Business Model LCA: Comparing the impact per revenue to help decision making within companies

A suitable approach for service companies?

Henrikke Baumann
Environmental Systems Analysis
Chalmers University of Technology

81st Swiss LCA discussion forum

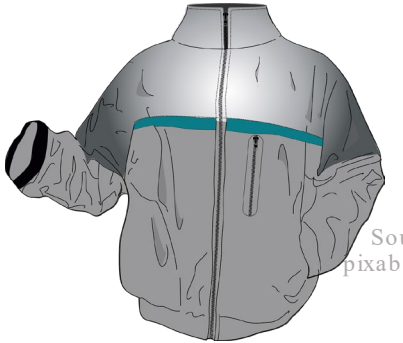
A business model ≠ service…

Also, business model ≠ product

Business model

≈ architecture of revenue and cost streams for generating a viable profit for a company

~ business is designed around an offer (product or service) to a customer



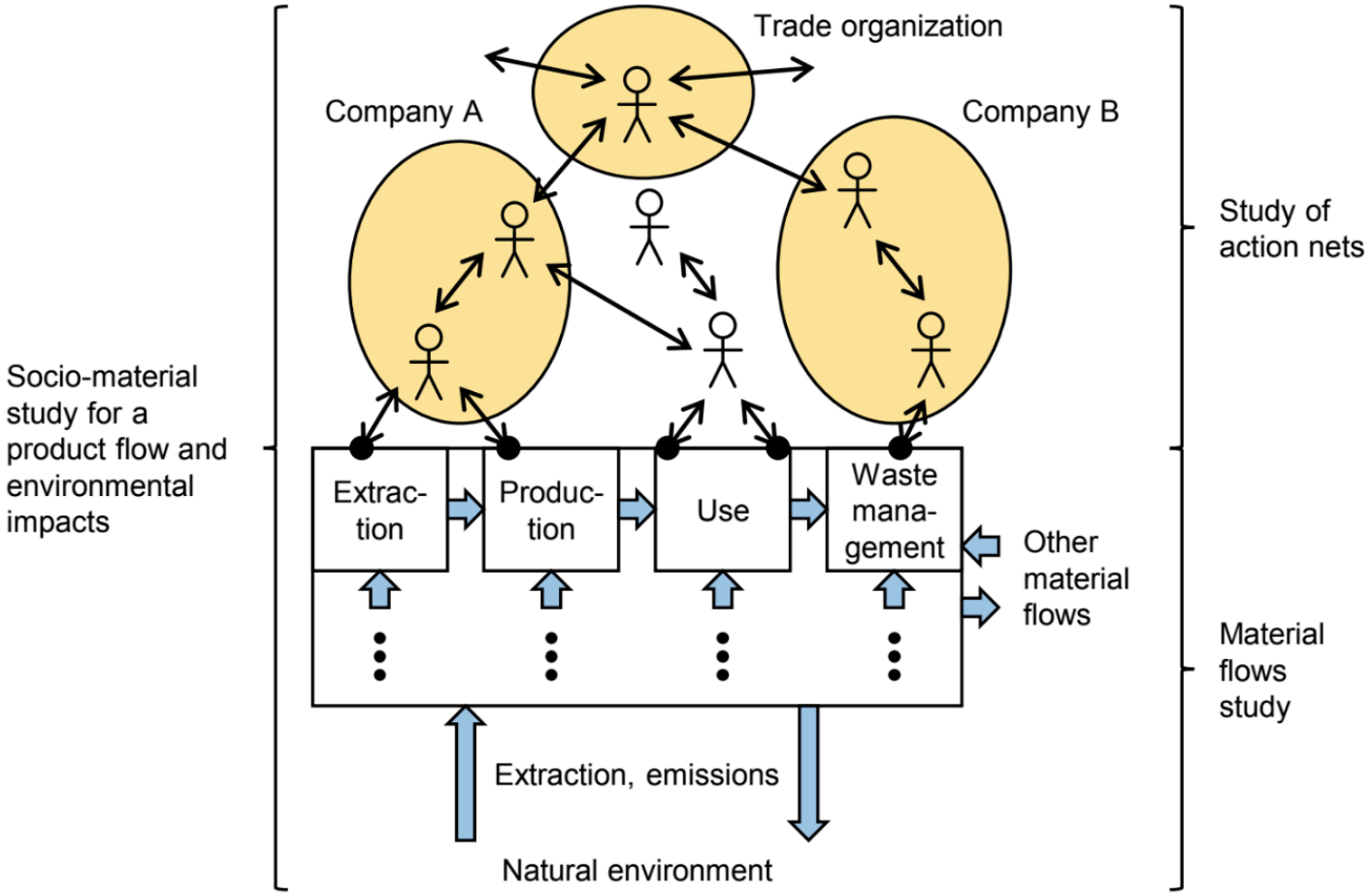
Sales model vs. rental model

Two foundational aspects for BMLCA

Modelling:
Purposive **representation** of the ***real world*** for the **user's need to act**

1. An LCA that is meaningful for business-related decisions

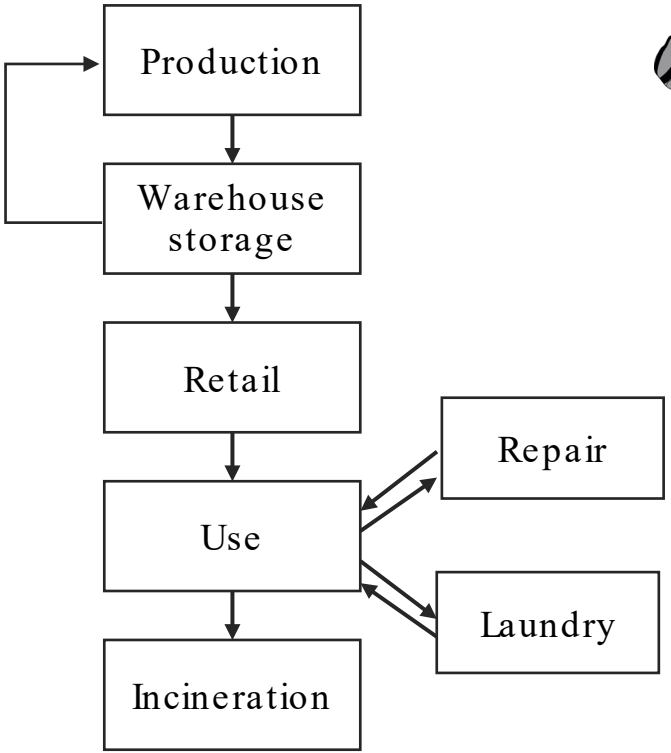
2. Reality as a complex socio-material network & what of it do we represent in the model


Trade organization
Company A
Company B
Study of action nets
Socio-material study for a product flow and environmental impacts
Extrac-tion
Produc-tion
Use
Waste mana-gement
Other material flows
Material flows study
Extraction, emissions
Natural environment

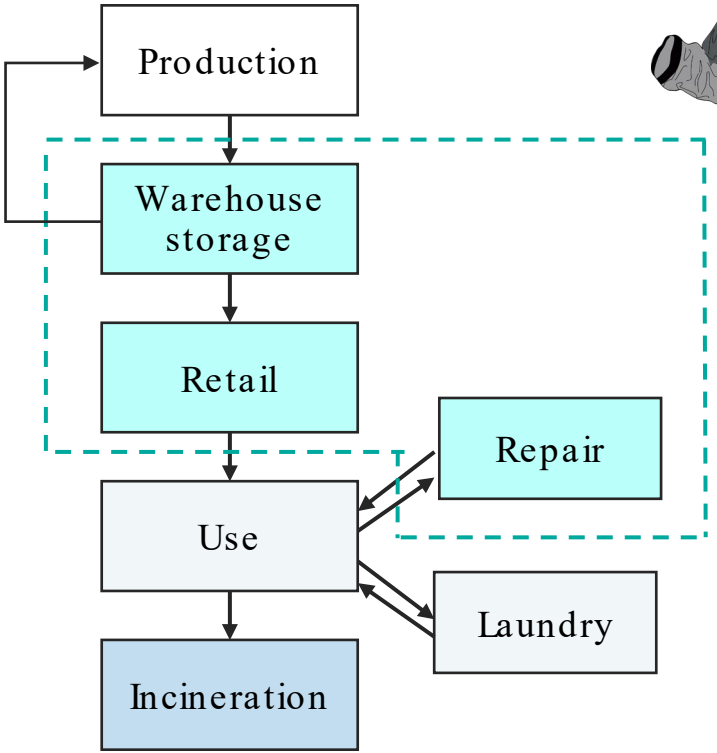
Product system ? Business model

Small footprint

Mass sales & mass production ?
Environmental impact ??



