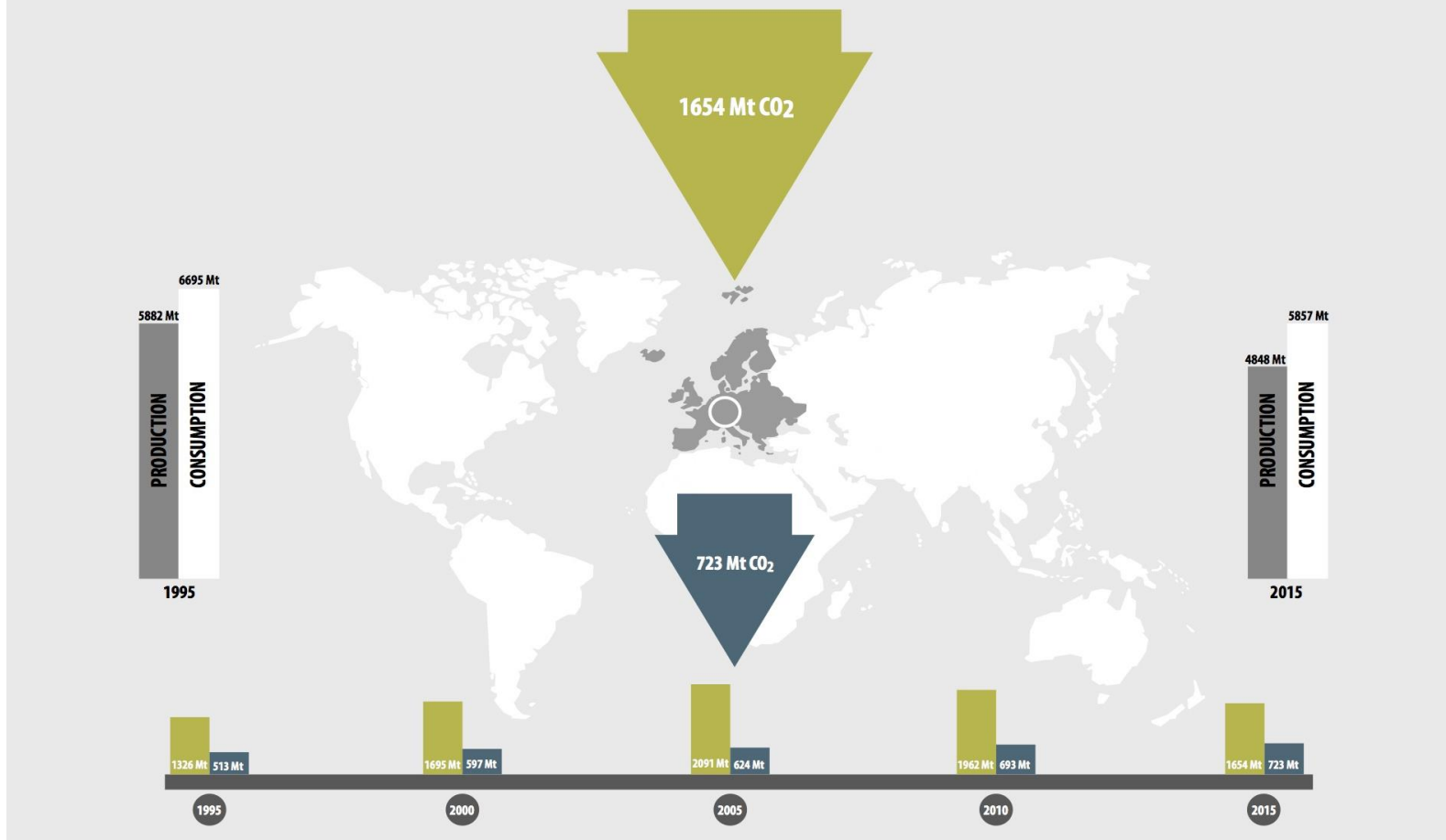




# Greenhouse gases (incl methane, N<sub>2</sub>O) in trade for the EU



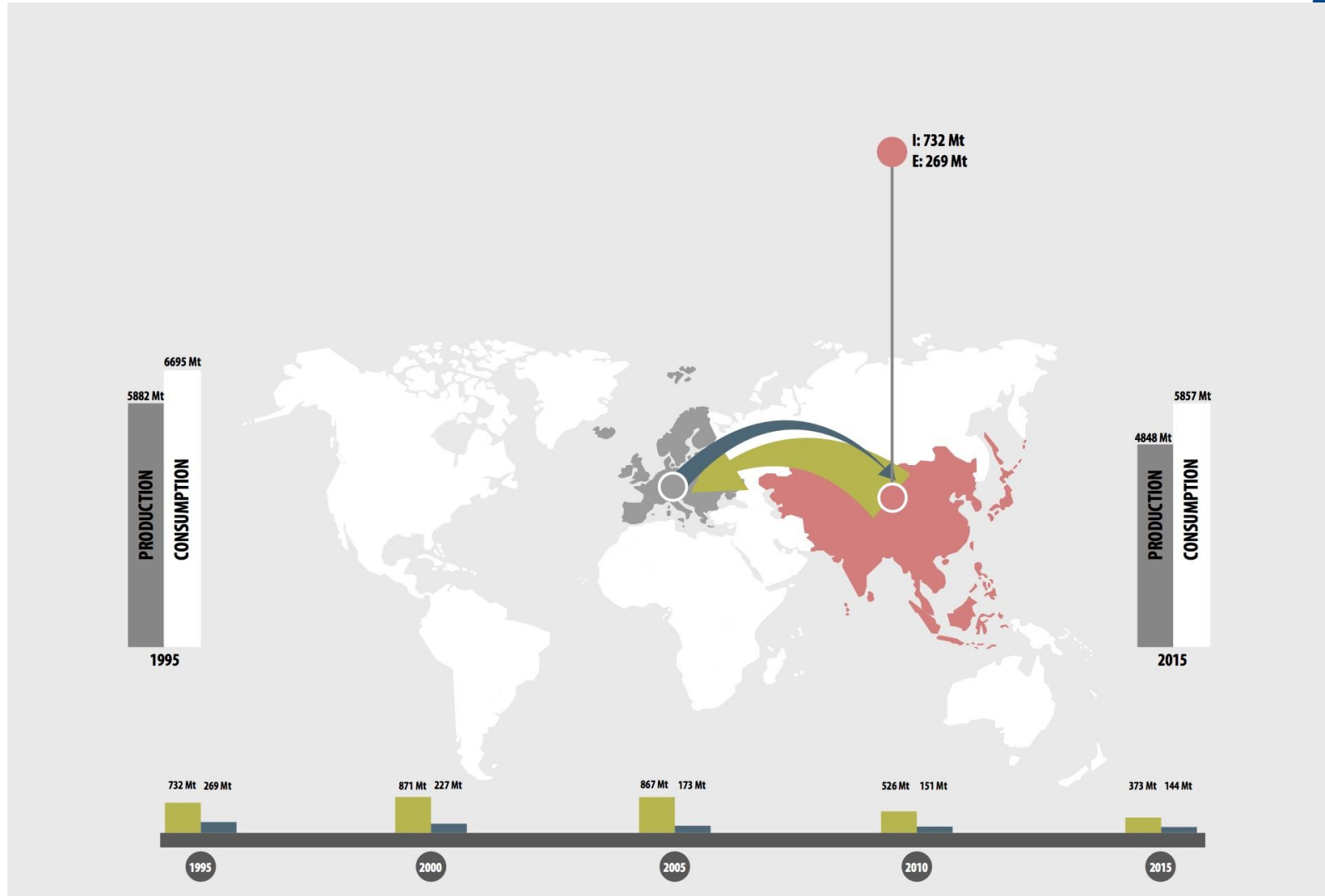
# Greenhouse gases in trade for the EU



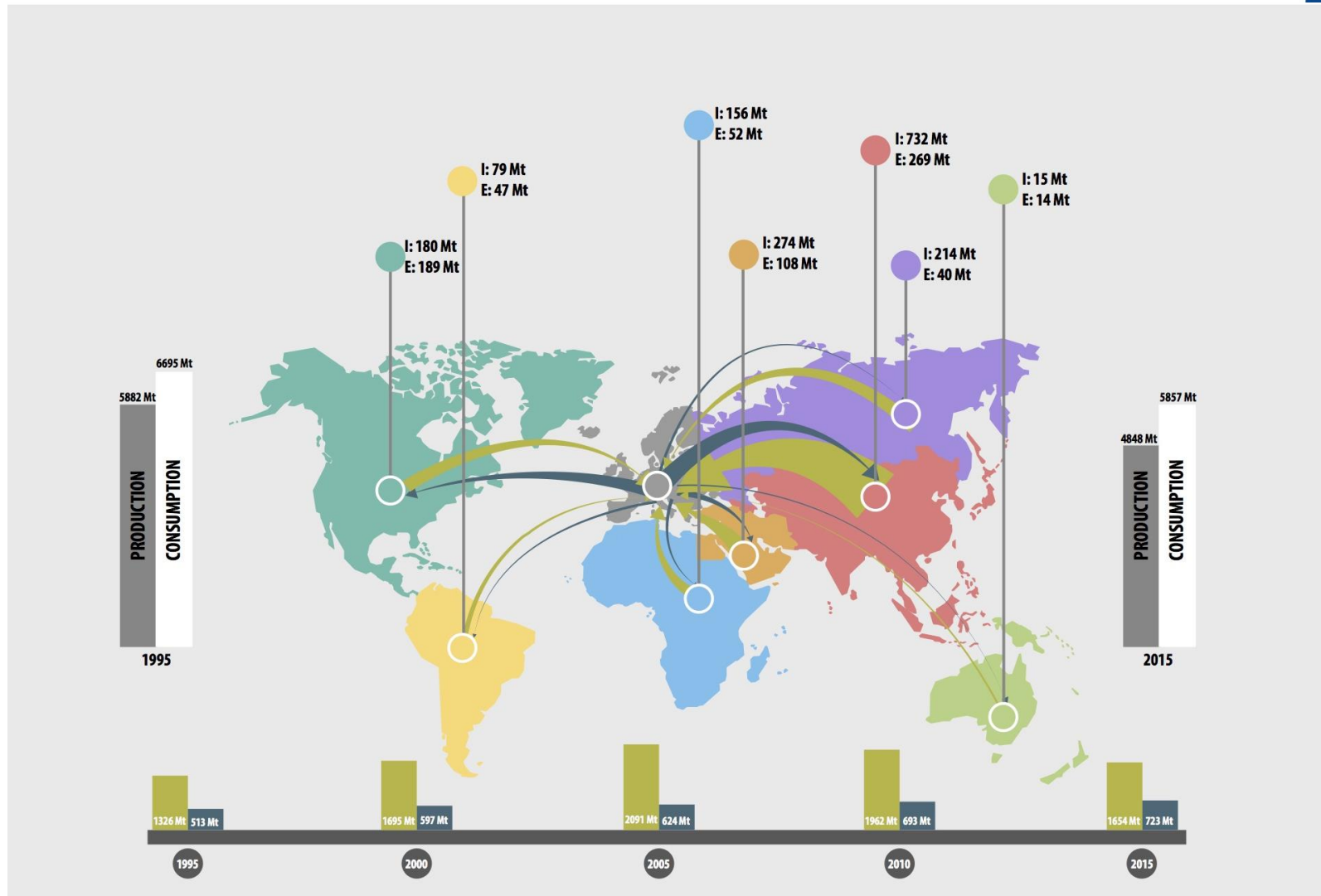
***"1 in 7 of all jobs in the EU, now depend on exports to the