

# Greening the food industry

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*Ulf Sonesson, Greening the food industry,  
Food and Nutrition in the 21<sup>st</sup> Century, Warsaw, 9 September 2011*

# The Food Chain

Solar energy

Land/marine areas

Core system

Agriculture/  
fishery

Industry

Retail

Consumer

Sewage/  
Waste  
treatment

Farm technical  
inputs  
(pesticides, fertilisers)

Energy

Packaging

Water

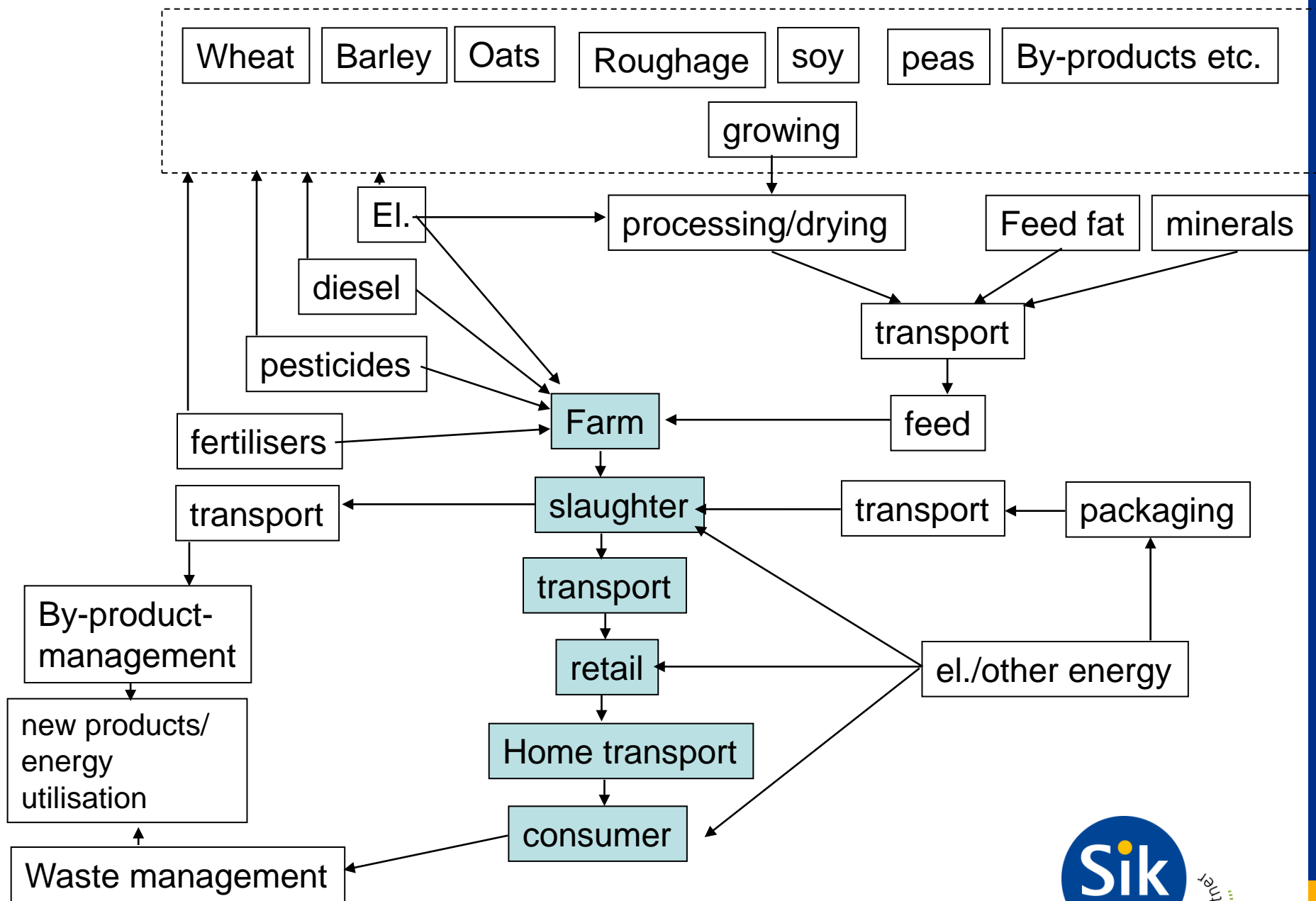


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# Food systems are messy.....

