



Arla Foods Environmental Profit and Loss Account (E P&L)

– Organisational LCA with Monetatisation

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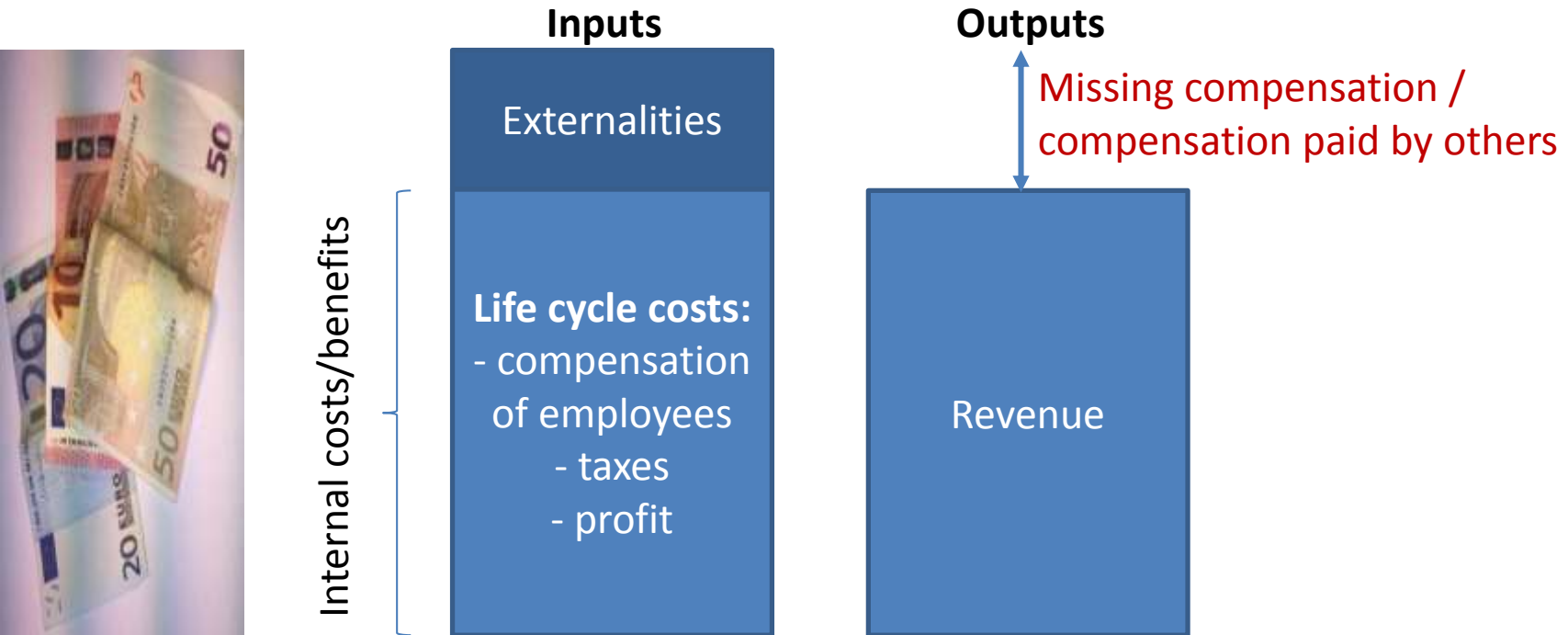
Picture: Arla Foods

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What is an E P&L?

- **Intention:** complement the company's financial Profit & Loss account with monetarised external benefits/costs of the life cycle of the company's product portfolio.