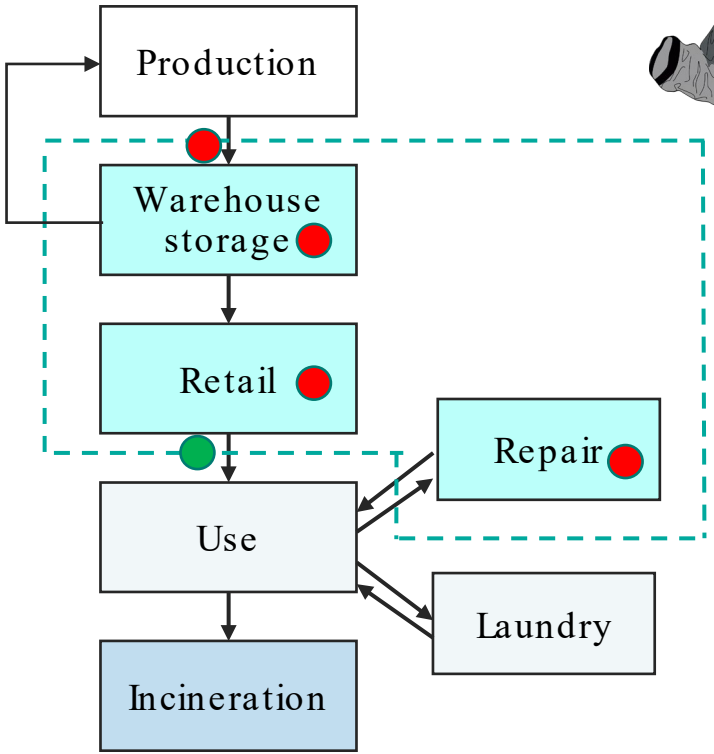
A sales model, with a repair service



A sales model, with a repair service

Conduct actor analysis

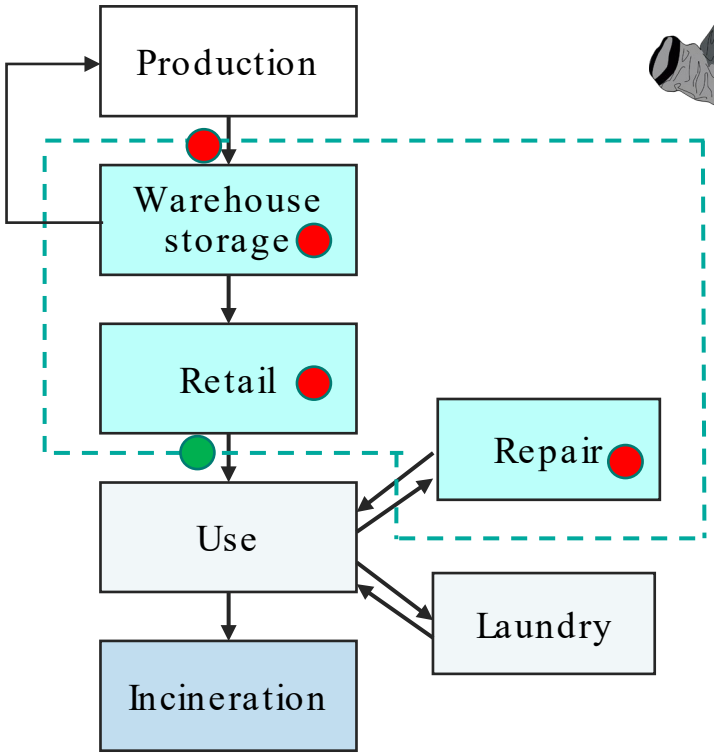
- Company
- Producers
- User
- Other actors



A sales model, with
a repair service

Identify all related costs and revenues

- Revenues
- Costs



A sales model, with a repair service

Express coupling equations, e.g.:

Revenues
= number of jacket sales x price of jacket

Costs
= number of procured jackets x procurement cost of jacket

= number of employees x salary / store

BM-LCA study of shell jackets

…put on the market by a Swedish company via 2 business models.

