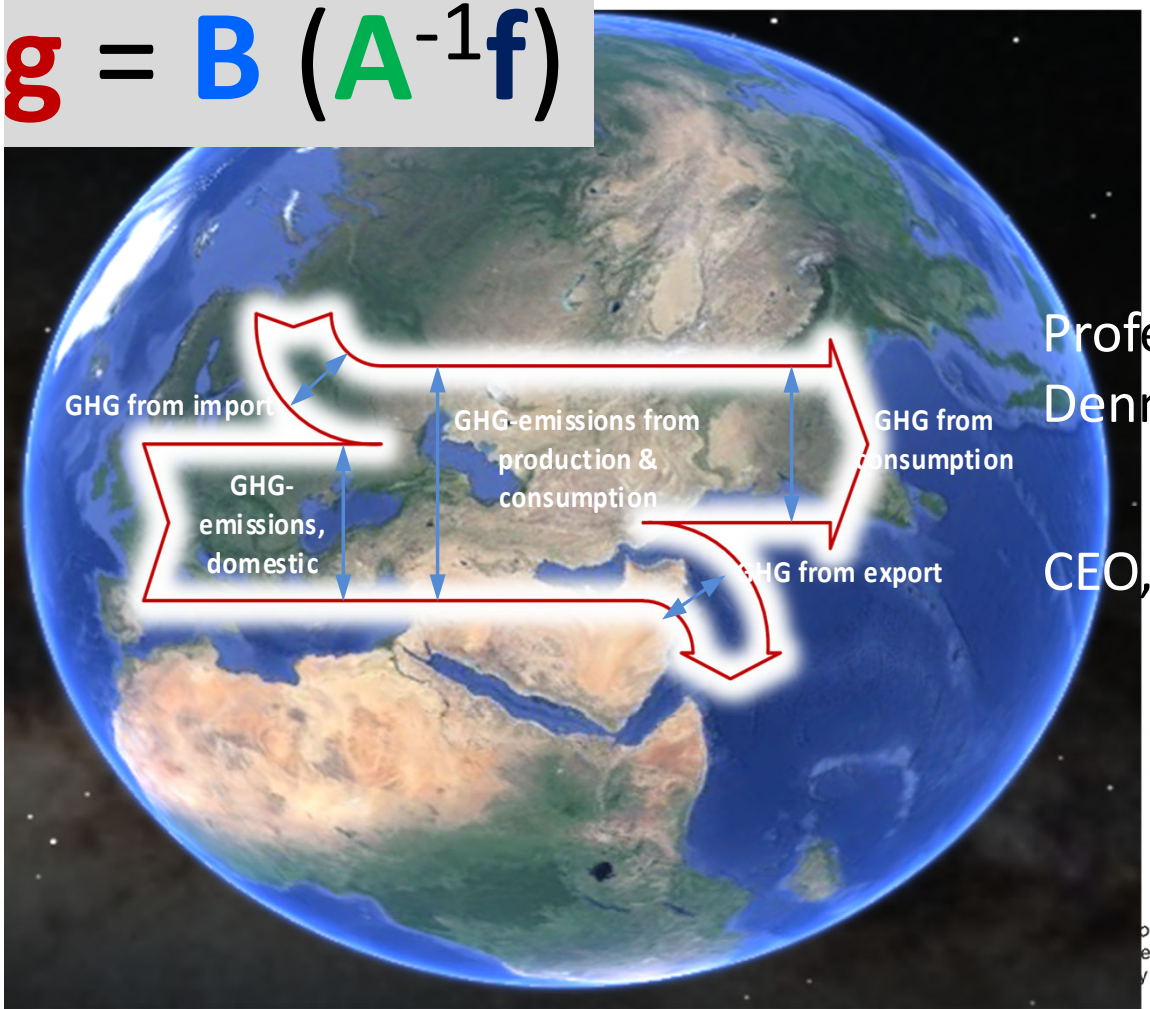
Input-output modelling

Creating a physical mirror of economy: physical supply use tables

$$g = B\,(A^{-1}f)$$



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CEO, 2.-0 LCA consultants

Updated: 22nd April 2022

AALBORG UNIVERSITY DENMARK

Agenda

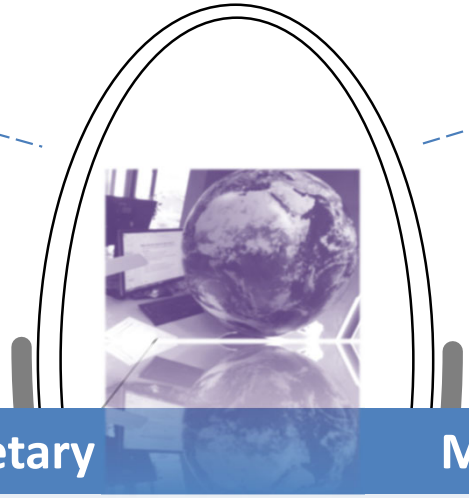
- Creating a physical mirror of economy: physical supply use tables (PSUTs)
- Creation of hybrid IO model

Physical supply-use tables
- Mirror of economy

Monetart SUT (EUR)

Balanced MSUT	Activities (a)	Import	Needs fulfilment	Export	Total
Products (c)	V'	N_c			q
Total	g'				

Products (c)	U	y	E	
Primary inputs	Labour			
	Taxes			
	Profit			
Total	g'			



Physical SUT (tonne)

Balanced PSUT	Activities	Stock formation	Final use	Export	Import	Total
Products	V'				N_c	q
Stock additions (classified as products)	ΔS					
Materials for treatment (classified as products)	W_V				N_w	
Emissions	B					
Total	g'					

Products	U	s^+	Y	N_c	q
Materials for treatment (reclassified homegeous)	W_U			N_w	
Natural resources	R				
Total	g'				

Monetary	Mass
+ Product supply	+ Product supply + Waste supply + Emissions
- Product use - Labour, taxes, profit	- Product use - Waste inputs - Resources
Balance = 0	**Balance = 0**