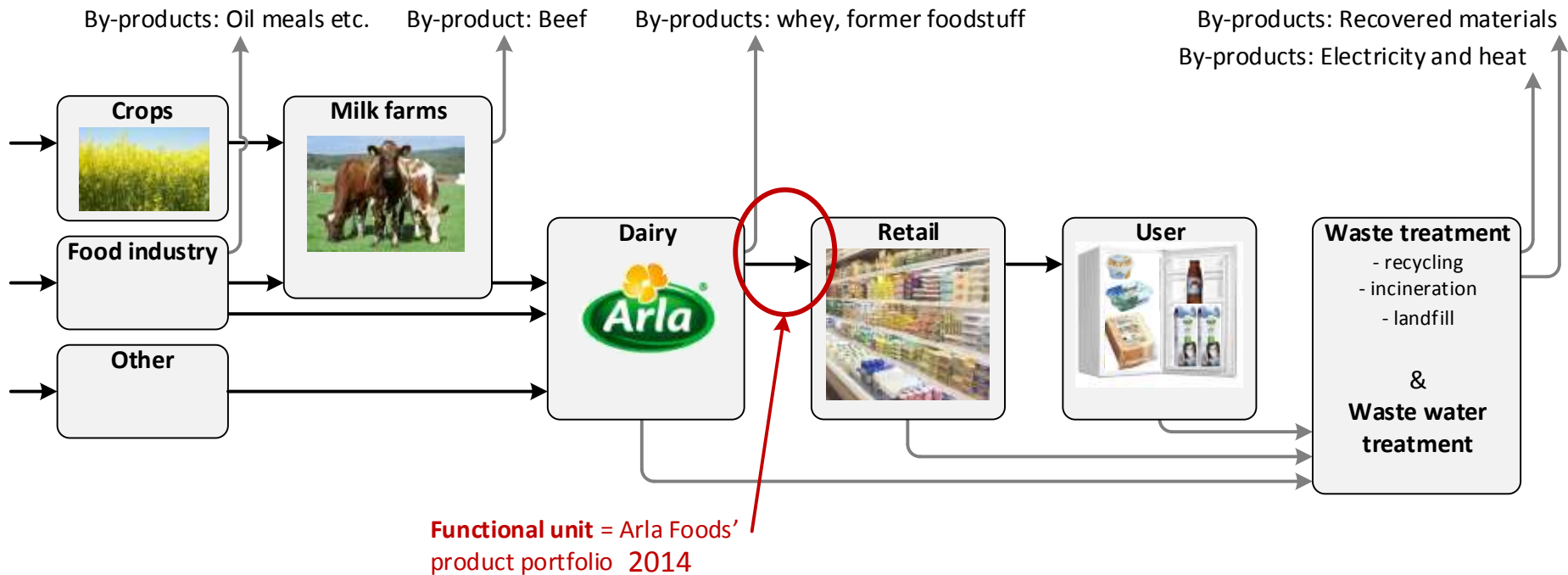


Value of externalities = loss of productivity + loss of welfare

Wellbeing cannot exceed loss of productivity because of budget constraint (on average)

What is an E P&L?

- **Similarity with LCA:** E P&L same as organizational LCA (e.g. GHG protocol, the Commission, UNEP/SETAC) with monetarisation as weighting.
- **Functional unit:** Product portfolio: upstream, direct and downstream.



