

Carbon footprint of NZ lamb

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AgResearch Ruakura

with contributions from Meat Industry Assn,
Beef+LambNZ, meat processing companies,
Landcorp, Ballance and MAF



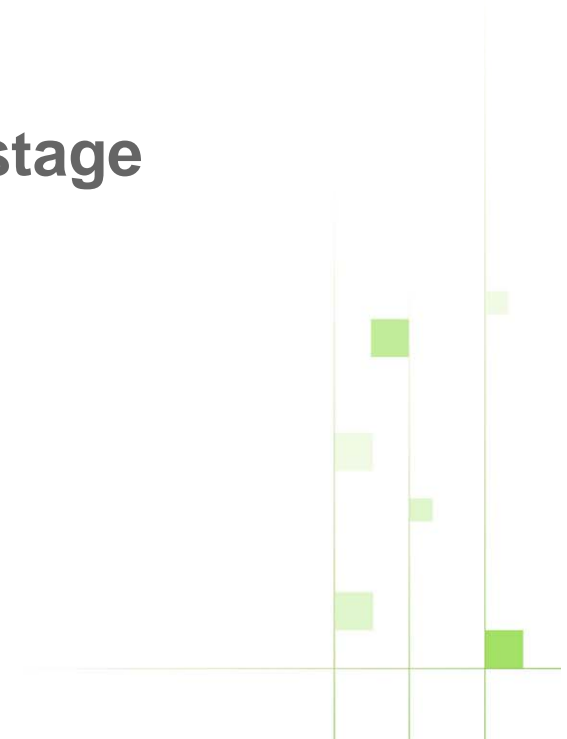
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Te Ahuwhenua, Te Kai me te Whai Ora. Tuatahi



Outline of talk



1. Background
2. What is a carbon footprint?
3. Results from NZ lamb study
 - variability from lamb processing stage
4. The future?



