Comparing environmental impacts of beef production systems

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Environmental impact of beef production

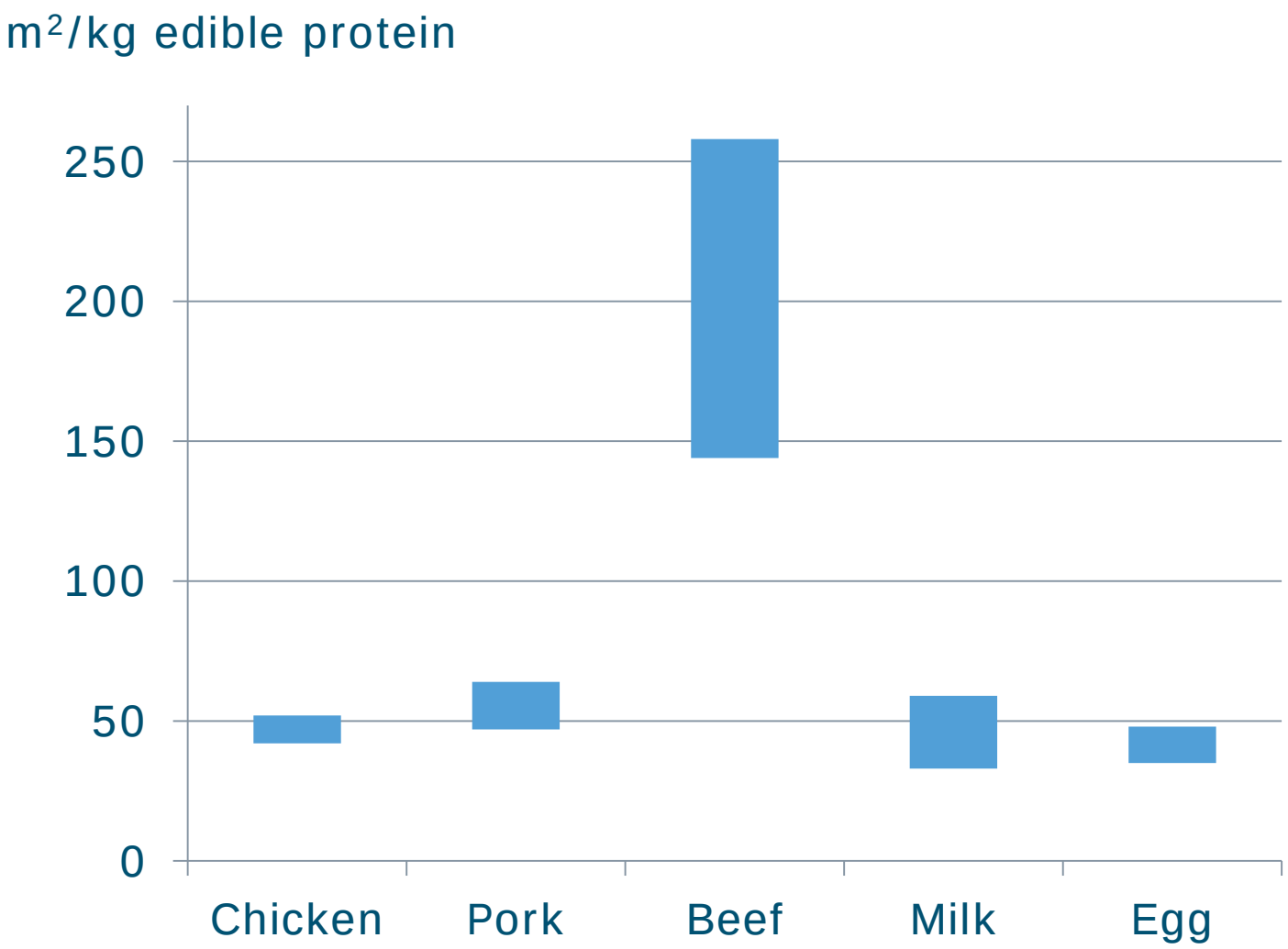
6% climate change

Degradation & deforestation

High m^2 per kg meat

High water use per kg meat