About Arla



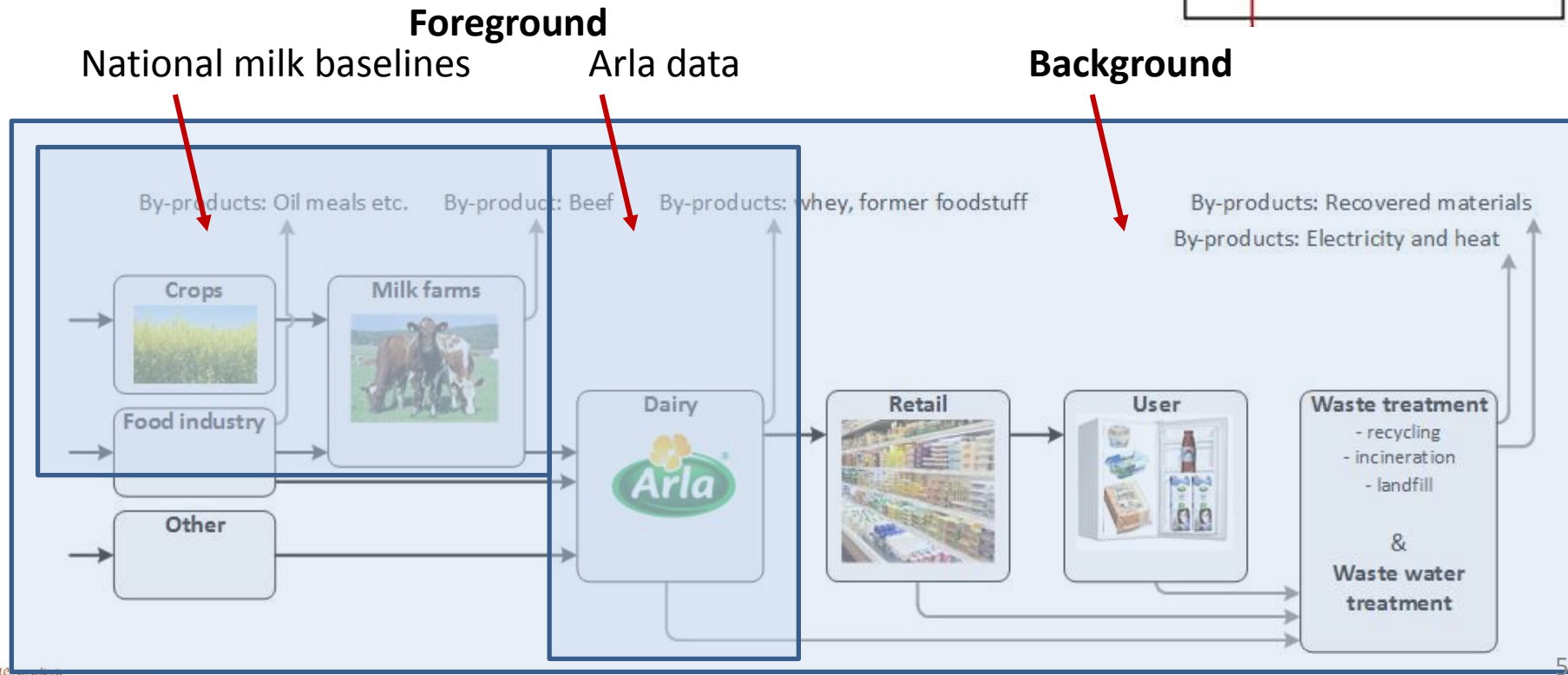
- One of the Worlds largest dairy companies
- Revenue: 10.8 billion € (~4% of Danish GDP)
- Production: 9 million tonne dairy products (62% fresh, 14% whey, 8% cheese, 17% other)



Data overview



- Foreground data:**
 - Arla data: physical + economic data
 - National milk baselines: DE, DK, SE, UK
- Background data:** Process LCA + IO (own studies, ecoinvent, FORWAST)