Examples of physical SUTs

exiobase
hybrid v4 update

https://lca-net.com/clubs/exiobase-update/

DESIRE
Development of a System of Indicators for a Resource Efficient Europe

http://fp7desire.eu/

CREEA

http://creea.eu/

FORWAST

http://forwast.brgm.fr/

EXIOPOL

http://www.feem-project.net/exiopol/

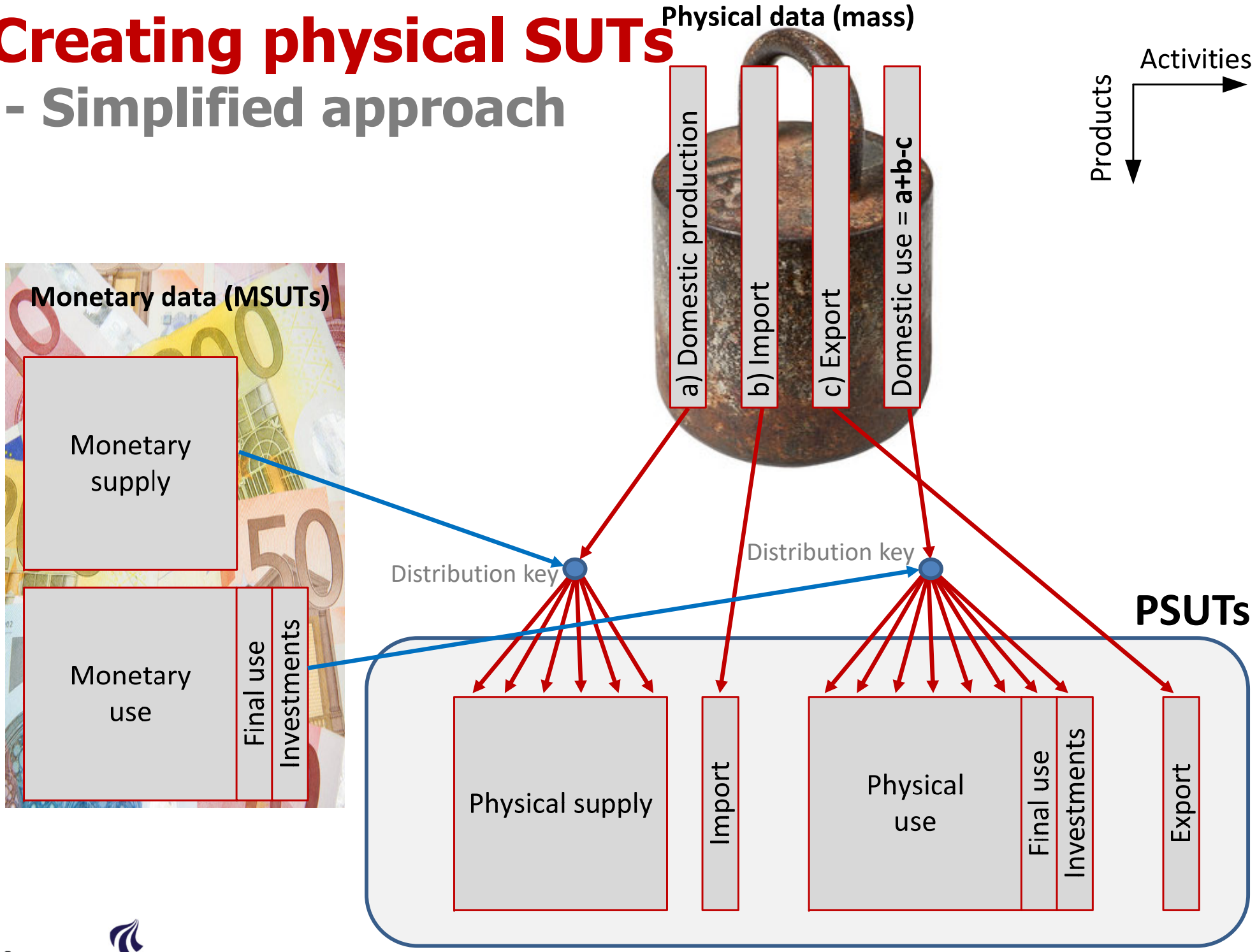
EXIOBASE *v4* 2022

EXIOBASE *v3* 2016

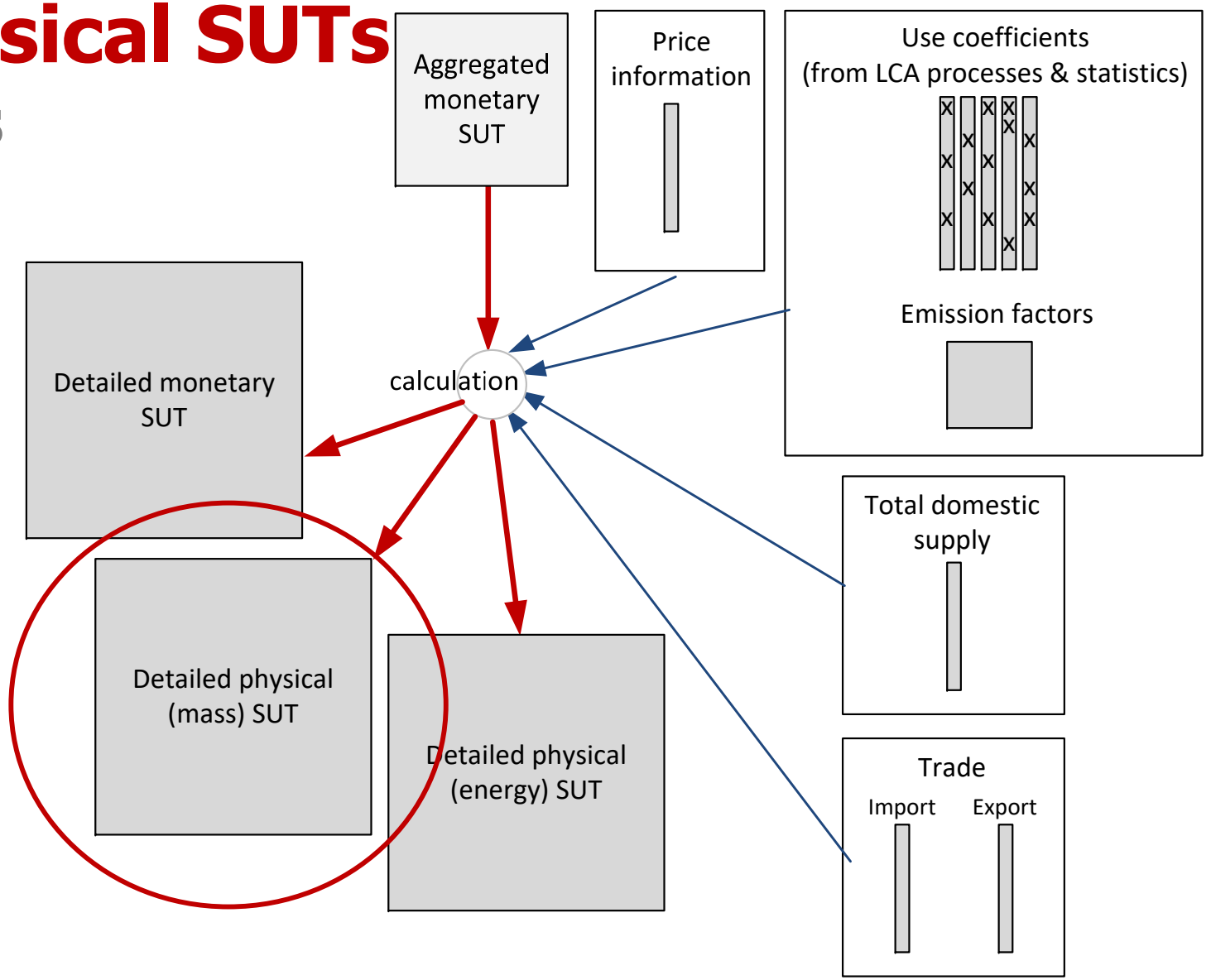