Sales model

- Jacket price is 5000 SEK

Rental model

- Rental price is 600 SEK for 5 days
- Jackets are washed after every rent
- Jackets not looking new or fresh are removed from the rental stock and sold 2nd hand

	Sales	Rental
Profit/month	320 000 SEK	320 000 SEK
Transactions	A	B
Jackets produced	A	C

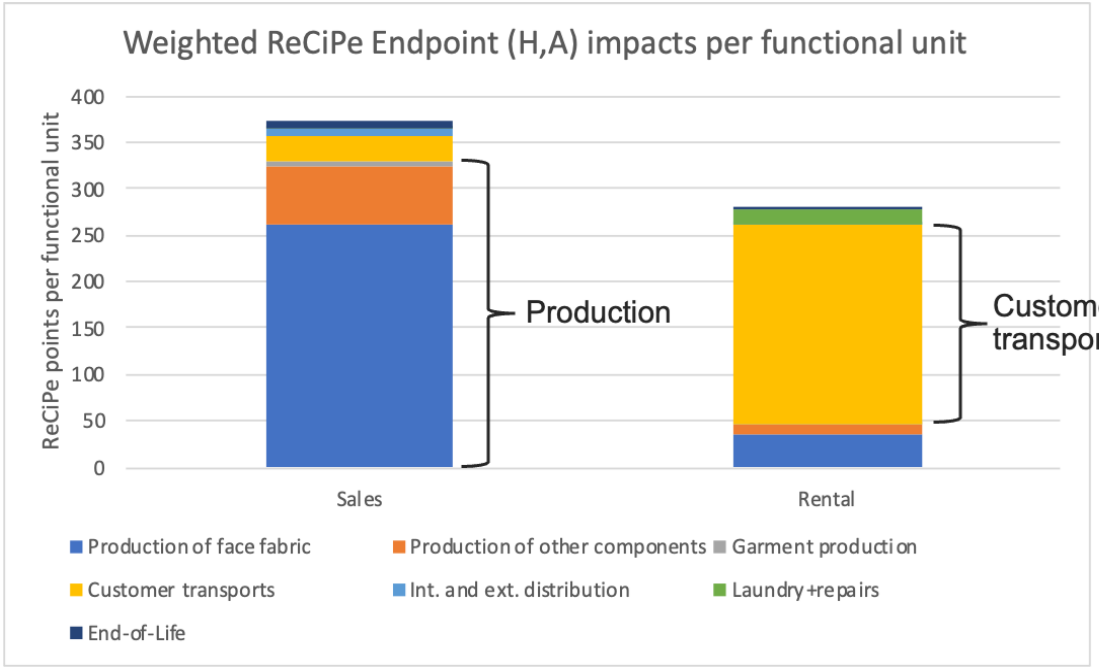
A sales model, with a repair service

A rental model, with 2nd hand sales

$$t_r = \frac{\pi_r}{\left(P_r - k_{maint} + \left(P_{2nd} - k_{prod} - k_{distr} - k_{EoL} * CR \right) * \frac{R_r * U_r}{E_r * T} - \left(k_{OH} + k_{emp} * EPS \right) * \frac{U_r}{30 * E_r * SS} \right)}$$

Results of jacket study

	Sales	Rental
Profit/month	320 000 SEK	320 000 SEK
Transactions	200	1108
Jackets produced	200	28



Lessons for LCA studies of services?