Metods

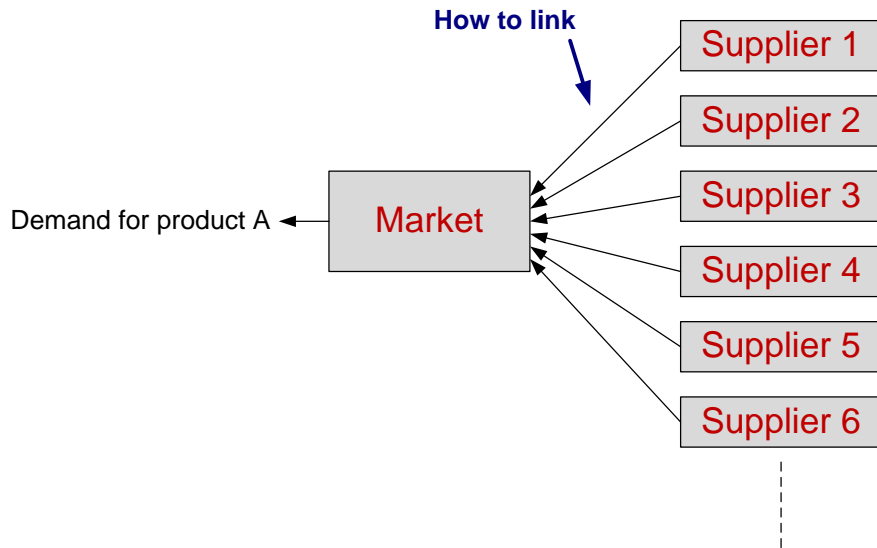
- Overview

- **Life cycle assessment (LCA):** ISO 14040/44
- **Two approaches:** Consequential incl. iLUC + Attributional
- **Results in physical units:**
 - GHG emissions
 - Biodiversity
 - Eutrophication
 - Resources etc.
- **Results in monetarised units:**
 - Stepwise
 - Danish guidelines
 - Trucost

Methods

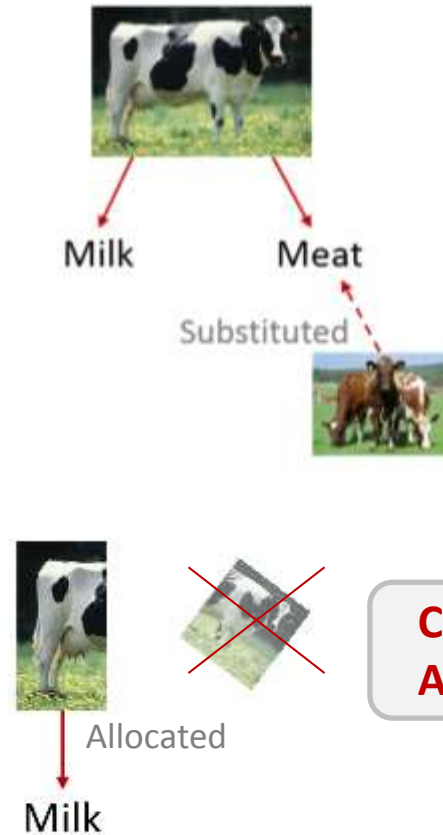
- Consequential incl. iLUC + Attributional

1) Suppliers: unconstrained versus average



CLCA: Only unconstrained
ALCA: Average of all

2) By-products: substitution versus allocation



CLCA: Substitution
ALCA: Allocation

Methods

- Consequential incl. iLUC + Attributional

- Why two methods?
- **Consequential**
 - Follows ISO14044
 - **Scientific approach:** Cause-effect based and preservation of properties
- **Attributional**
 - Follows IDF guideline
 - **Normative approach:** non-real processes, constrained processes are included, and mass balances are not respected

Two LCA methods, two sets of results, answers to two different questions

Consequential LCA gives an answer on the question: “*what is the impact of a choice?*” This choice could be to buy or produce a product, or to implement an improvement option. Consequential LCA is relevant when Arla wants to know the impacts of their actions.

Attributional LCA gives an answer on the question: “*what are the impacts from that part of the life cycle that it has been decided to include based on the normative allocation and cut-off rules?*” Attributional LCA is relevant when Arla wants to report their impacts according to consensus-based guidelines/standards.