EXIOBASE *v2* 2014

FORWAST DB 2010

Creating physical SUTs
- Simplified approach

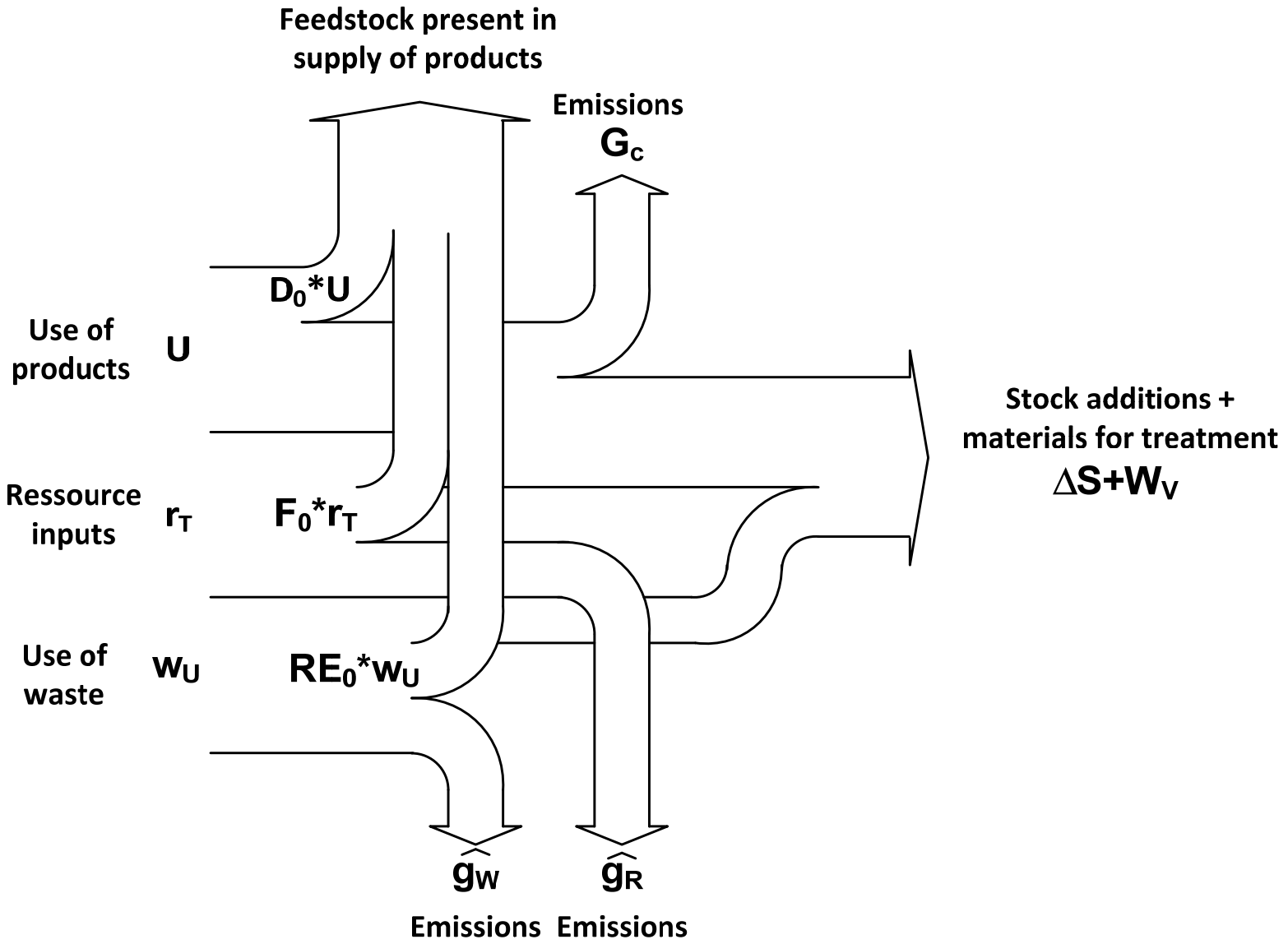


Creating physical SUTs