Variation in land use among systems



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De Vries and De Boer 2010

Aim

To compare environmental impacts of beef production systems

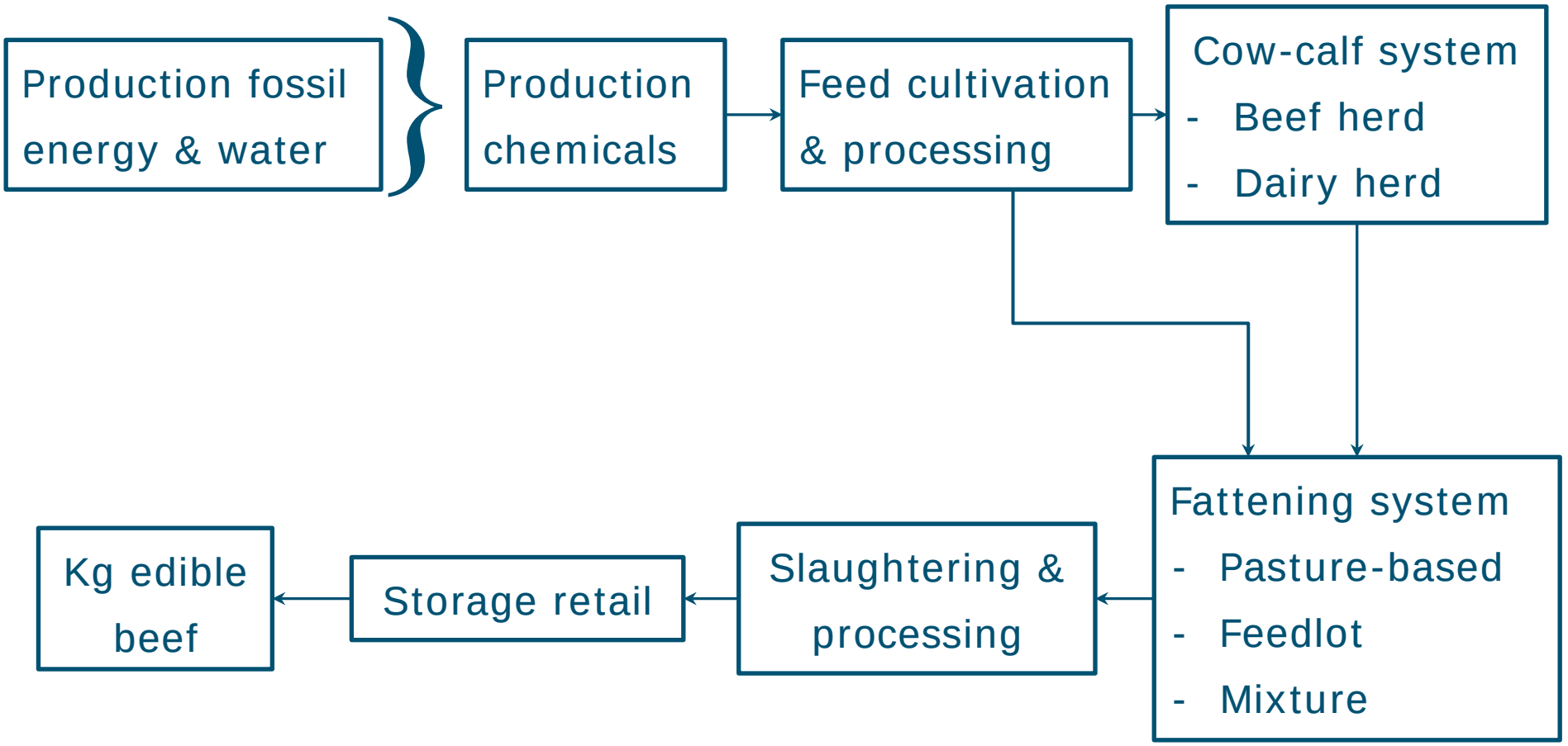
Which beef is most environmentally friendly?