Monetarisation

- 3 methods

- Why 3 methods? Large differences and uncertainties
- The used methods

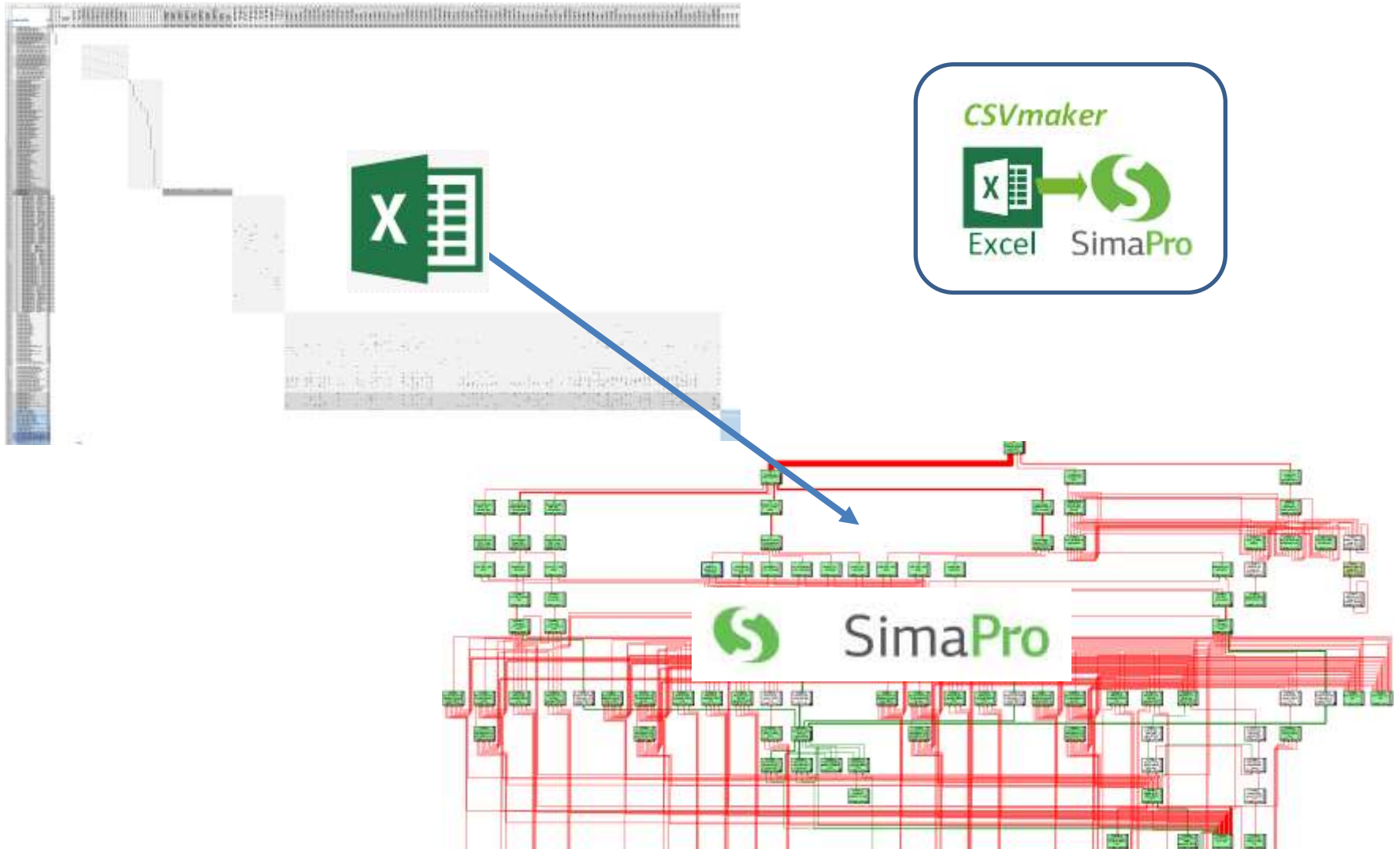
<http://lca-net.com/services-and-solutions/impact-assessment-option-full-monetarisation/>

Emissions	Stepwise (EUR2003/ kg)	Danish Guidelines (EUR2013/kg)			Trucost (EUR2011/kg)	
		Danish EPA: (Andersen and Brandt 2014)			(Høst-Madsen, Damgaard, Szeler, et al. 2014)	
		Low	Average	High	Global	Denmark
Ammonia (NH ₃)	10.2	20.9	20.9	20.9	0.632	0.400
Carbon dioxide (CO ₂ -eq)	0.0830	0.00737	0.00737	0.00737	0.0860	0.0860
Carbon monoxide (CO)	0.317	0	0	0.0013		
Lead	145	14.0 ^a	95 ^a	424 ^a		
Nitrogen oxides (NO _x)	9.69	5.23	15.4	15.4	1.30	0.577
NM VOC	0.246				0.875	0.374
Particulates < 2.5um (PM _{2.5})	67.6	18.9	27.4	44.2		
Particulates < 10um (PM ₁₀)	36.2				12.5	7.75
Sulphur dioxide (SO ₂)	5.42	12.3	35.4	55.6	0.972	1.53