rest of the world"***  
(J.C. Juncker, State of the Union address, 14 Sep 2016).

***-> 1 in 7 of all emissions in the EU, are due to exports to the rest of the world***

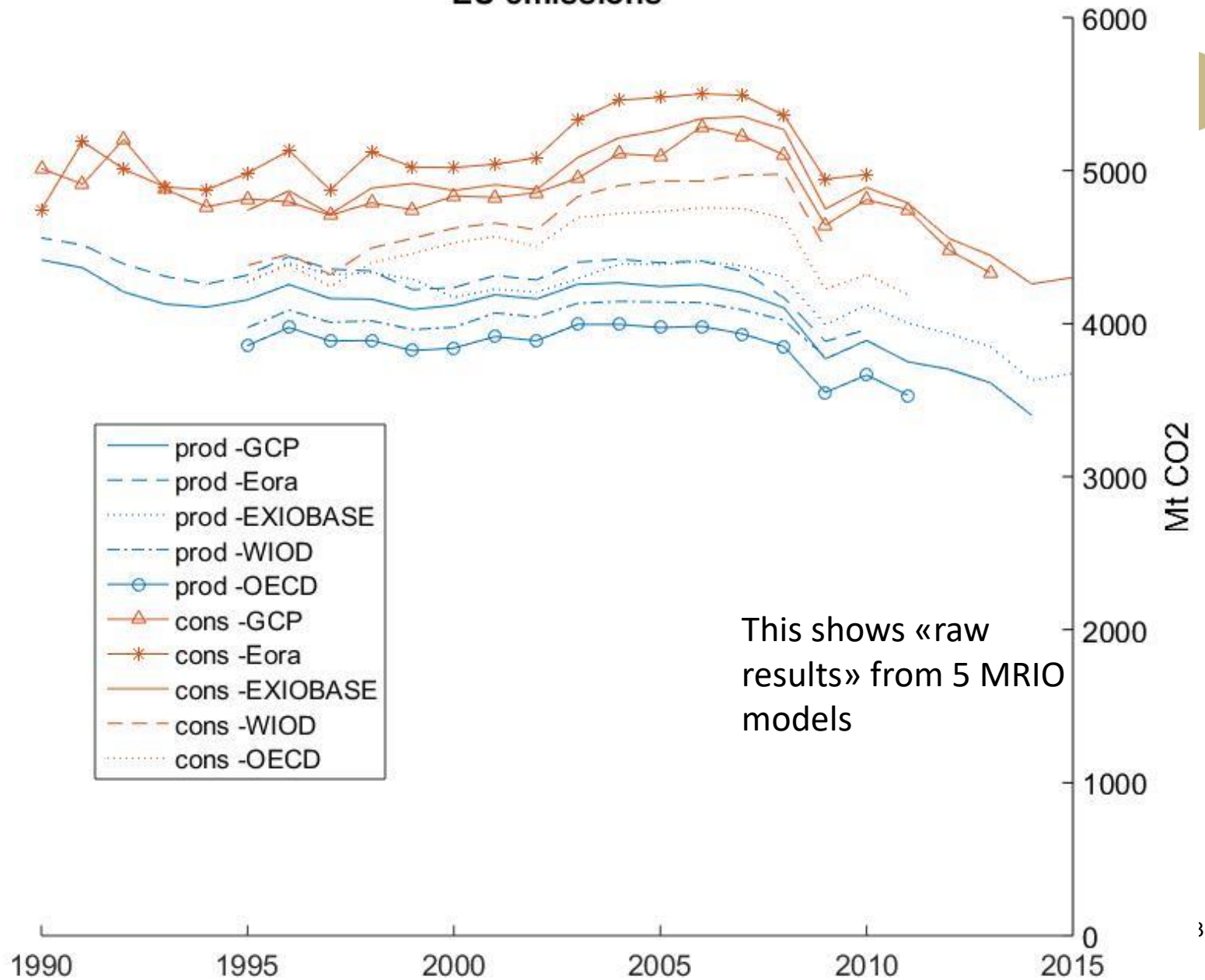
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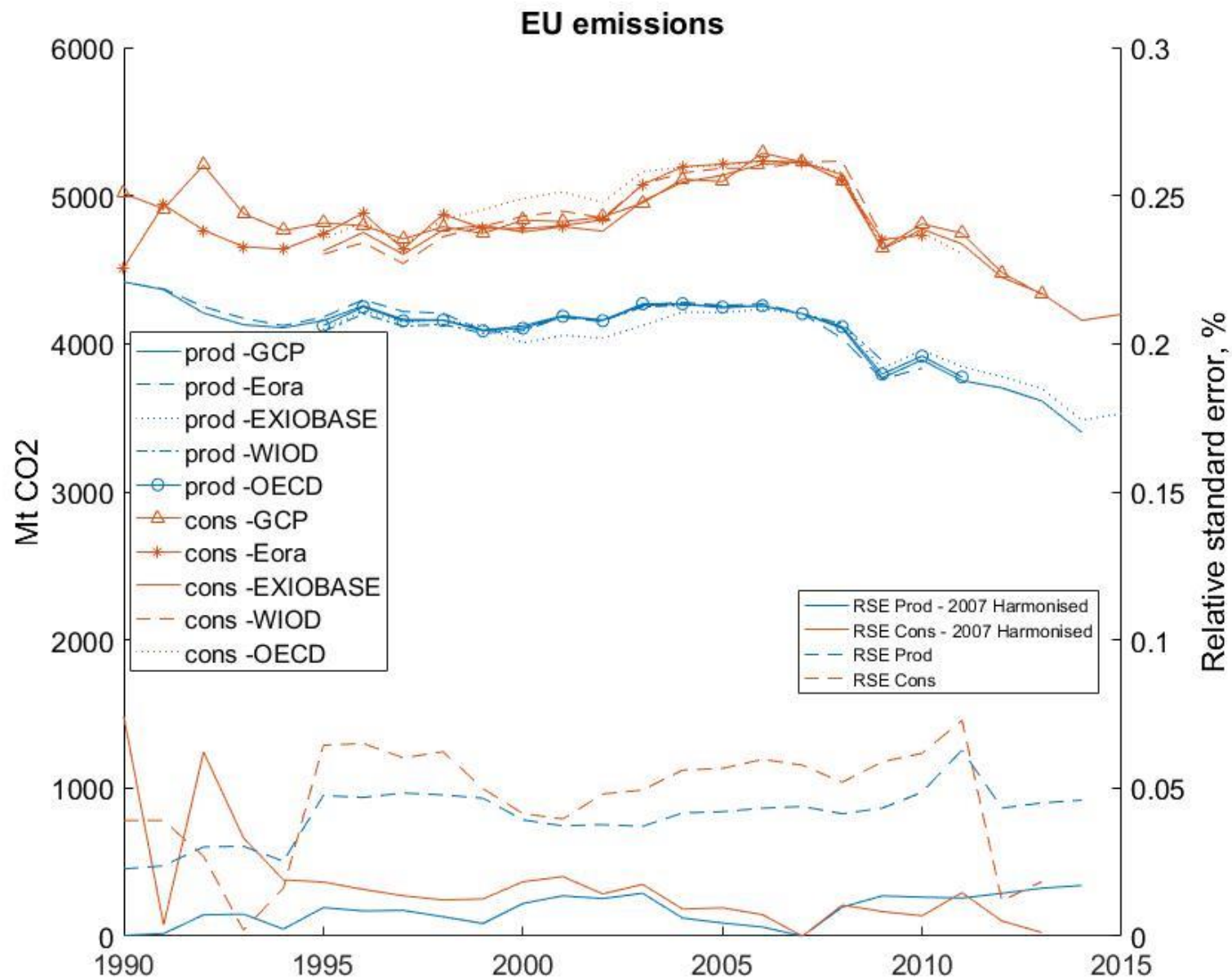