Approach

Reviewed studies that used life cycle assessment to compare contrasting systems

Life cycle assessment (LCA) is a method to quantify resource use and emissions of pollutants along the life cycle of a product

Life cycle assessment of beef



CO_2-e / kg beef: $(1 \times CO_2 + 25 \times CH_4 + 298 \times N_2O)$ / kg beef

Selection studies

- Main function of system is beef production
- Study includes more than one production system

Classification of systems

Calf from beef herd

Calf from dairy herd

Classification of systems

Pasture-finished

Concentrate-finished

Classification of systems

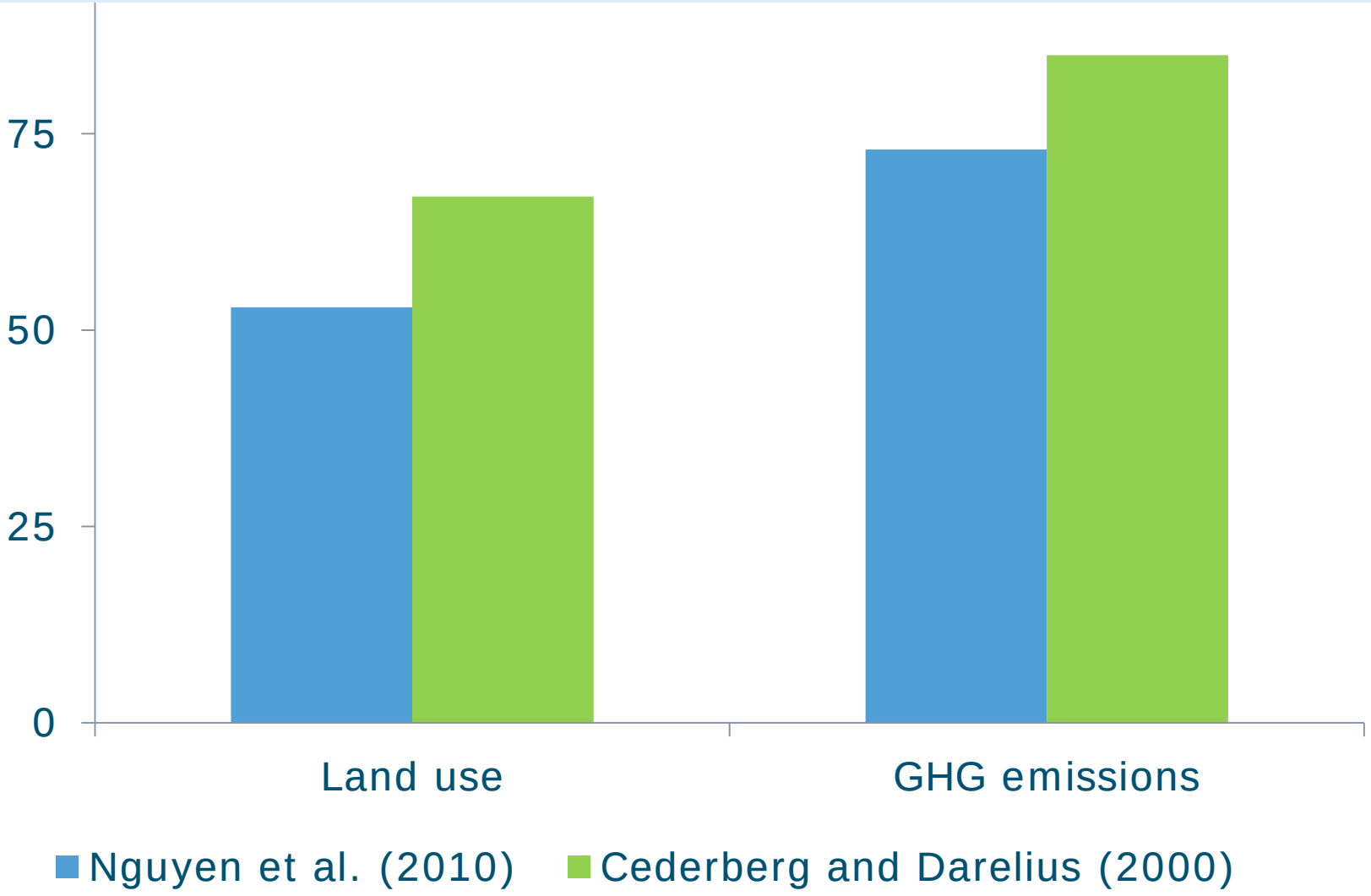
- Origin of calves
  - Bred by dairy cow - *dairy-calf*
  - Bred by beef cow - *beef-calf*