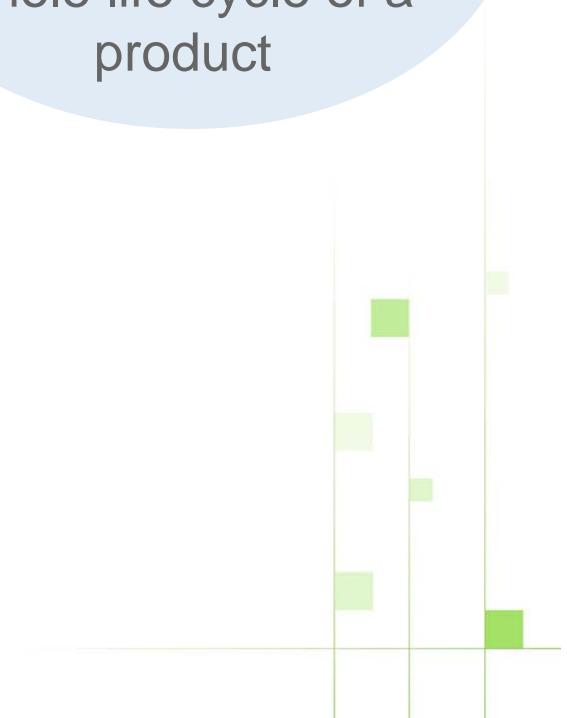
Background

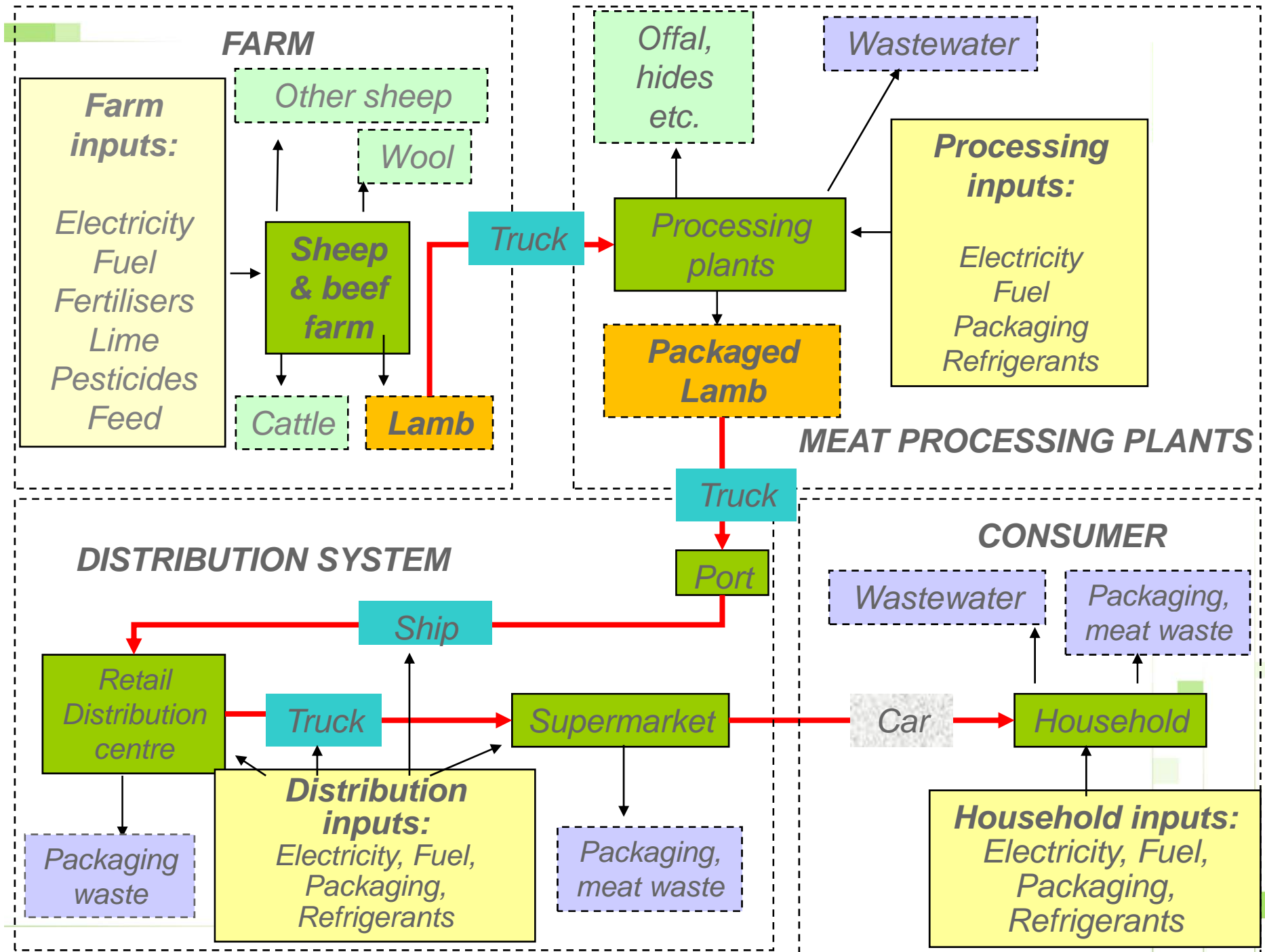


Market related issues:

- *Food miles* → *Carbon footprinting*
- *UK supermarkets*
 - *Tescos : Carbon labelling*
 - *M&S : Carbon reduction plans*

Carbon footprint =
Total greenhouse gas
emissions through
whole life cycle of a
product





Lamb carbon footprint project:



Farm:

- **Beef+LambNZ farm classes** (national data; > 400 farms surveyed)
- **Two case farms** and examined mitigation options

Lamb meat processing:

- **11 lamb-only plants** (national spread; ~ 40% lambs processed)

Transport, retail, consumption & disposal stages:

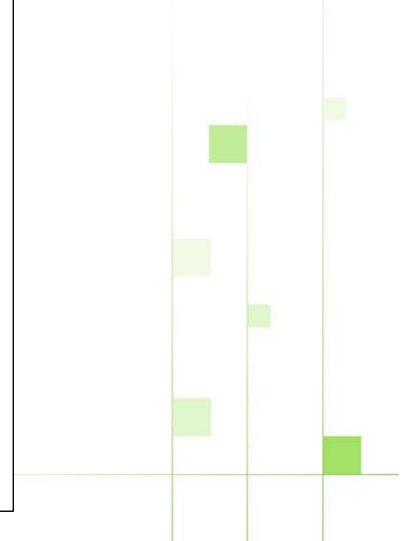
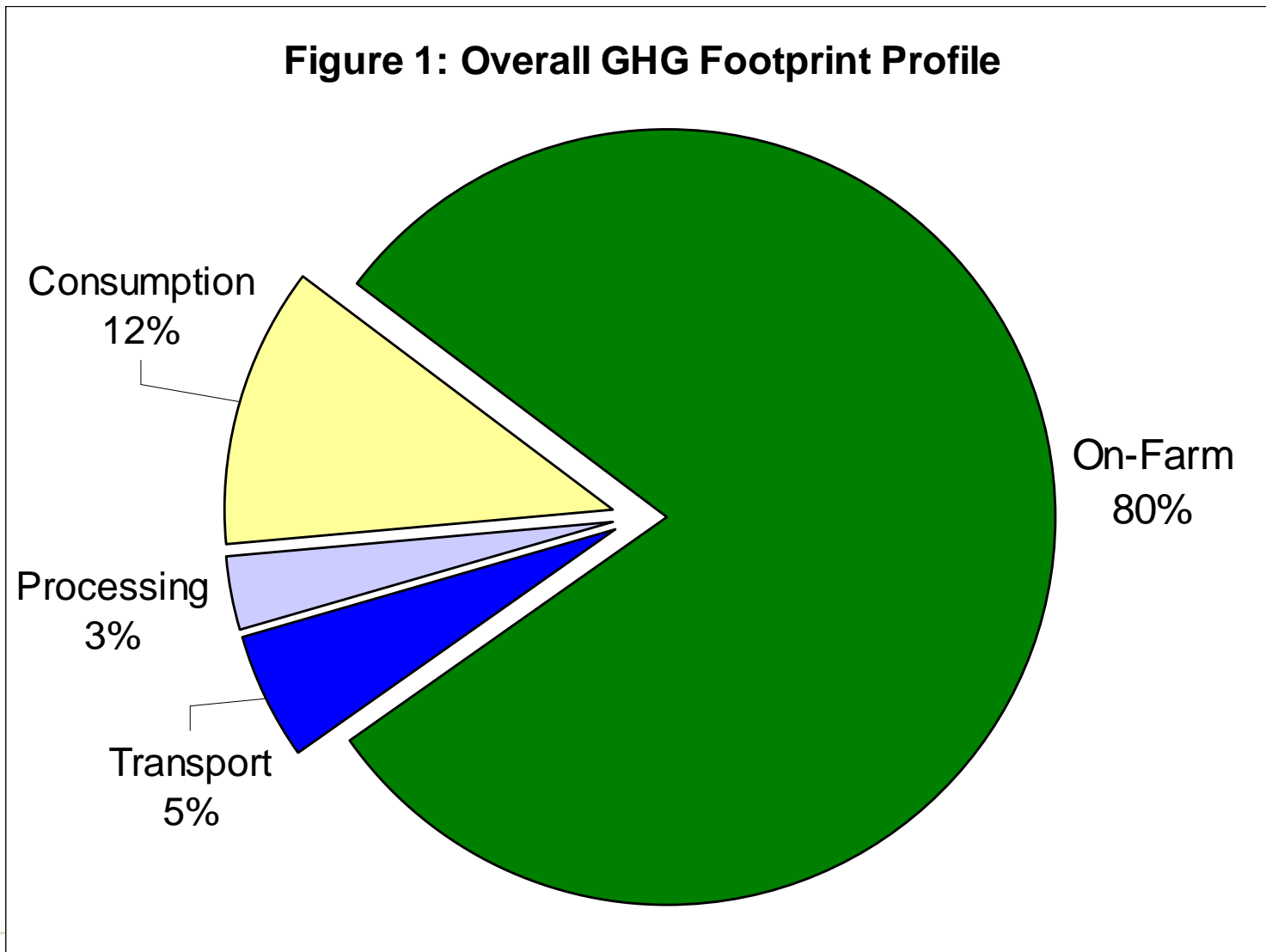
- Survey & published data