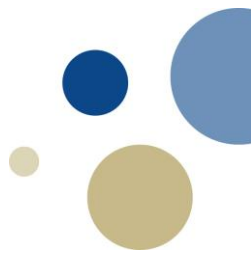
# Greenhouse gases (incl methane, N<sub>2</sub>O) in trade for the EU



## EU emissions





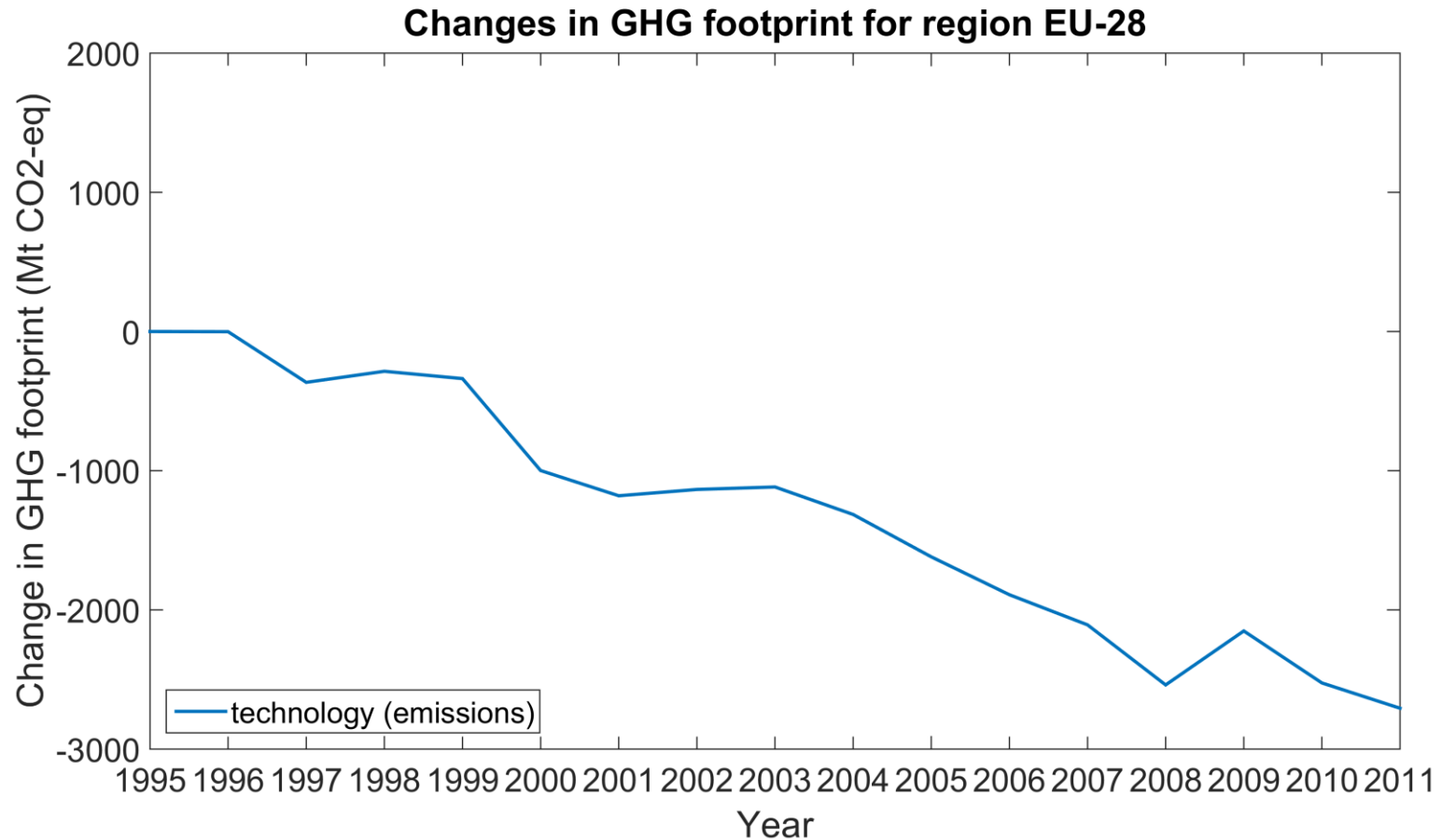


# **Drivers of change underlying EU Carbon Footprints**

Role of:

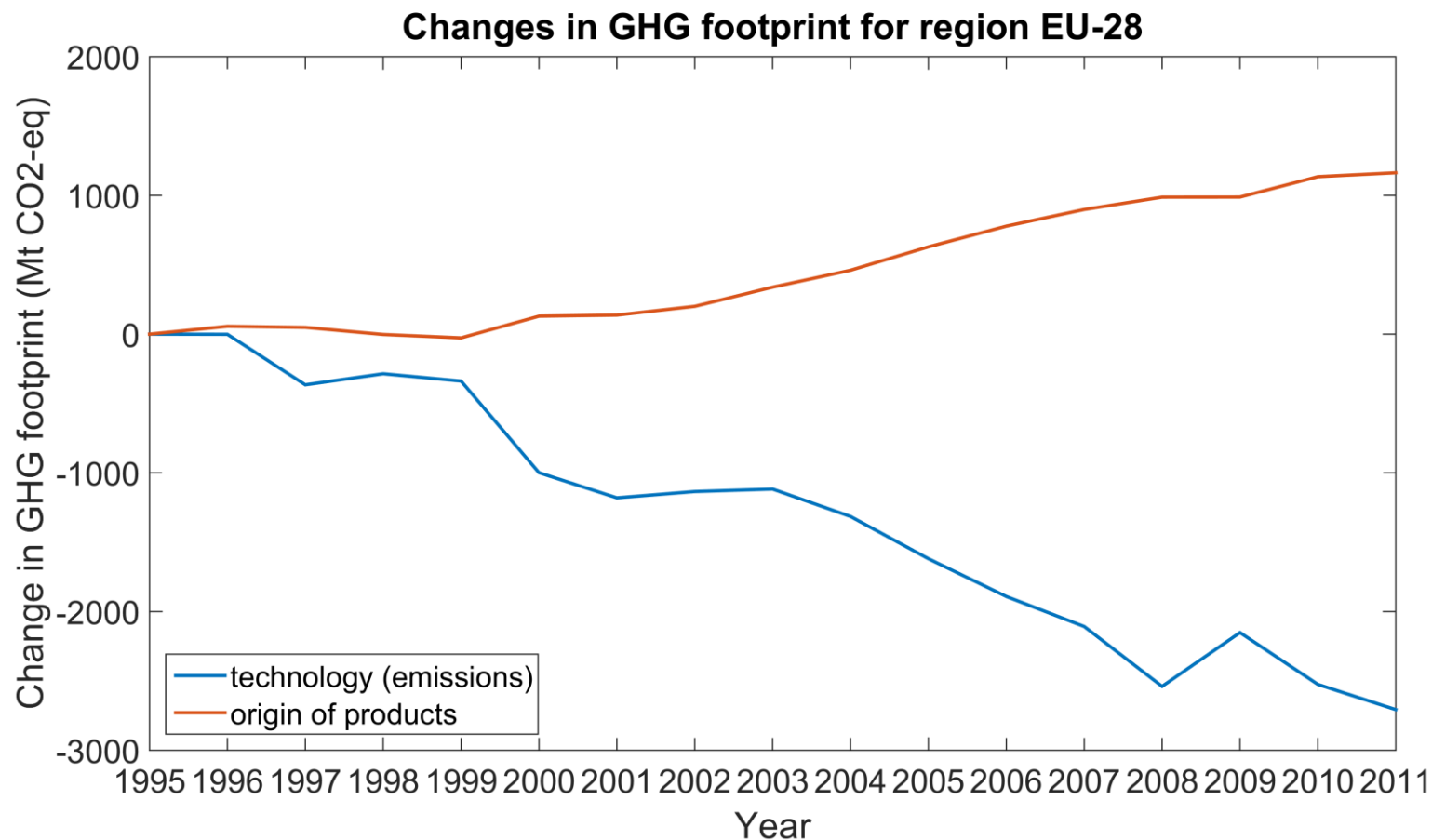
- technology
- trade
- consumer preference
- affluence
- population

# Structural Drivers of EU GHG footprint

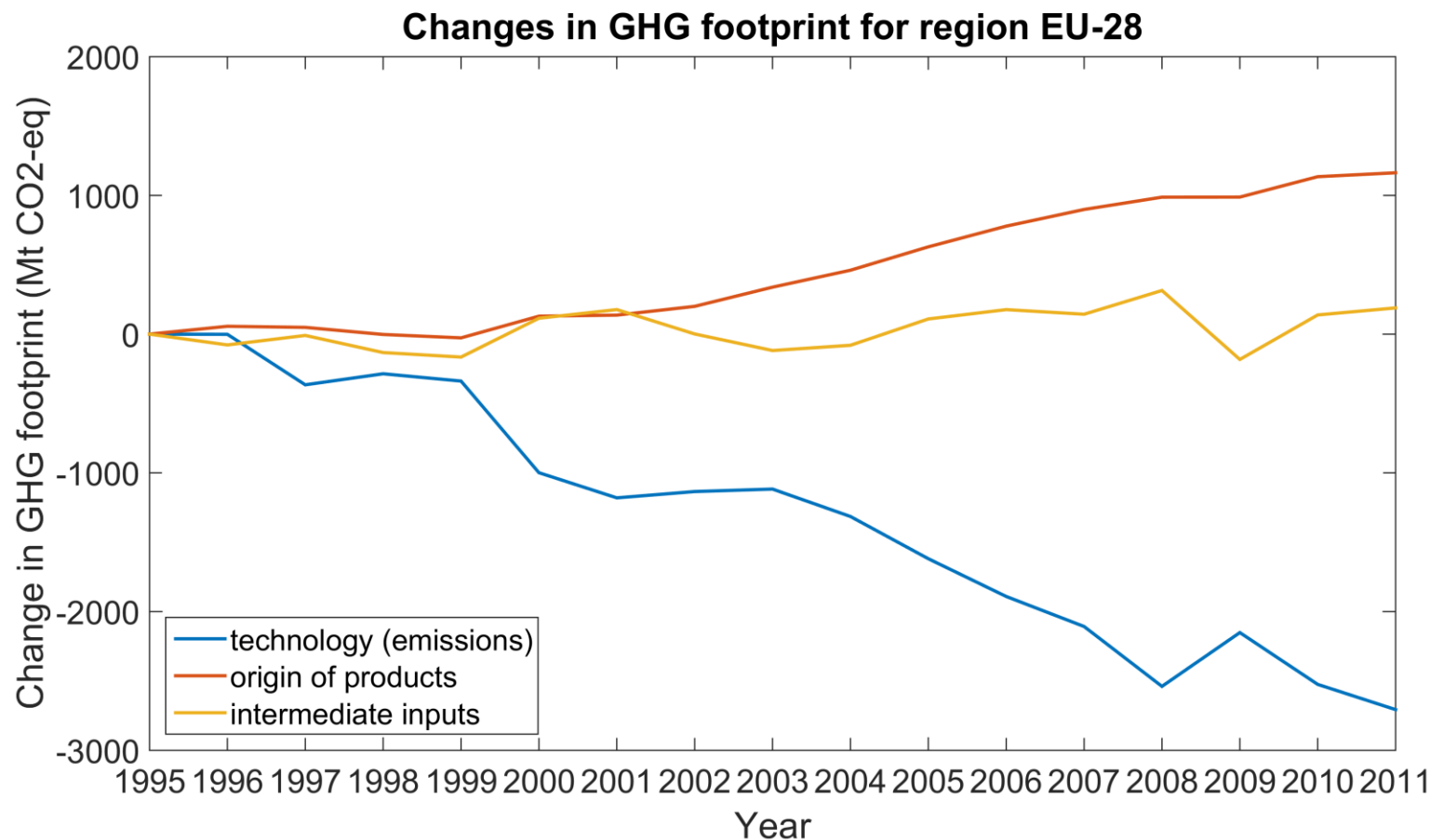




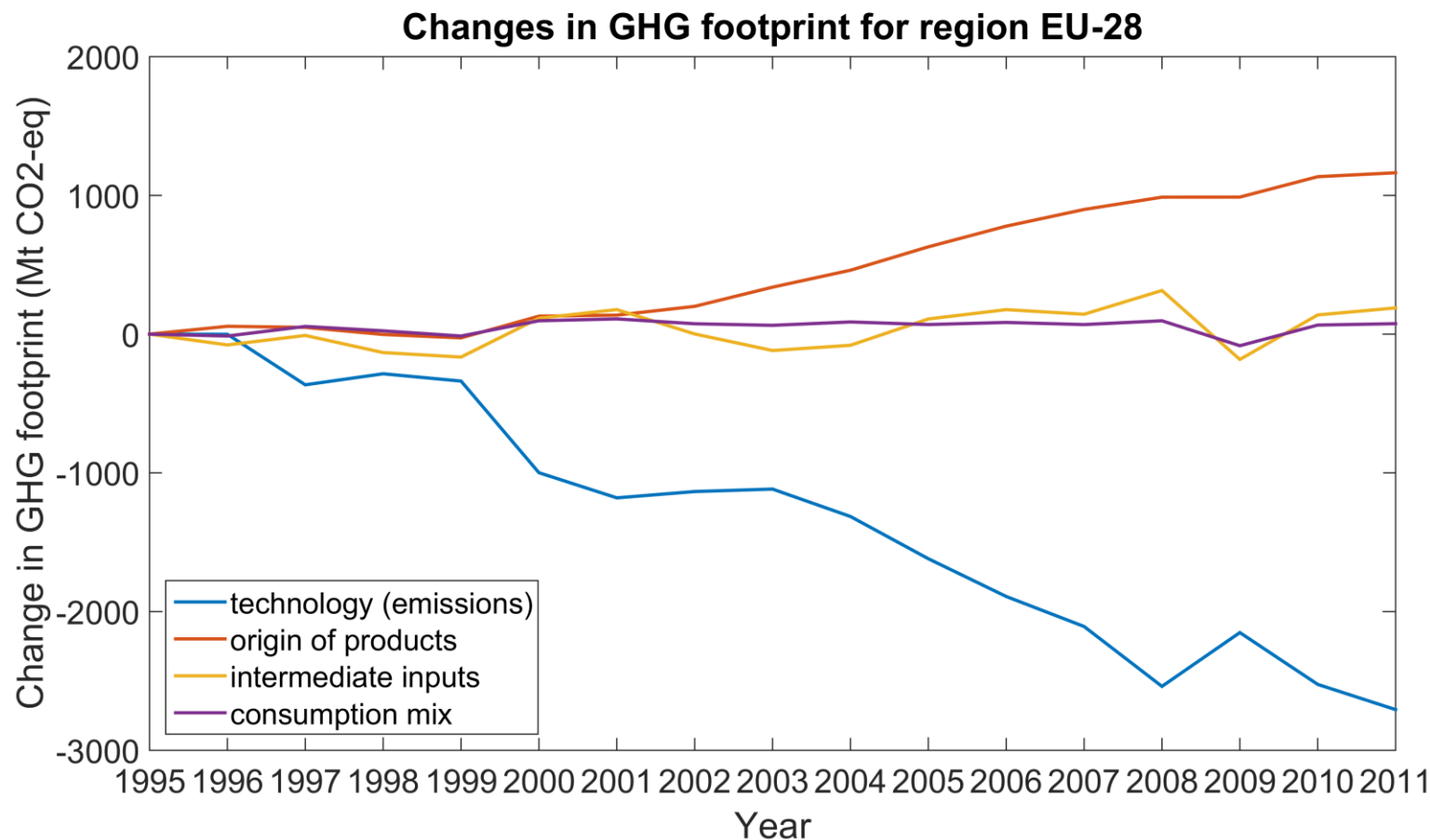
# Structural Drivers of EU GHG footprint