- Conventional vs organic production

- Feed use during finishing calves
  - mainly *pasture-finished beef (PFB)*
  - mainly *concentrates-finished (CFB)*

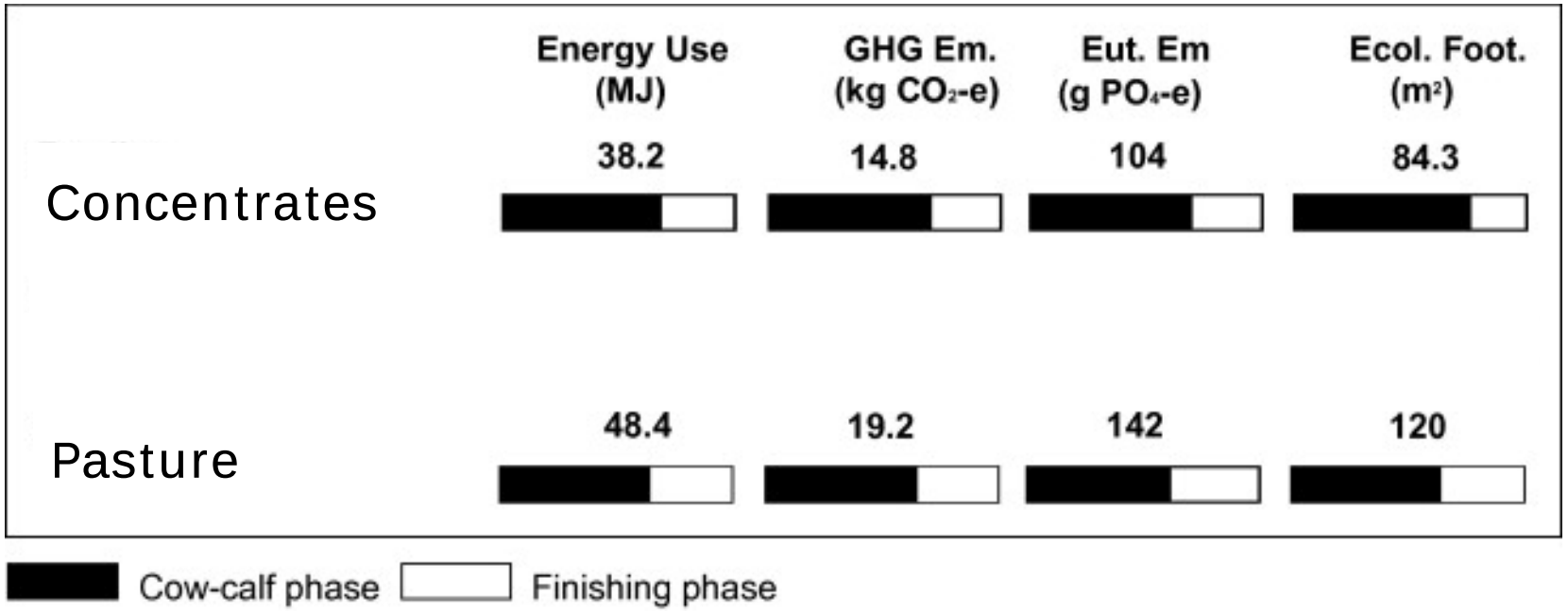
Dairy-calf versus beef-calf (%)