The service sector

The bigger part of the economy

2/3 of GDP
4/5 of work force
(for OECD countries)

Servitization

PSS, product-service systems

as a strategy towards sustainability

LCA of a building

LCA of property management

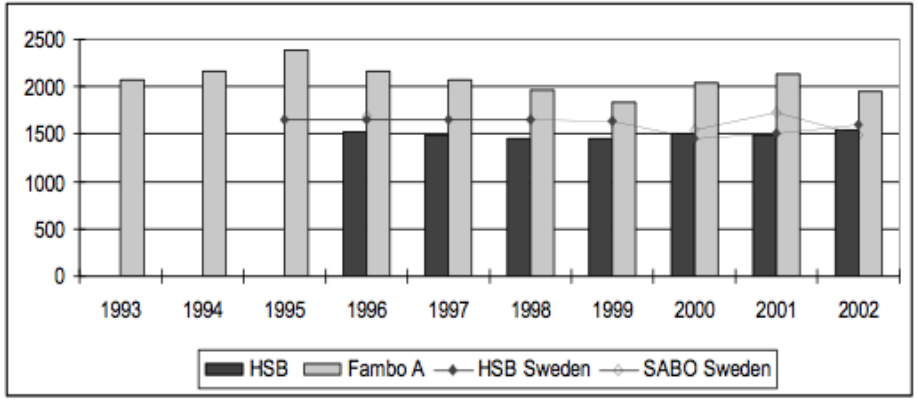
4 properties:

different ownership and management

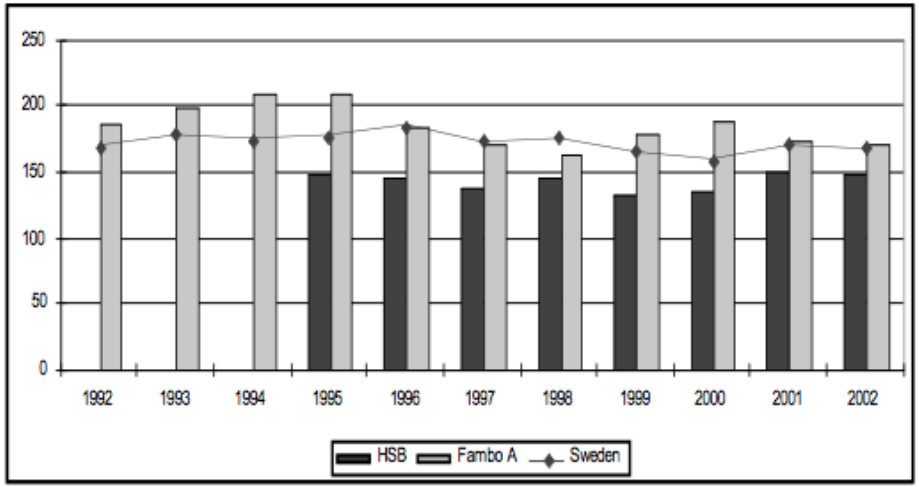
municipally owned, private company, housing association, investment company