- data sources

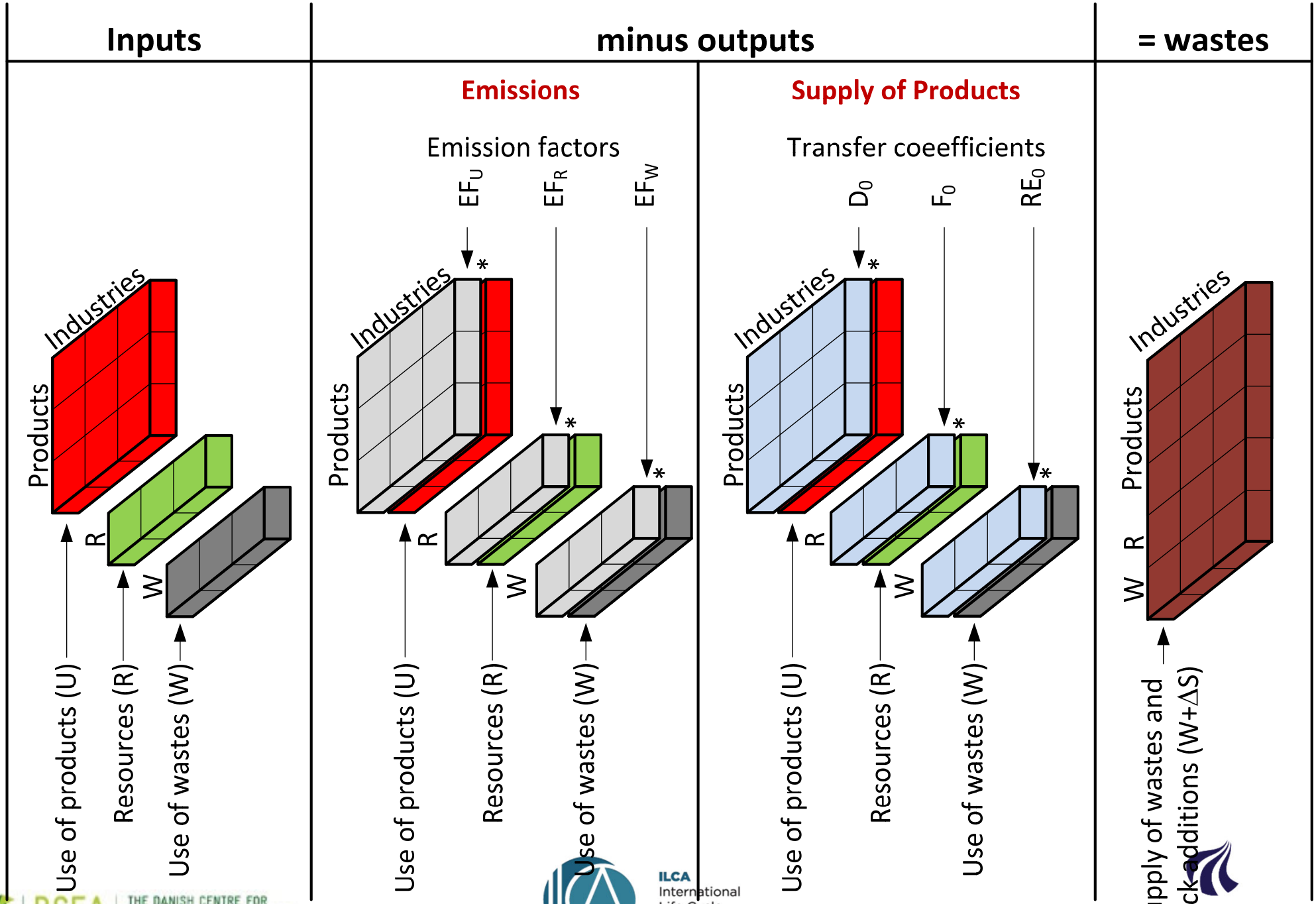


Mass balance and waste calculation

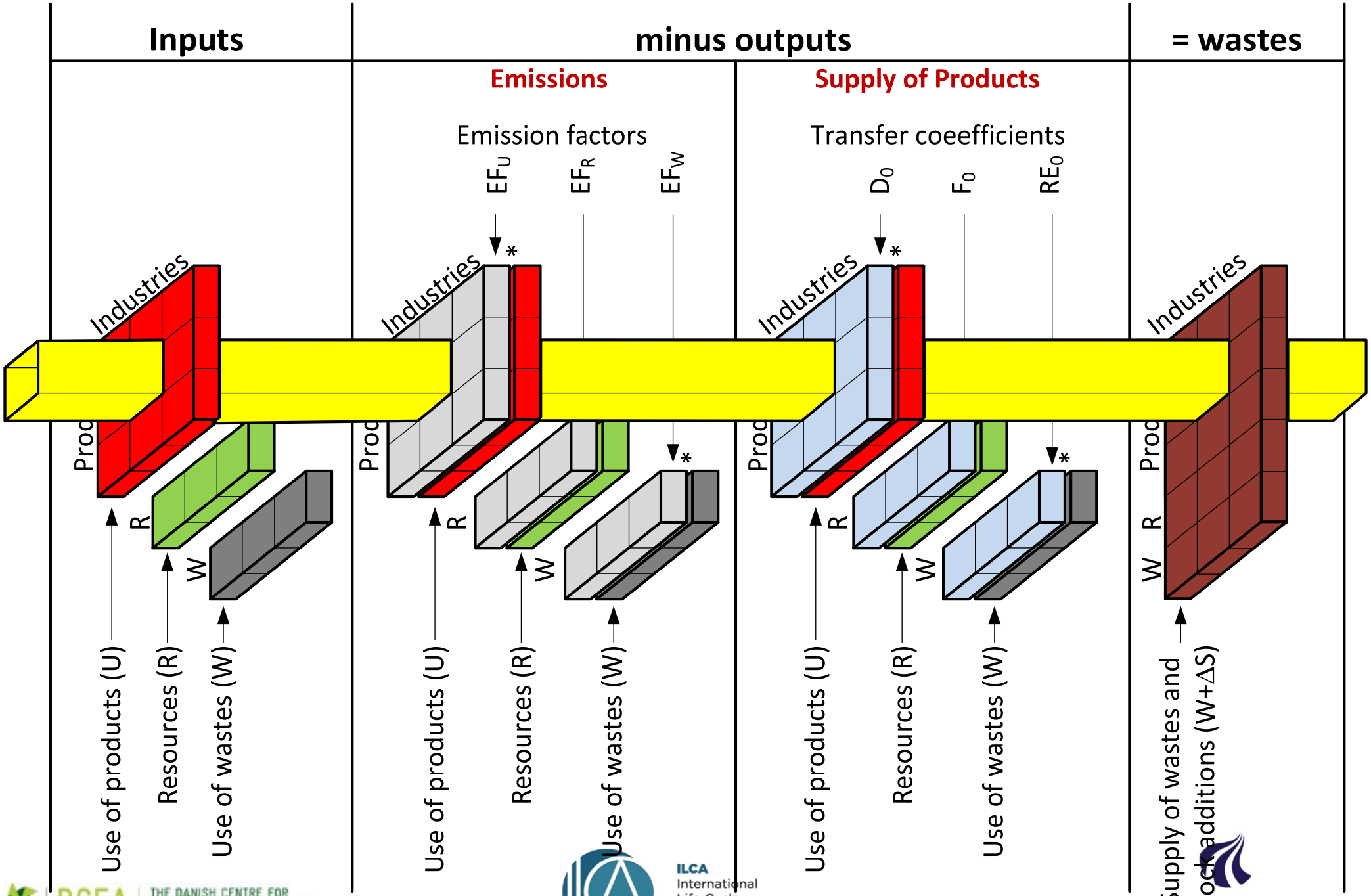