Impacts on average 24% lower



US suckler beef – contribution stages

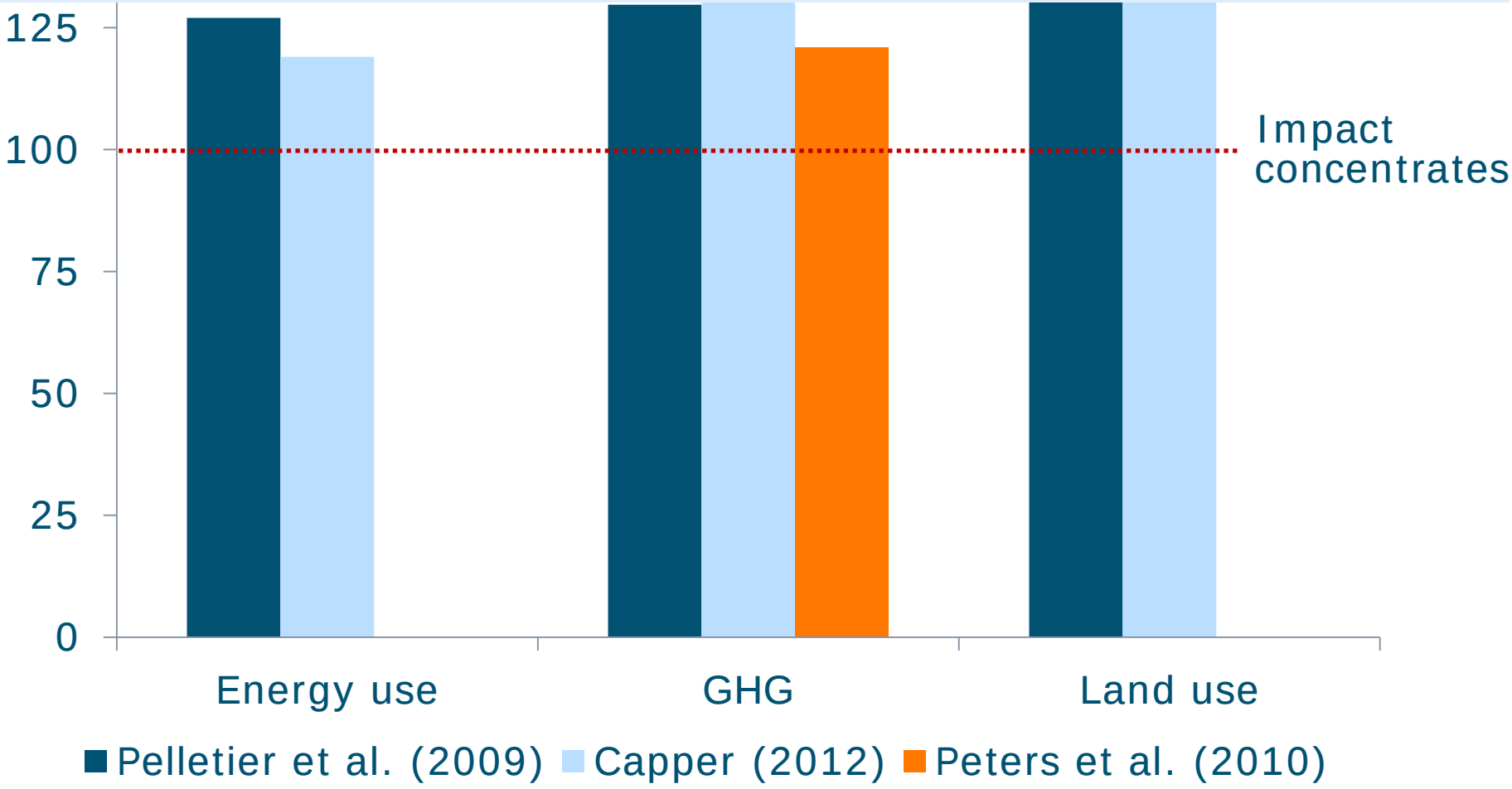
Source: Pelletier et al. (2010)