teams of specialists covering a greater neighbourhood

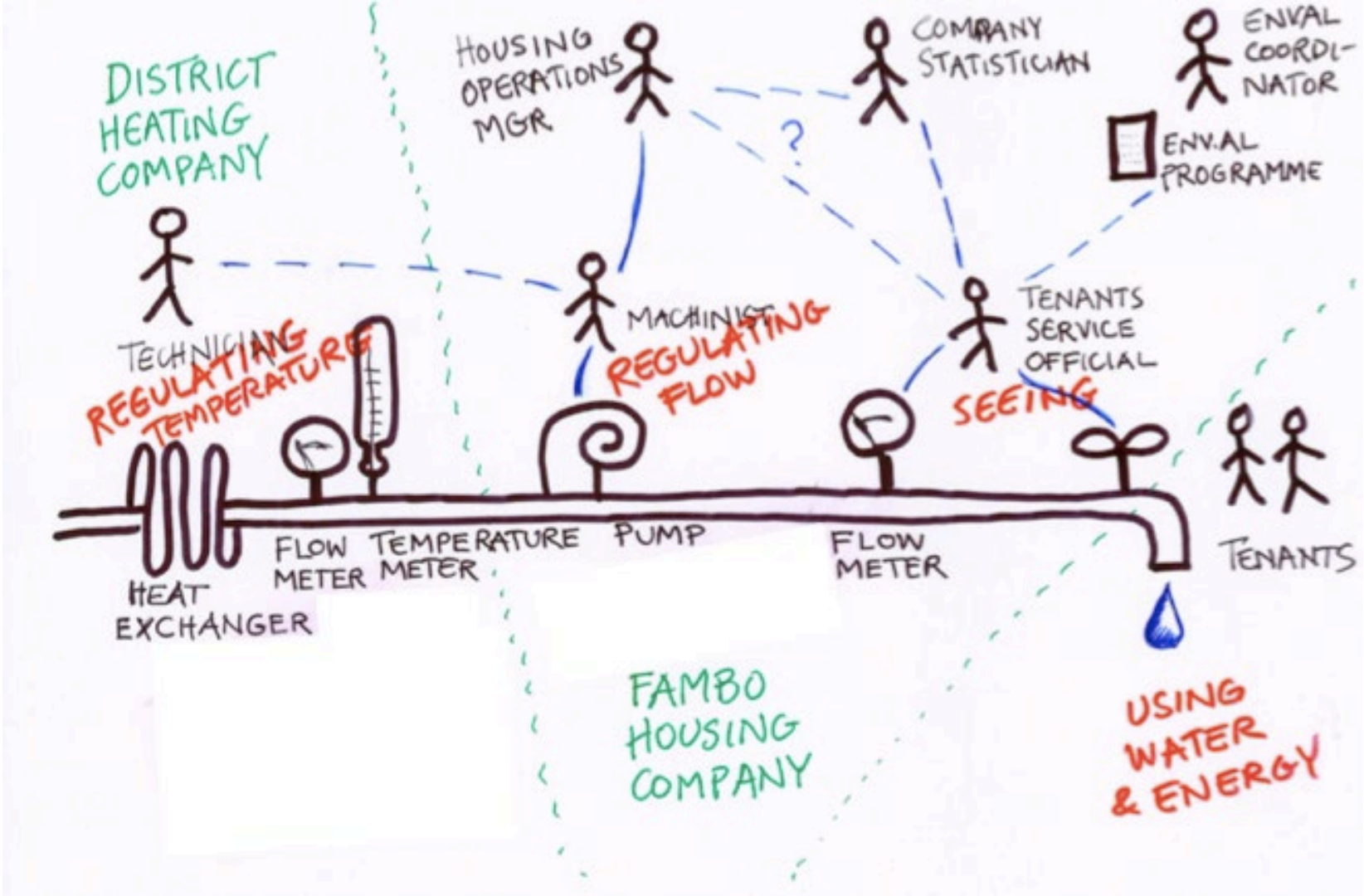
1 person doing all tasks



Water use
(litres / m² yr)



Energy use
(kWh / m² yr)


DISTRICT HEATING COMPANY
HOUSING OPERATIONS MGR
COMPANY STATISTICIAN
ENVAL COORDI-NATOR
ENV.AL PROGRAMME
?
TECHNICIAN
REGULATING TEMPERATURE
MACHINIST
REGULATING FLOW
TENANTS SERVICE OFFICIAL
SEEING
FLOW METER
TEMPERATURE METER
PUMP
FLOW METER
HEAT EXCHANGER
TENANTS
FAMBO HOUSING COMPANY
USING WATER & ENERGY

Lessons for LCA studies of services?

1. Challenge of analysing service:

Really understand the object of analysis, i.e., service encounter, service company, business models of service…
>> The service triad, the five I:s of service

2. Recommendations on functional unit & system boundaries

What function for what actor and what purpose?
'Two sets' of system boundaries: the social + the material and the sociomaterial *coupling* between these two dimensions

>> Harmonisation – per type of purpose, so to say

3. Differences of products and services

More attention to actors and activities, and express socio-material coupling
Understanding of the function of object of the study
Users (audience) of analysis changes

Some references

- Baumann, H., & Lindkvist, M. (2022). A sociomaterial conceptualization of flows in industrial ecology. Journal of Industrial Ecology, 26(2), 655-666.
- Brunklaus, B. (2009). Does organising matter? Tracing connections to environmental impacts in different housing estates. Progress in Industrial Ecology, 6(2), 120.
- Böckin, D., Goffetti, G., Baumann, H., Tillman, A. M., & Zobel, T. (2022). Business model life cycle assessment: A method for analysing the environmental performance of business. Sustainable Production and Consumption, 32, 112-124.
- Goffetti, G., Böckin, D., Baumann, H., Tillman, A. M., & Zobel, T. (2022). Towards sustainable business models with a novel life cycle assessment method. Business Strategy and the Environment.

CHALMERS