- How to calculate waste generation



Organization of mass balance



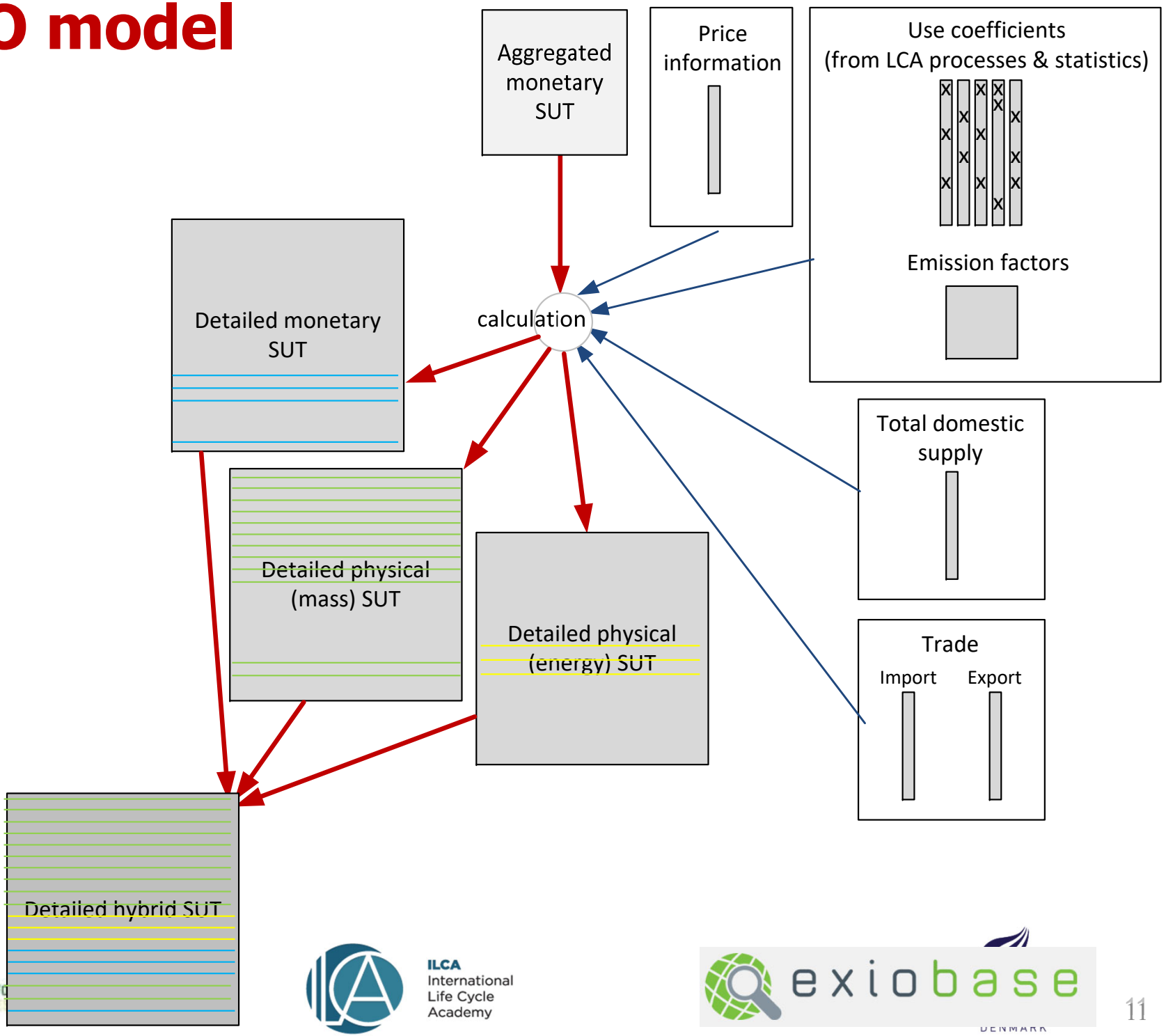
Tracability of each element; origin of waste