Cow-calf phase explains on average 63% of impacts

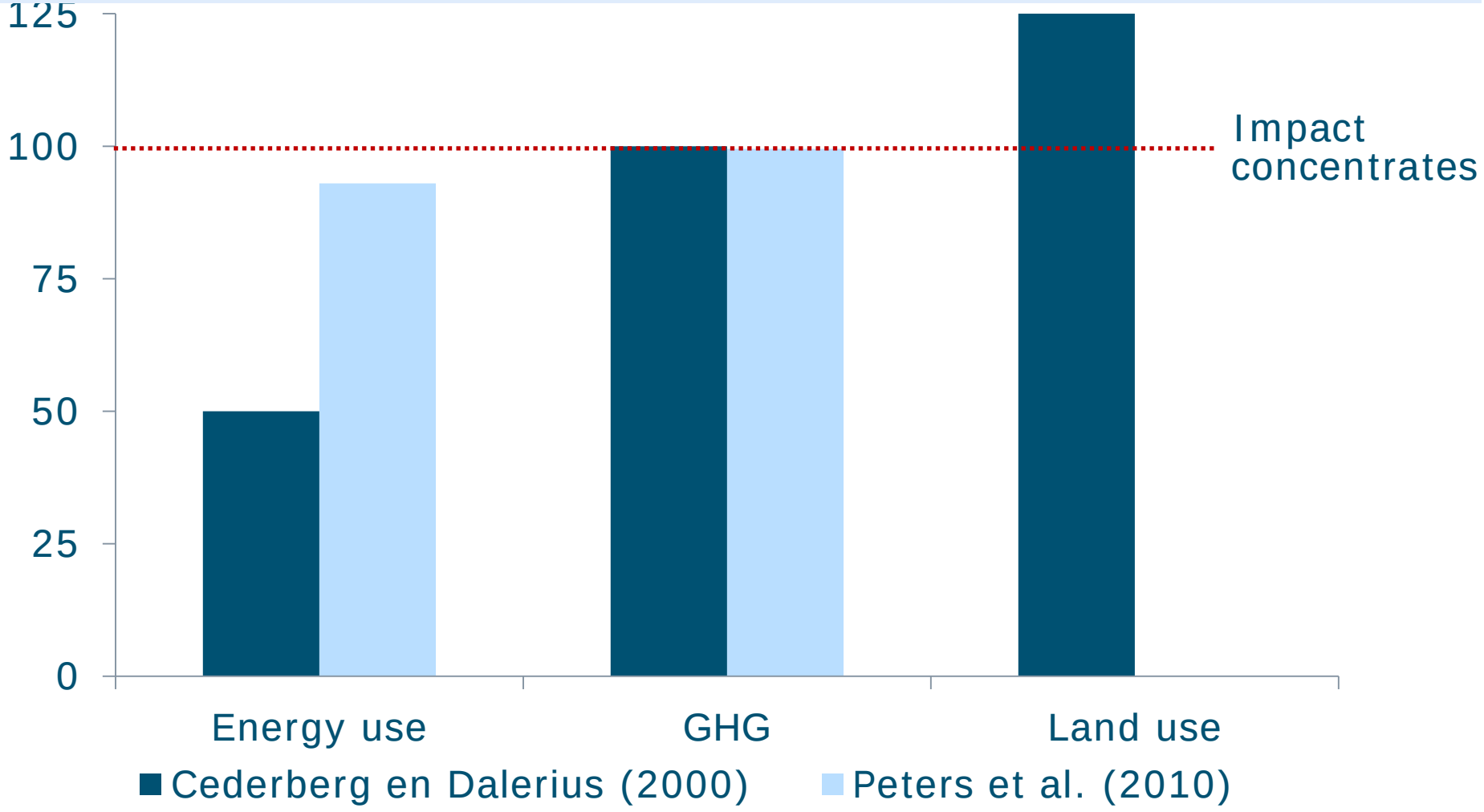
Pasture versus concentrates (%)

Impacts on average 33% higher



Organic versus concentrates (%)

EU lower, GHG similar, LU higher



Competition between humans and animals

human edible energy return on human edible energy investment

System	Ratio (Calorie / Calorie)
Concentrates-finished beef	4.2
Pasture-finished beef	69.1

Accounting for competition between humans and animals for land would be in favour of pasture-finished beef

Conclusions

- Impacts lower for dairy than for beef-calf systems
- Energy use of PFB higher or lower than of CFB, depending on intensity of grassland management
- GHG emissions of PFB higher or similar than of CFB, depending on intensity of grassland management

Conclusions

- Comparison of PFB versus CFB hindered because LCAs do not account for competition for land between humans and animals

Recommendations

- Dual-purpose cows way to produce milk and meat in an environmentally friendly way
- Precision grassland management needed for pasture-finished beef
- LCA comparisons should include competition for resources between humans and animals

Thank you for your attention!

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