- **Complex production systems**
  - Distributed production, small scale
  - Biological systems, much more than energy is important!
  - Biological raw materials
  - Diffuse emissions (agriculture)
  - Global food chains
  
- **Complex consumption systems**
  - Distributed consumption
  - Varying patterns of consumption
  - Consumption choices very important





**Product under study: 100 gram beef**



“Greening the Food Industry” is not a goal in itself, but an important part of providing “Sustainable Nutrition” and includes:

- Products demanded by consumers
- Healthy diets
- Safe products
- Food security
- Viable businesses throughout the chain
- And all the above provided by environmentally efficient production/distribution systems!



# Products of vegetable origin - important aspects

- Nitrous oxides ( $N_2O$ )
  - Manufacturing of mineral nitrogen fertilisers (also fossil  $CO_2$ )
  - Nitrogen turnover in soils
- Use of fossil fuels on farm and in farm inputs
  - Production of mineral fertilisers
  - Diesel for field work and transports
  - Drying of grain
  - Heating of greenhouses
- Post-farm (can be very important for some products)
  - Transport
  - Refrigeration
  - Processing - wastage
  - Packaging

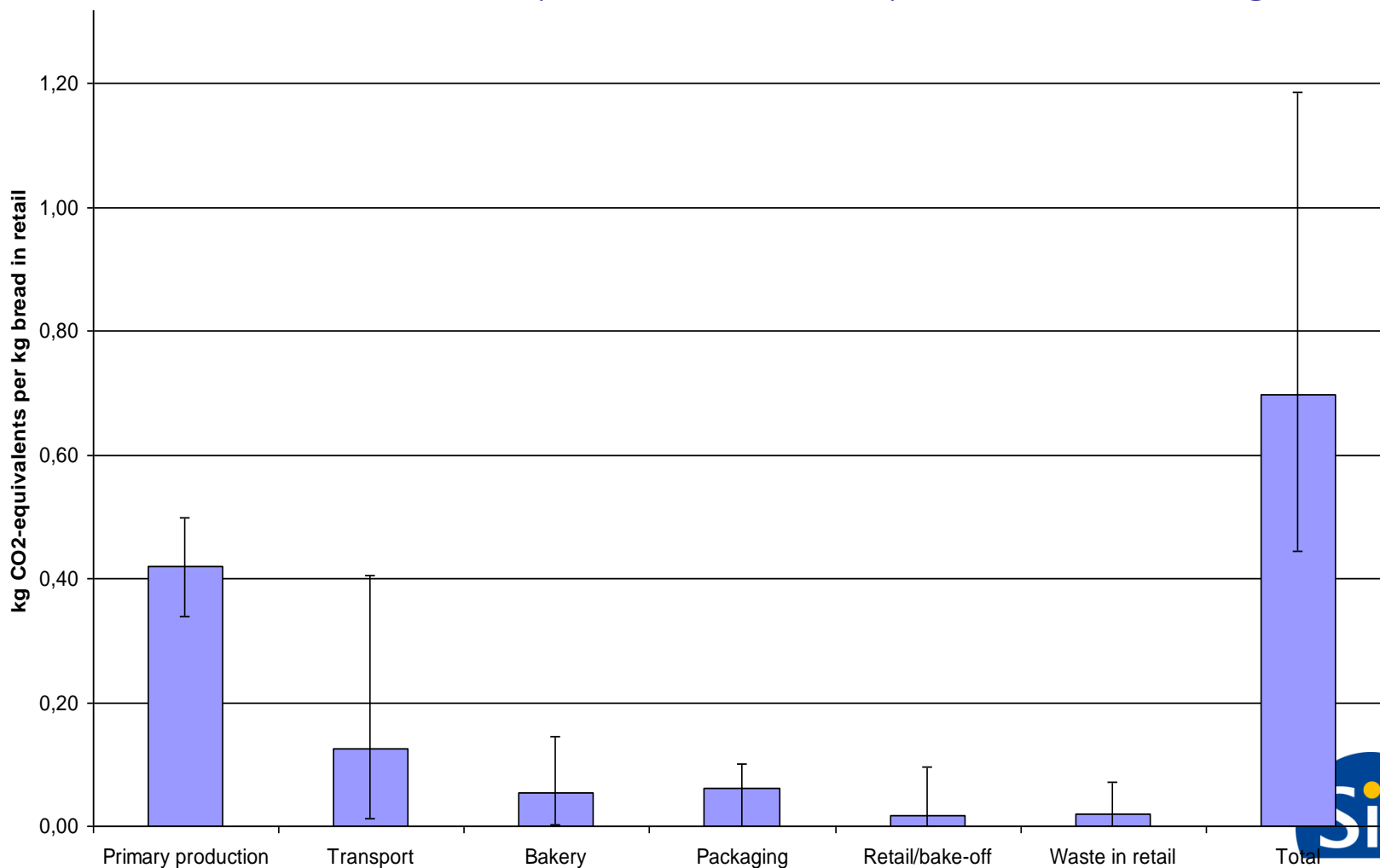


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# Global warming potential from 1 kg bread at retail, produced and consumed in Sweden.

Different breads, scales of production and transport distances (average, max and min)



Source: SIK Food database, Brödinstitutet

# Products of animal origin

## Ruminants (Cattle, sheep)

- Methane from enteric fermentation important (GHG)
- Also methane from manure, but to a lesser extent (GHG)
- Feed provision is also of importance, differences depending on feed

## Monogastric animals (Pigs, poultry)

- Feed provision most important (hence same aspects as veg. products)
- Manure management
- Energy use for housing (heating, cooling, ventilation etc.)