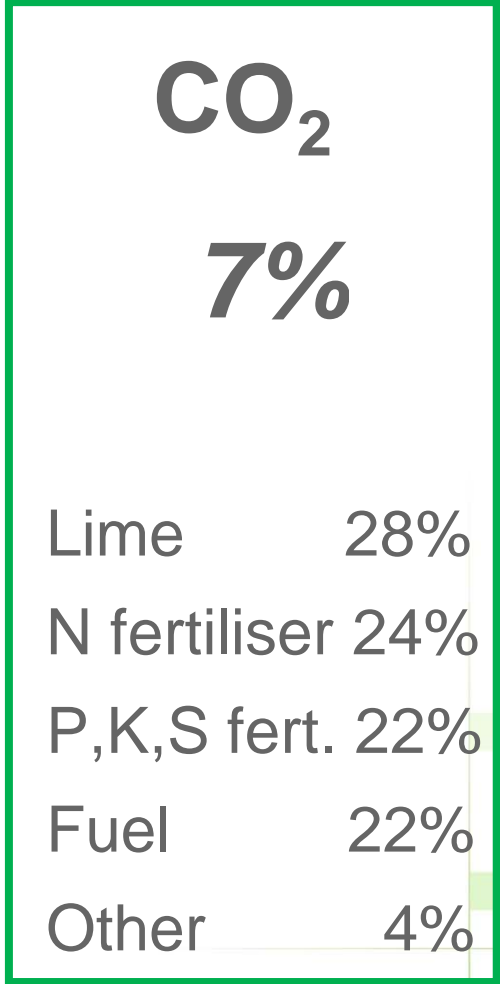
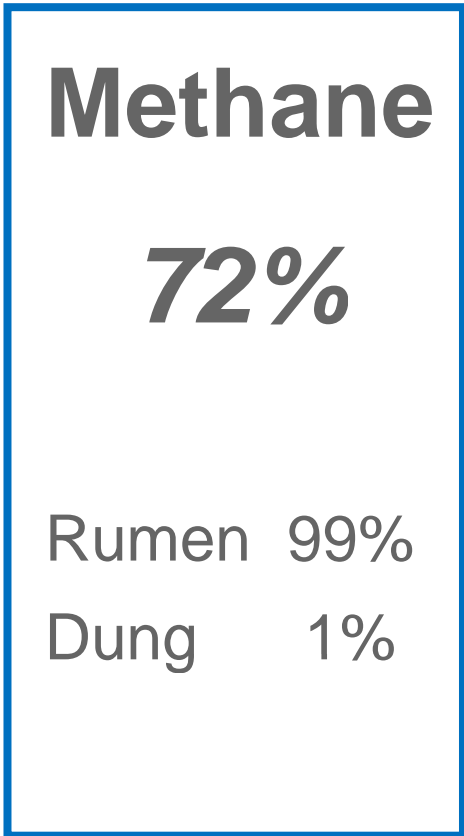
Results: 19 kg CO₂-equivalents/kg lamb



Figure 1: Overall GHG Footprint Profile



Farm stage GHG emissions for NZ average lamb:



Lamb processing: Abattoir survey (MIRINZ)



5/08/2009 Plant Info
 Kill Lamb Meat processing Data entry sheet for J. and B. Plant, Robert Kemp 0708.xls

Lamb Life Cycle Analysis
General Plant Information Data Entry Form

Surveyed Year: _____ Enter data into white cells
 Company: _____
 Plant Name: _____

When text is already entered in white cell, please re-write with correct response.

Nominal Production - Meat Products

Product Type	Capacity	Season	Average dressed ccs	Comments:
	ccs/day	mths/year	wt kg	
Lamb				
Sheep				
Cattle				
Calves				
Pigs				
Goat				
Deer				
Other:				

Nominal Production - By-products

By-product type	Capacity (t/day)	Season (mths/year)	Comments:
Tallow			
Meal			
Blood			
Slip wool			
Other:			

Energy Types Used

Energy Type	Calorific Value (MJ/kg)	Density (kg/l)	Comments:
Electricity	n/a	n/a	
Natural gas			
Fuel oil 1			
Fuel oil 2			
Coal/Lignite 1			
Coal/Lignite 2			
LPG			
Wood			
Other:			

Water Supply Source

Supply	Source	Measured (Y/N)	Incoming temp. °C (C)	Comments:
Potable supply	Council/bore/river	(Y/N)	(C)	
Non-potable supply	Council/bore/river	(Y/N)	(C)	

Wastewater Treatment

	Main Treatment Process	Measured (Y/N)	Comments:
On-site	Aerated/anaerobic/physico-chemical	(Y/N)	
Off-site	Aerated/anaerobic/physico-chemical	(Y/N)	

Equipment Types

	Percentage (Y/N)	Refrigeration	Percentage	Weight of refrigerant replaced during the year. kg
Rendering:	Y/N	Refrigeration		
Low temperature		Ammonia		
Dry batch / continuous		Large R		
		Many small CFC/HCFC units		

Hot Water Production

	Percentage (Y/N)	Hot Water Production	Comments:
Blood drying	Y/N	Fuel fired boilers	
Rotary dryer		Electric boilers	
Ring dryer		Rendering heat recovery	
Batch dryer/cooker		Refrigeration heat recovery	
Other:		Other:	

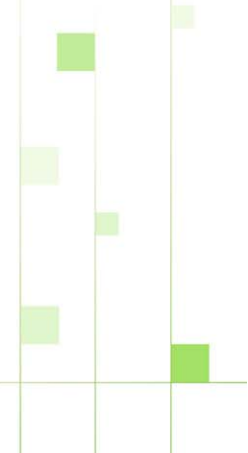
Cool Storage

Coolstore number	1	2	3	4	5	6
Total Gross Volume (m3)						
Storage Capacity (tonnes product)						
Typical Operating Temp. (°C)						