Agenda

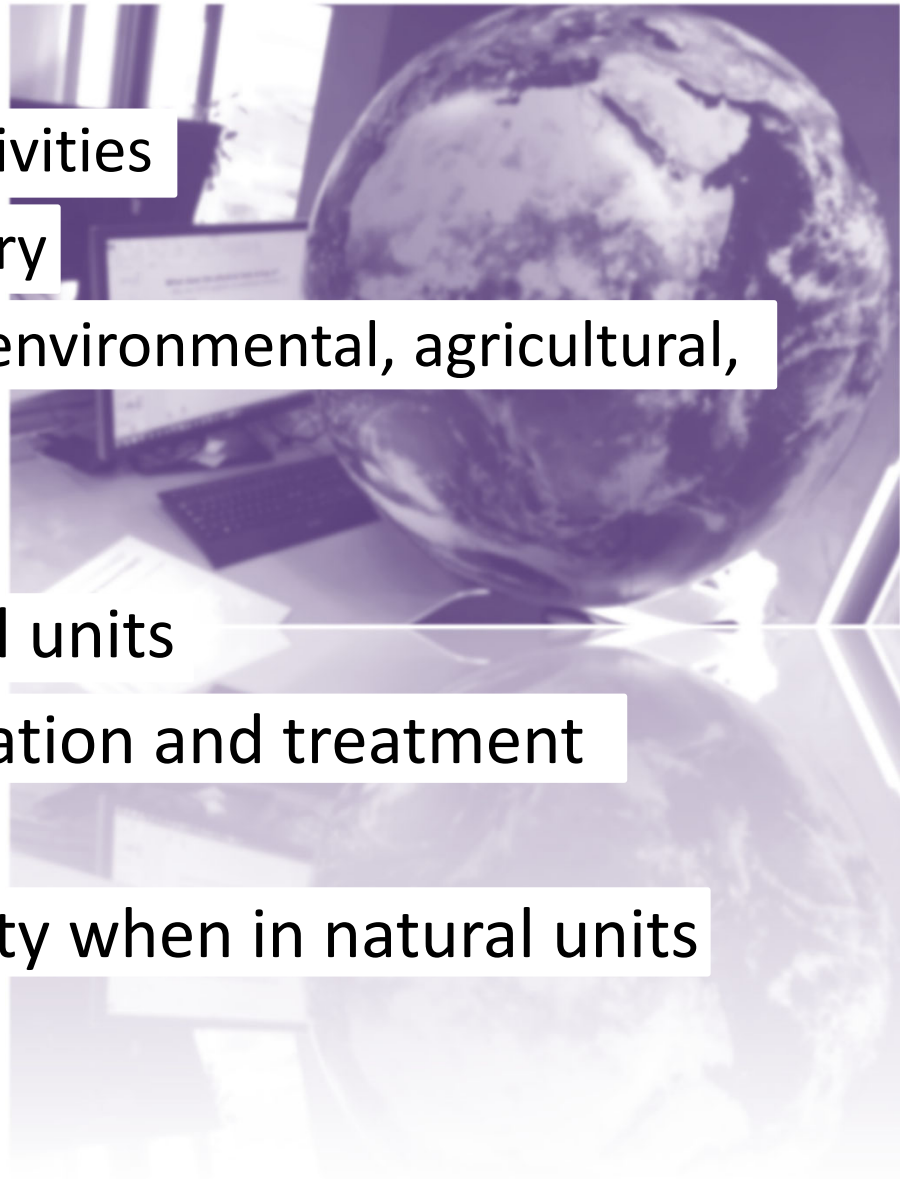
- Creating a physical mirror of economy: physical supply use tables (PSUTs)
- Creation of hybrid IO model

Hybrid IO model



What does physical data bring in?

- Why are HIOTs superior to traditional monetary IO



- **Theoretical**
  - **Prices:** Differences in prices over activities
  - **Balances:** Mass, energy and monetary
  - **Integration of accounts:** Economic, environmental, agricultural, energy, MFA, water, land, forest
- **Application**
  - Policies are formulated in physical units
  - Explicit modelling of waste generation and treatment (virgin/recycled materials)
  - Modelling easier to relate to reality when in natural units

… if you want to know more

- The International Life Cycle Academy (https://ilca.es/)
- Consequential LCA (https://consequential-lca.org/)