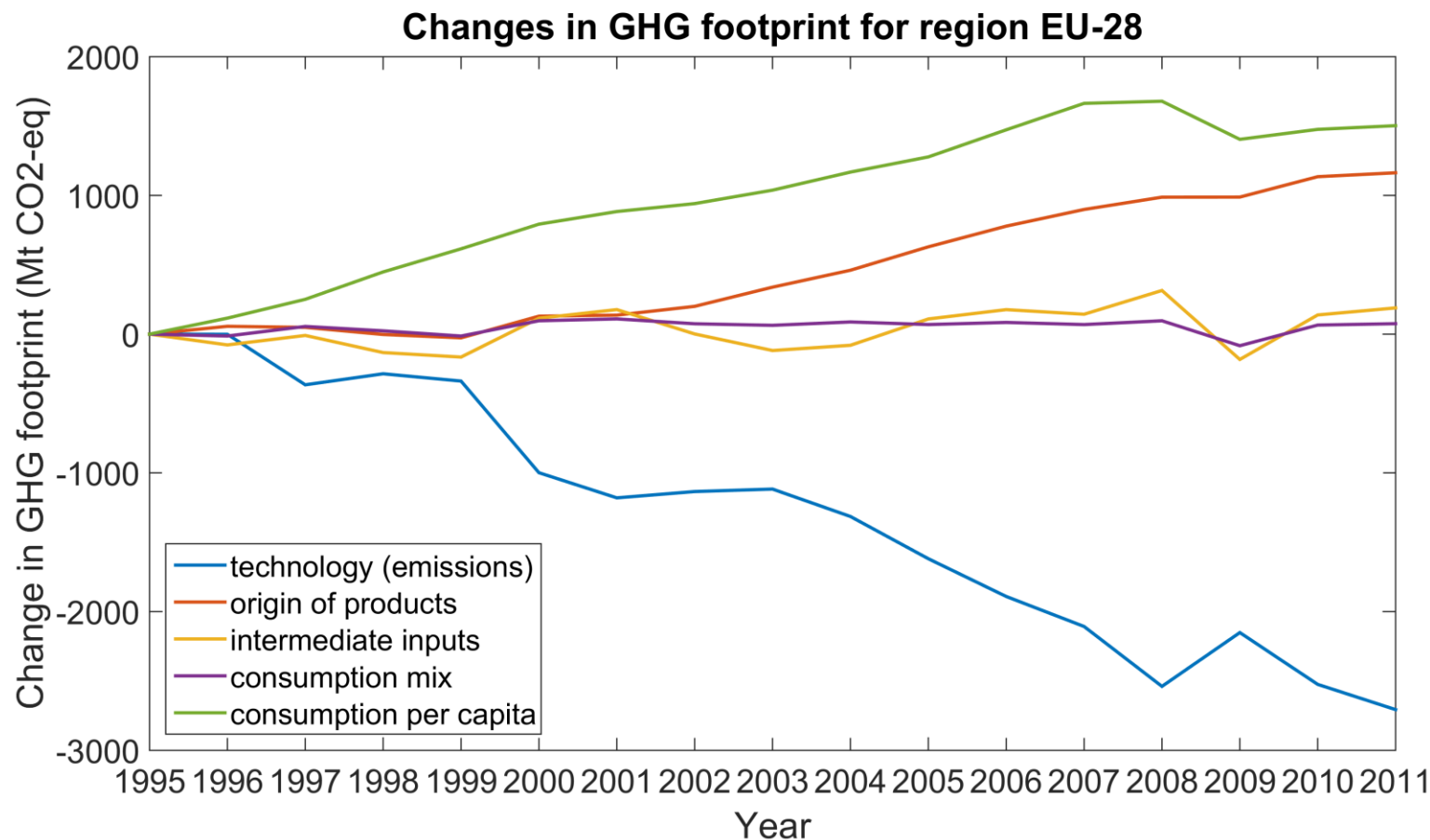
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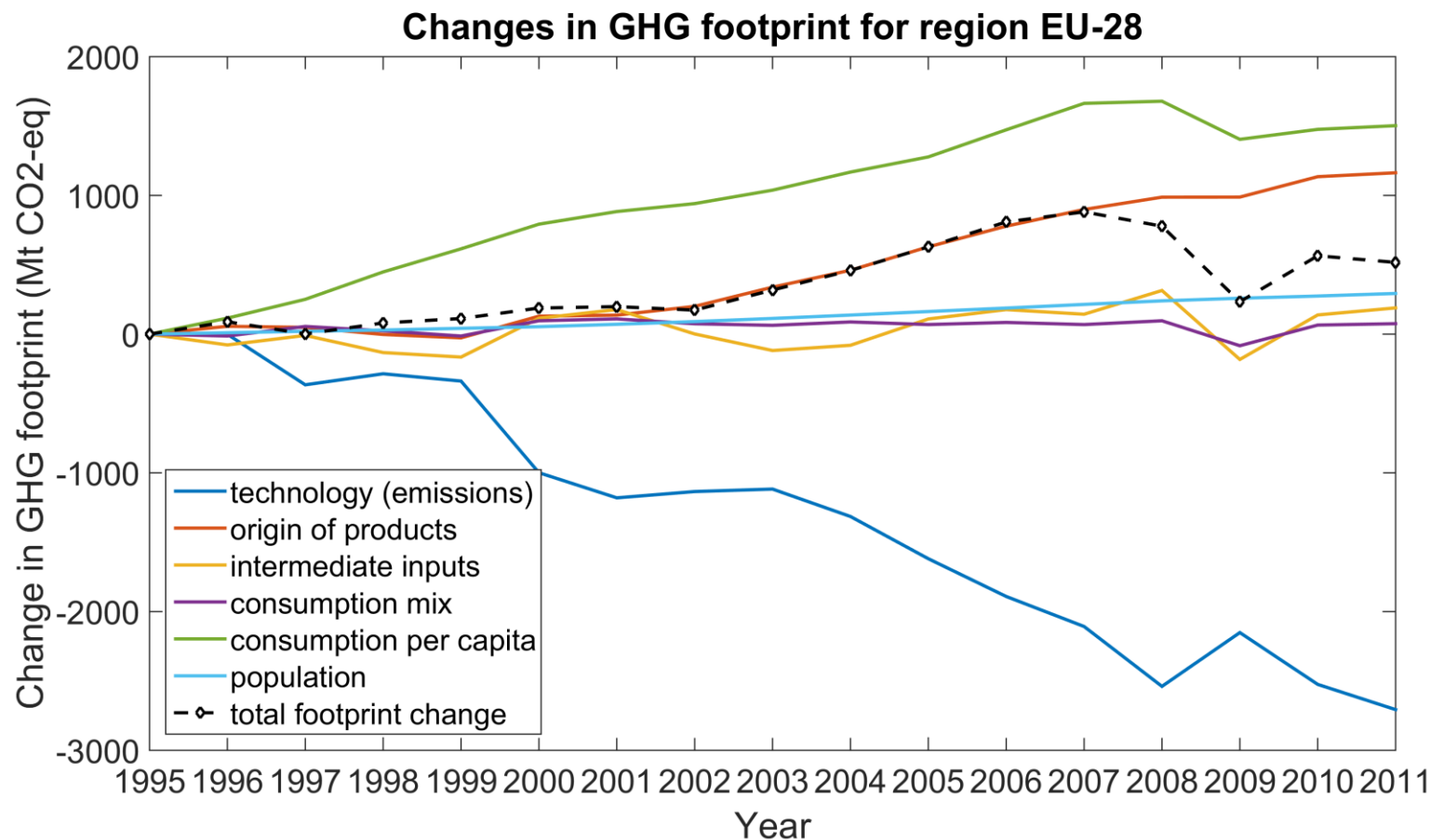
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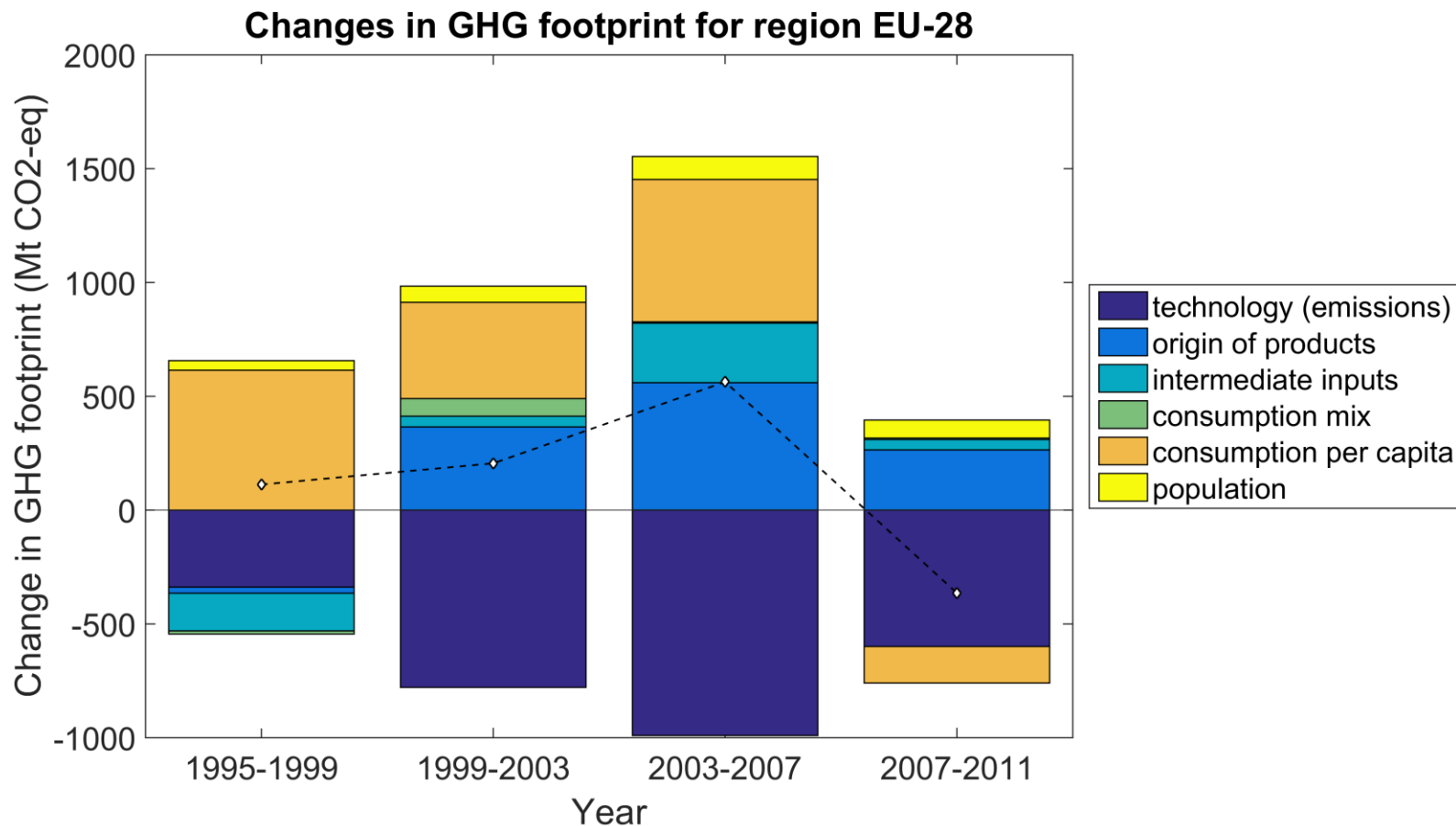
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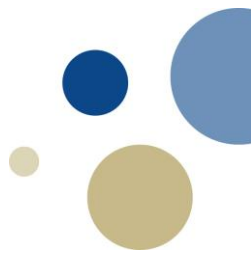