Stepwise: ~1000 more

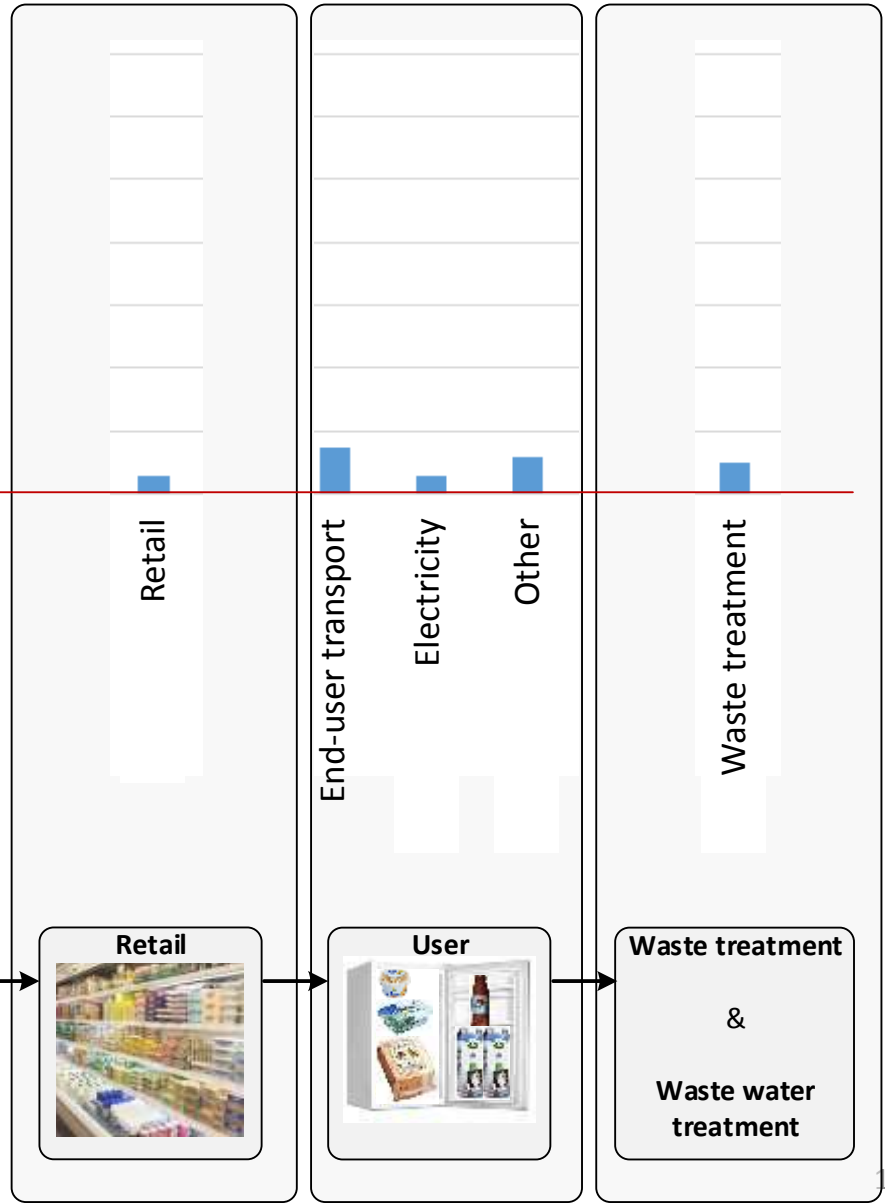
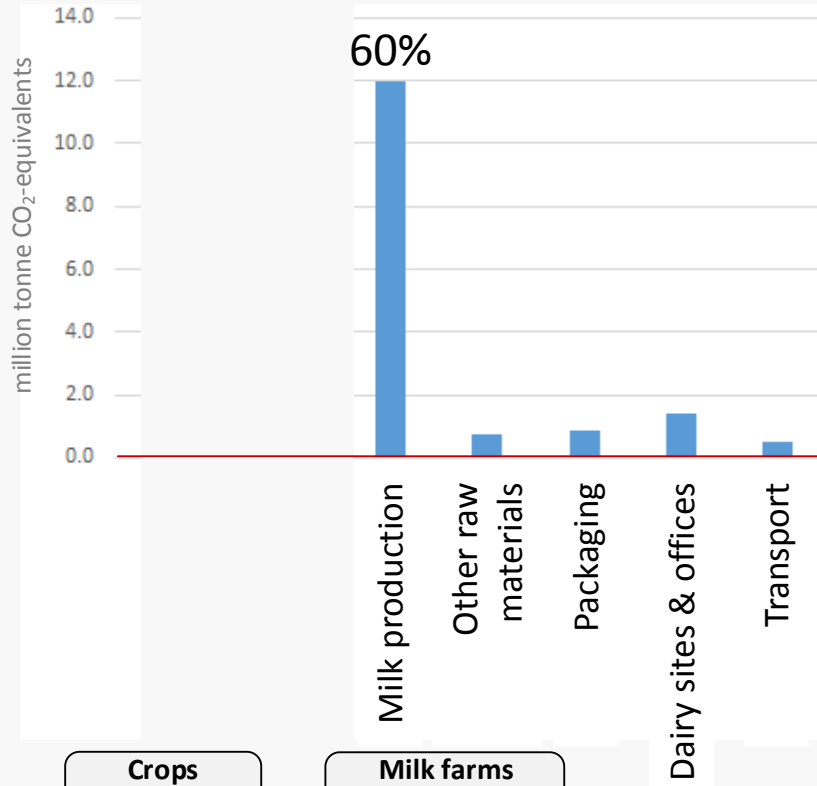
Results