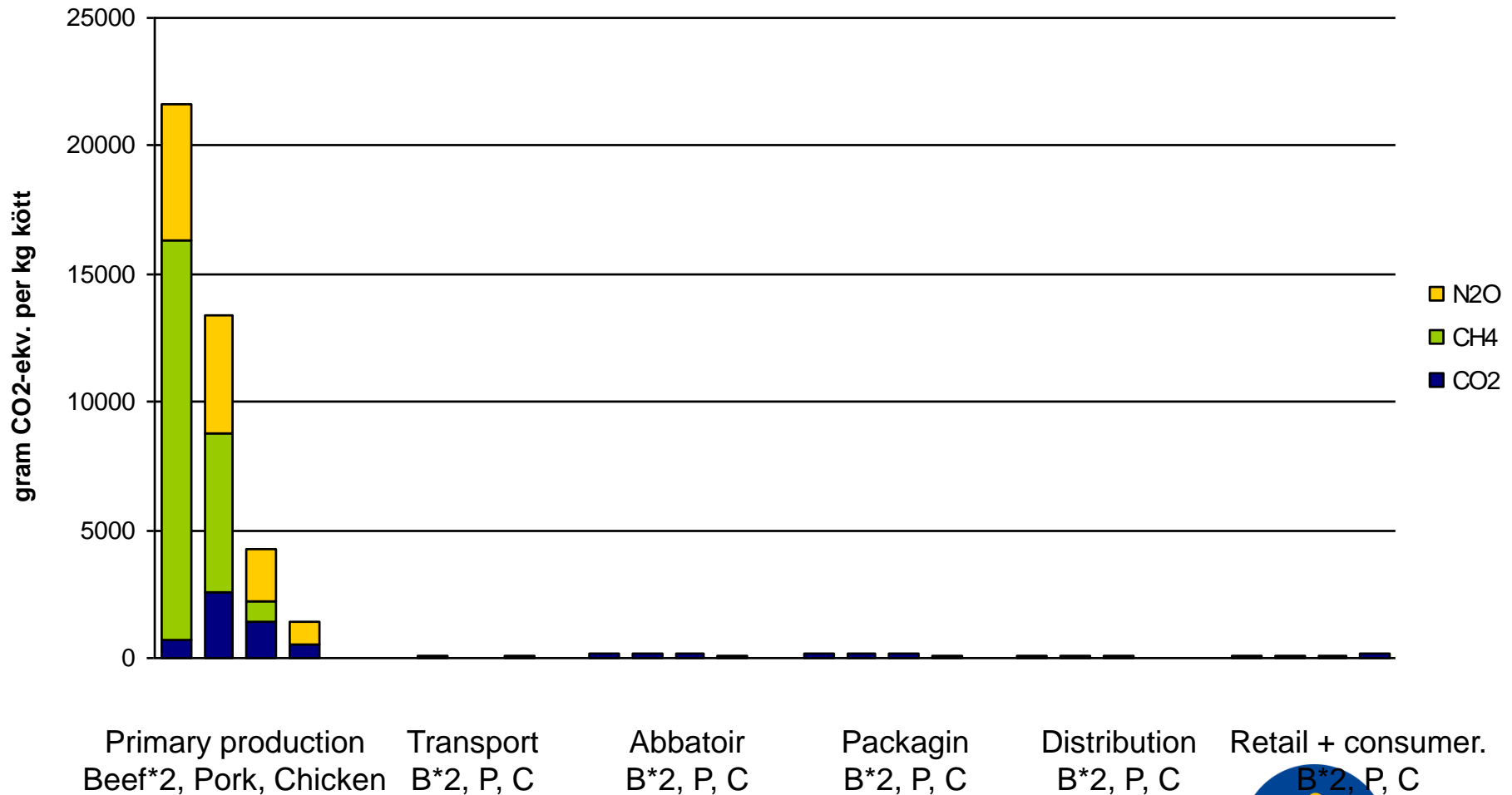
## General for animal products

- Feed efficiency is key (large production per kg feed used)
- Products from ruminants cause higher emissions than from monogastric animals
- Post-farm less important - except wastage





# Emissions of GHG's from Swedish meat chains

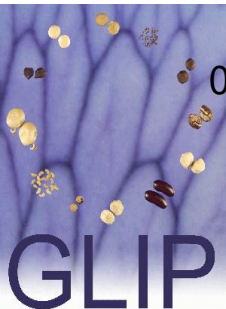


Sources: *Maten och Miljön, LRF, 2002*  
*Cederberg & Nilsson 2004, SIK-Rapport 718*