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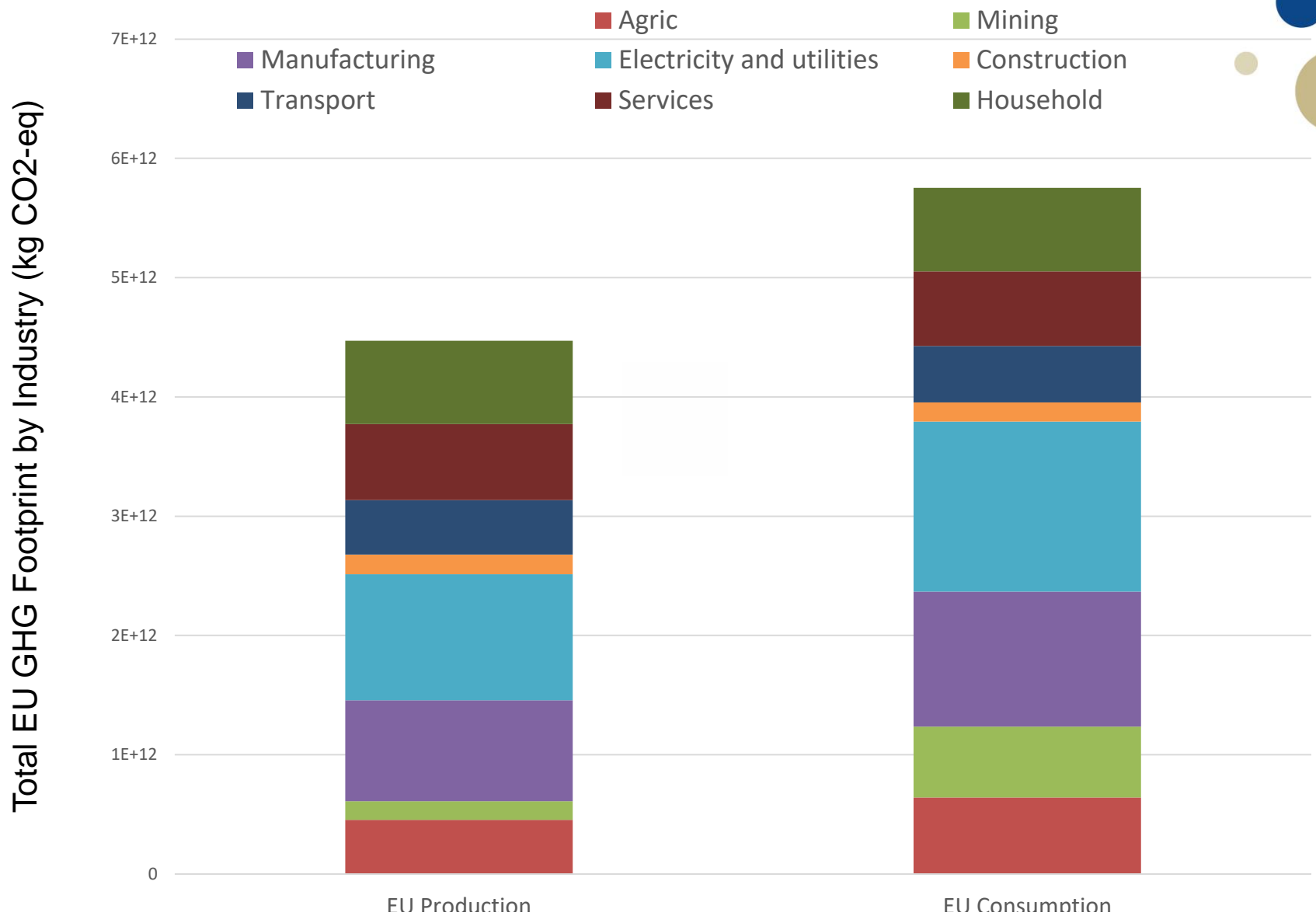