- From data and model in **Excel** to **SimaPro**



Results: GHG emissions

Consequential
 GHG emissions 20.2 million tonne CO₂-equivalents



Results

- Monetarised

Arla Foods revenue
10,600 million € 2014

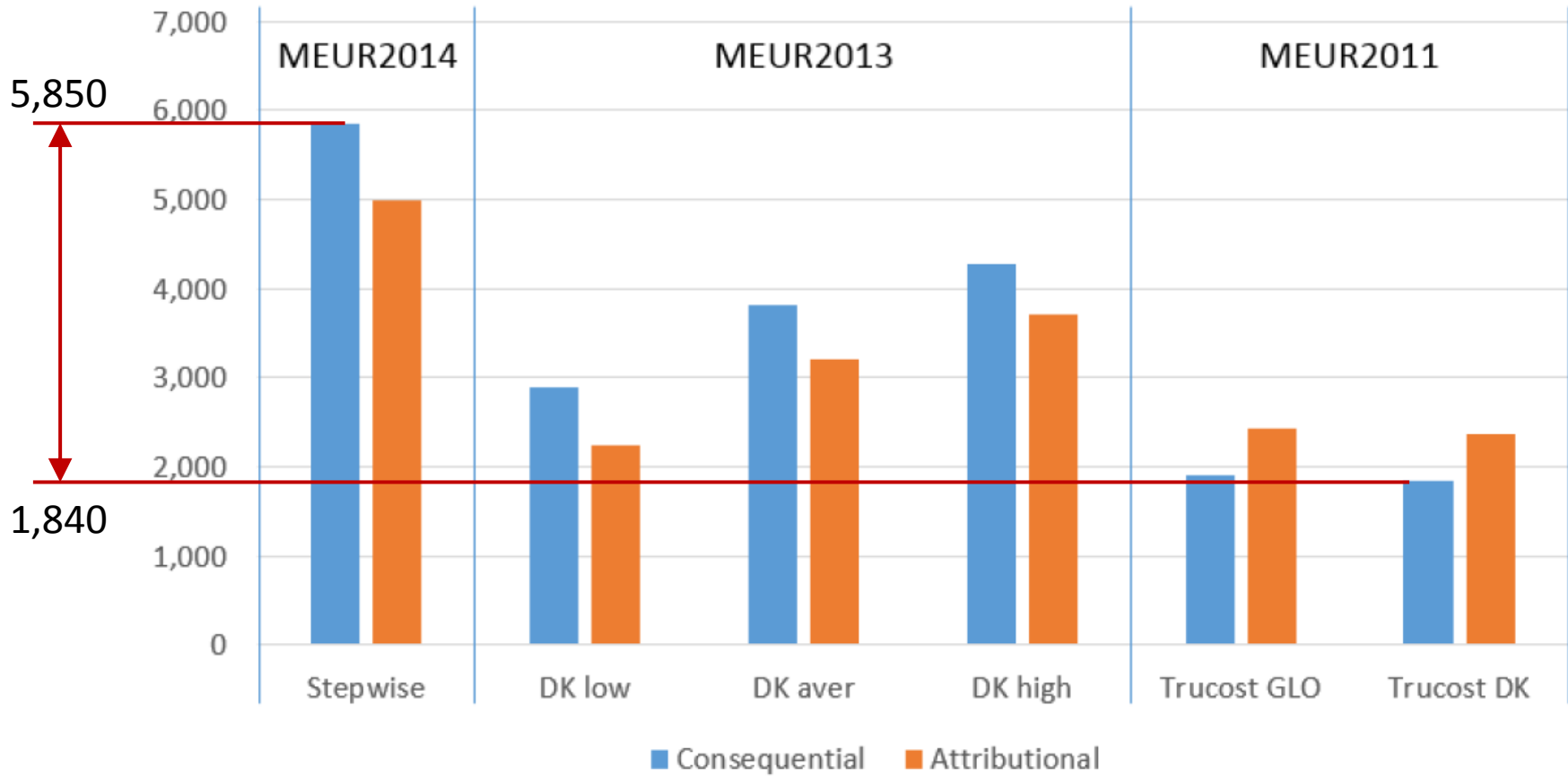
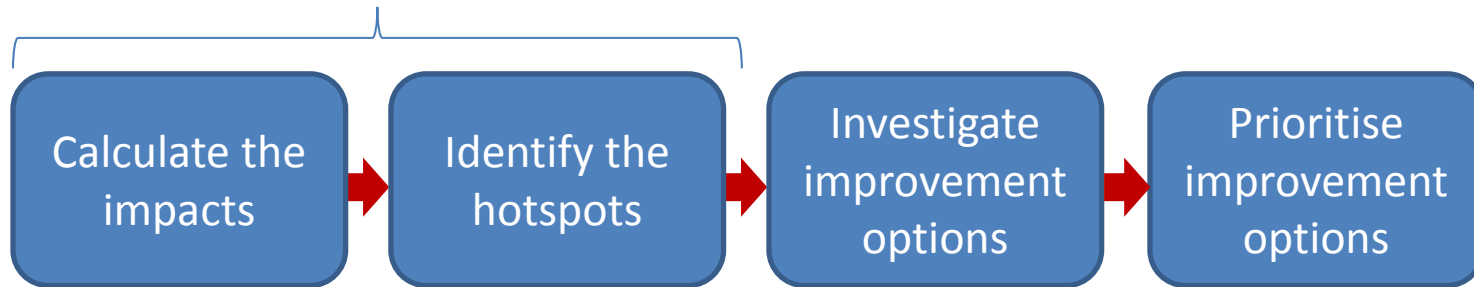


FIGURE 8.1: COMPARISON OF MONETARISED RESULTS USING ALTERNATIVE VALUATION METHODS.

Unit: million € 2014

Conclusions and next steps

- Complete study: **Everything** about Arla is in the model...
- E P&L = Full impact \Rightarrow good tool for prioritising
 - All footprints gathered in one!
 - Indicator (externalities/revenue) good for benchmarking
 - So far so good:



- Outlook
 - New standards for Sustainability reporting
 - Benchmarking companies, sectors, countries...
 - Update of Stepwise: <http://lca-net.com/clubs/monetarisation/>
 - Include social impacts: <http://lca-net.com/clubs/social-lca/>