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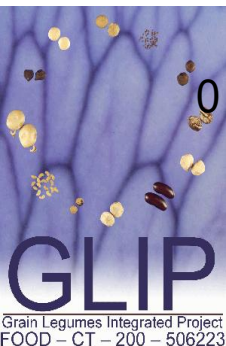
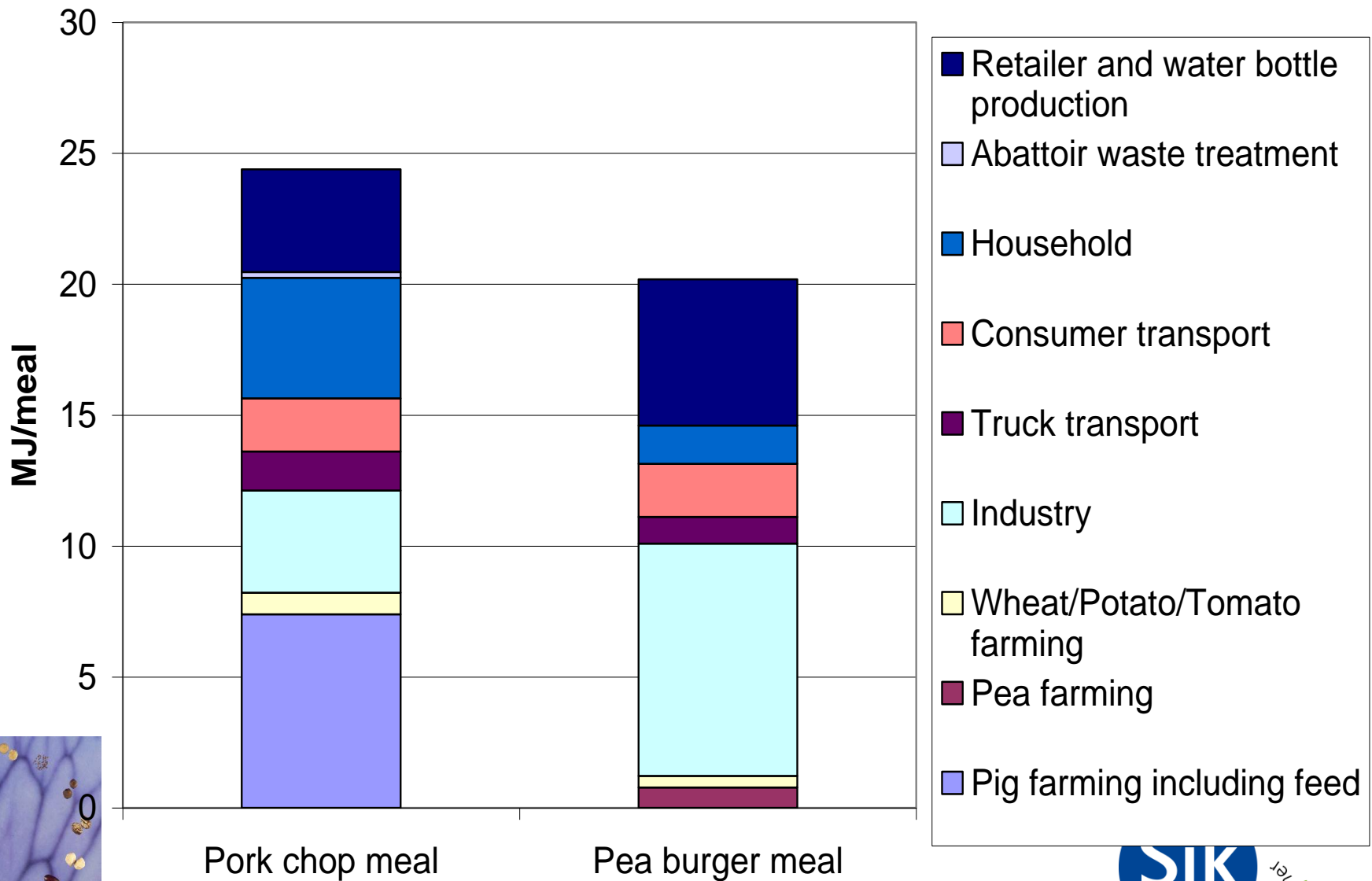
# Energy use for different meals, agricultural phase



*Davis, J., Sonesson, U., Baumgartner, D. & Nemecek, T., 2009, Environmental impact of four meals with different protein sources – Case studies in Spain and Sweden, Food Research International 43(7), pp 1874-1884,*



# Energy use for different meals, life cycle



Davis, J., Sonesson, U., Baumgartner, D. & Nemecek, T., 2009, *Environmental impact of four meals with different protein sources – Case studies in Spain and Sweden*, *Food Research International* 43(7), pp 1874-1884,



# Improvement options for food industry

- Reduced wastage
- Energy optimisation
- Choice of energy source
- Packaging design
- Raw materials / products
- Improved functioning of chains (joint effort along chains)



Extremely important to consider:

- Food safety
- Sensory quality
- Price
- Etc.



# And in addition systems to quantify and communicate measures taken and actual performance

- To consumers
- To society
- To other food chain actors (to build a chain-wide system)
- To authorities



# Take-home messages

- Whole-chain perspective is central (*A green industry is part of a green food sector*)
- It is not (all) about energy and fossil fuels!
- Production efficiency is often determining direct emissions
- Animal products often has higher emissions than vegetable
- Large scope for technical improvements in food chains
- Trustworthy communication is needed
- Multi-disciplinary approaches necessary, it's about providing safe, affordable, healthy, tasty and sustainably produced products



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# Thank You for Your attention!

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