# What are the focus points in EU CBCA

## Perspectives

- source - which industry - produces emissions embodied in consumption
- destination - which consumption category bears high embodied emissions

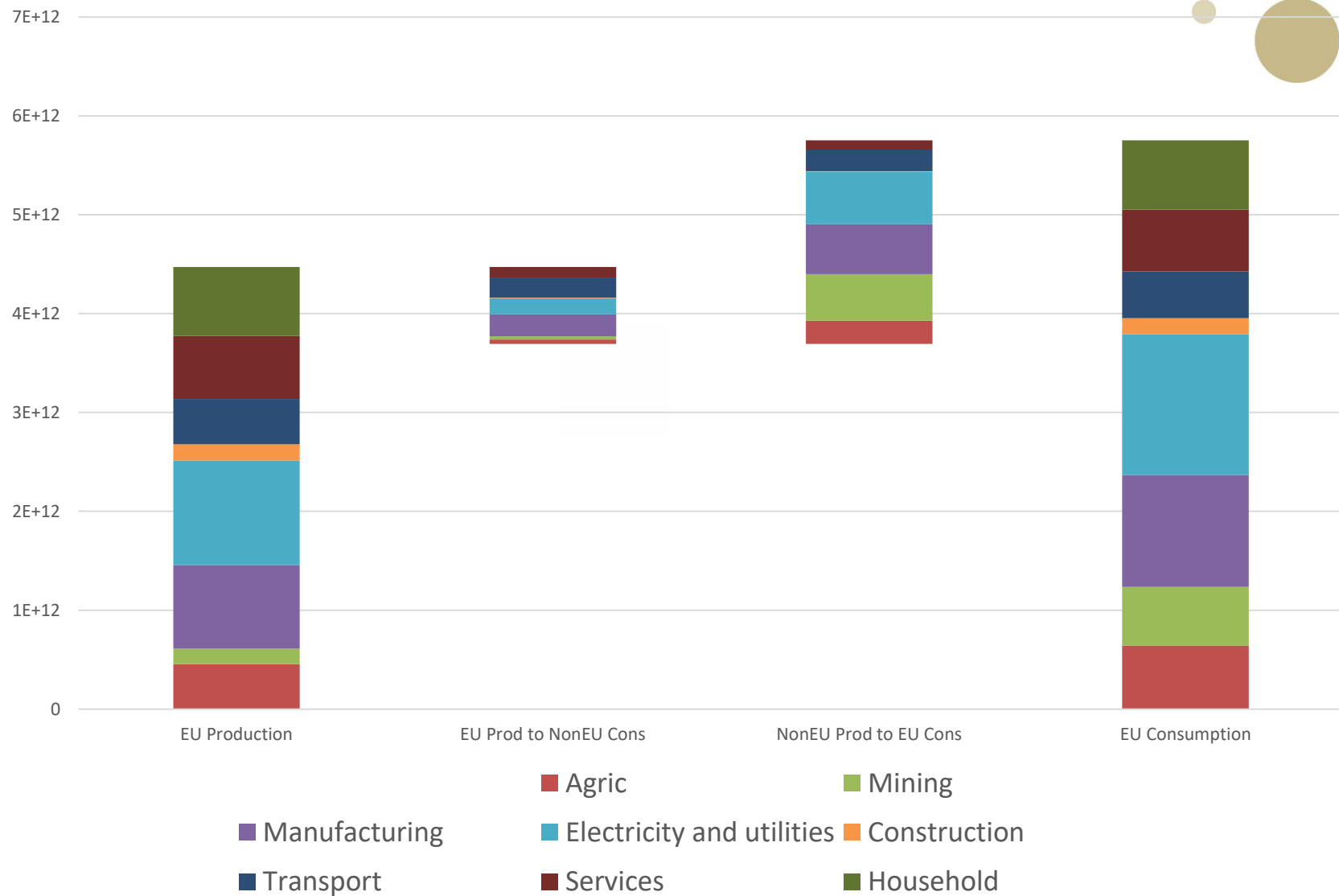
# EU footprint by source

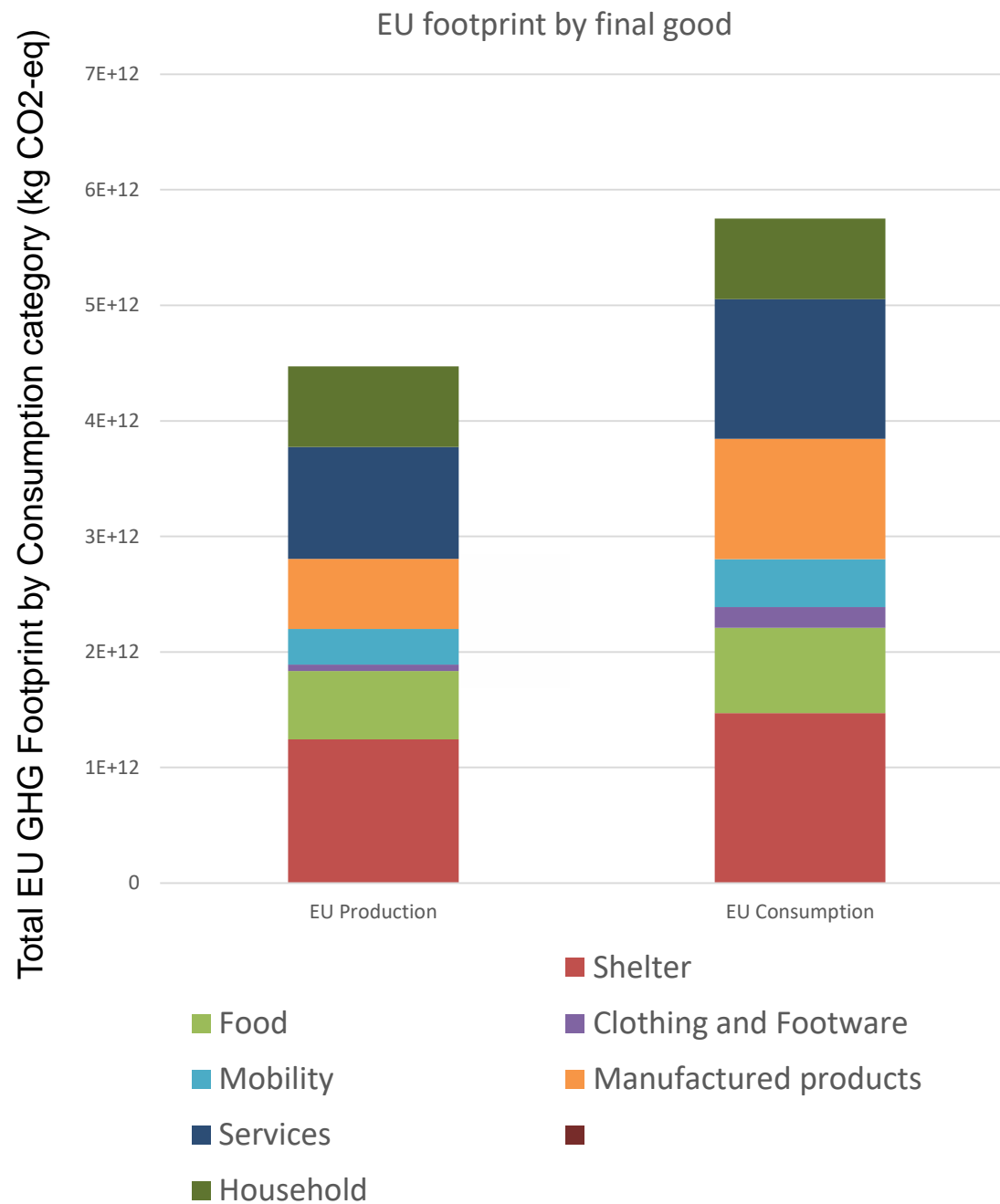




EU footprint by source

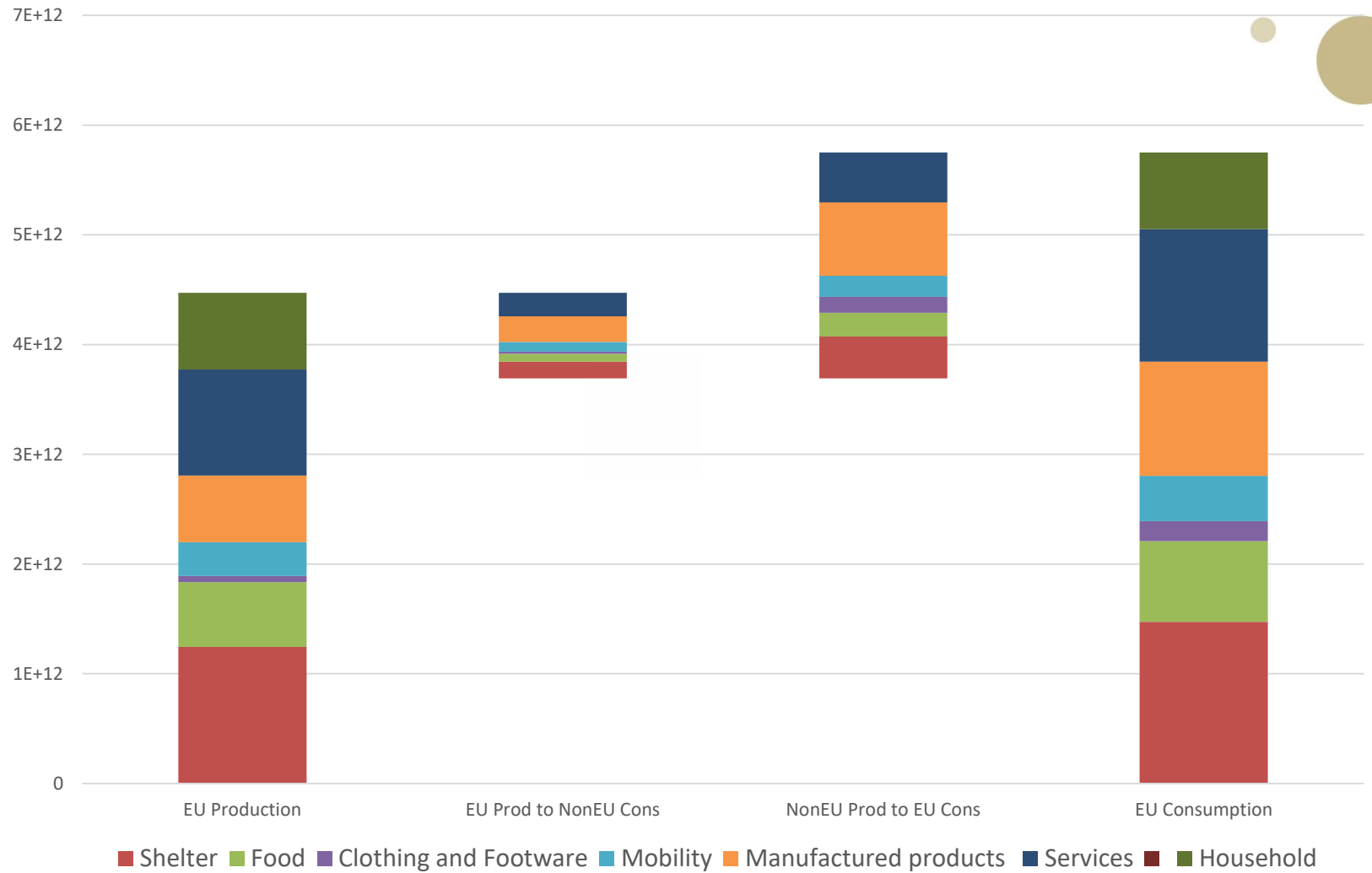
Total EU GHG Footprint by Industry (kg CO<sub>2</sub>-eq)





EU footprint by final good

Total EU GHG Footprint by Consumption category (kg CO<sub>2</sub>-eq)



# Structure EU Carbon footprint + EU production, GHG, kg, 2011



## CONSUMERS

## PRODUCERS

		EU	EU	EU	EU	EU	EU	nonEU	nonEU	nonEU	nonEU	nonEU	nonEU
		Shelter	Food	Clothing and Footware	Mobility	Manufactured products	Services	Shelter	Food	Clothing and Footware	Mobility	Manufactured products	Services
EU	Agric	2E+10	3E+11	2E+09	8E+08	5E+09	3E+10	6E+09	3E+10	1E+09	8E+08	5E+09	9E+09
EU	Mining	8E+10	7E+09	1E+09	2E+10	1E+10	2E+10	4E+09	2E+09	5E+08	4E+09	7E+09	5E+09
EU	Manufacturing	2E+11	7E+10	1E+10	8E+10	2E+11	7E+10	4E+10	2E+10	5E+09	2E+10	9E+10	3E+10
EU	Elec & utilities	6E+11	5E+10	1E+10	2E+10	9E+10	2E+11	2E+10	9E+09	4E+09	4E+09	5E+10	2E+10
EU	Construction	2E+11	1E+09	3E+08	3E+08	2E+09	1E+10	2E+09	4E+08	1E+08	1E+08	1E+09	1E+09
EU	Transport	3E+10	2E+10	3E+09	1E+11	3E+10	7E+10	4E+10	1E+10	4E+09	4E+10	4E+10	5E+10
EU	Services	2E+11	6E+10	6E+09	1E+10	5E+10	3E+11	2E+10	1E+10	3E+09	4E+09	3E+10	4E+10
nonEU	Agric	2E+10	1E+11	5E+10	5E+09	4E+10	3E+10						
nonEU	Mining	1E+11	3E+10	2E+10	1E+11	1E+11	8E+10						
nonEU	Manufacturing	8E+10	4E+10	3E+10	3E+10	2E+11	8E+10						
nonEU	Elec & utilities	5E+10	3E+10	5E+10	2E+10	2E+11	7E+10						
nonEU	Construction	2E+09	4E+08	1E+08	2E+08	6E+08	9E+08						
nonEU	Transport	3E+10	2E+10	6E+09	5E+10	4E+10	5E+10						
nonEU	Services	2E+10	1E+10	4E+09	5E+09	2E+10	3E+10						
EU	Household	3E+11	0E+00	0E+00	7E+11	0E+00	0E+00						

EU Production

EU Consumption

# Structure EU Carbon footprint + EU production, GHG, 2011



## CONSUMERS

## PRODUCERS

	EU	EU	EU	EU	EU	EU	nonEU	nonEU	nonEU	nonEU	nonEU	nonEU	EU	nonEU
	Shelter	Food	Clothing	Mobility	Manufact prod	Services	Shelter	Food	Clothing	Mobility	Manufact prod	Services	Total	Total
Agric	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	1%
Mining	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Manufacturing	4%	1%	0%	1%	3%	1%	1%	0%	0%	0%	1%	1%	11%	3%
Elec & utilities							0%	0%	0%	0%	1%	0%		2%
Construction	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%
Transport	1%	0%	0%		0%	1%	1%	0%	0%	1%	1%	1%	2%	3%
Services	3%	1%	0%	0%	1%	5%	0%	0%	0%	0%	1%	1%	10%	2%
Agric	0%	2%	1%	0%	1%	1%							4%	
Mining	2%	1%	0%	2%	2%	1%							8%	
Manufacturing	1%	1%	0%	0%	4%	1%							8%	
Elec & utilities	1%	1%	1%	0%	3%	1%							7%	
Construction	0%	0%	0%	0%	0%	0%							0%	
Transport	1%	0%	0%		1%	1%							2%	
Services	0%	0%	0%	0%	0%	0%							1%	
HHld													0%	
<b>Total</b>	<b>17%</b>	<b>12%</b>	<b>3%</b>	<b>4%</b>	<b>15%</b>	<b>14%</b>							<b>65%</b>	<b>11%</b>

# Conclusions



- Last 20 years has seen a large growth in emissions embodied in trade
  - EU carbon footprint not at the level of EU production emissions.
- Technology change has been a significant enabler, but by and large off-set by affluence increases, and source of production effects.
  - Consumption mix does not point to any historical benefits.
- Whilst electricity and mobile fuel combustion are the largest point sources of emissions, CBCA points to the importance of Agric/Food (globally); Construction and manufacturing for shelter in the EU; Embodied emissions across mining/manufacturing/electricity from non-EU;

# Capital effects