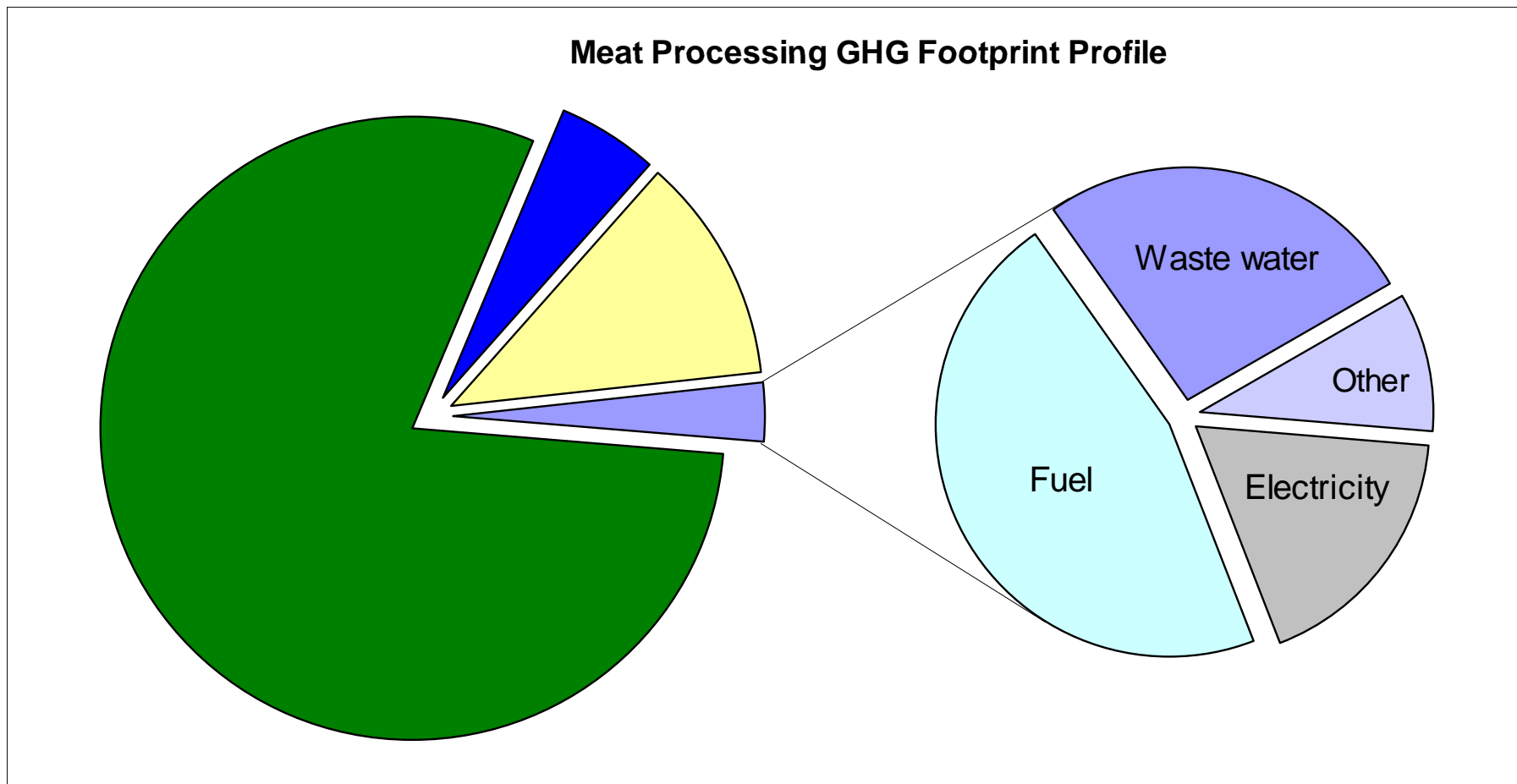
Cold Storage

Coldstore number	1	2	3	4	5	6
Total Gross Volume (m3)						
Storage Capacity (tonnes product)						
Typical Operating Temp. (°C)						

- Survey sent out,
- Collected data on:
 - Throughput,
 - Energy use,
 - Source of energy,
 - Refrigerants used,
 - Wastewater produced,

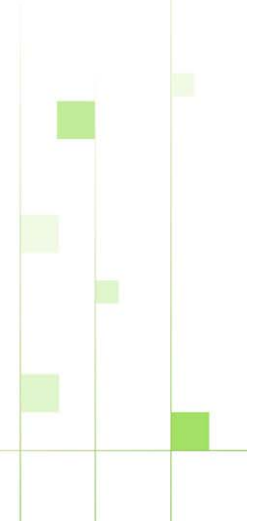
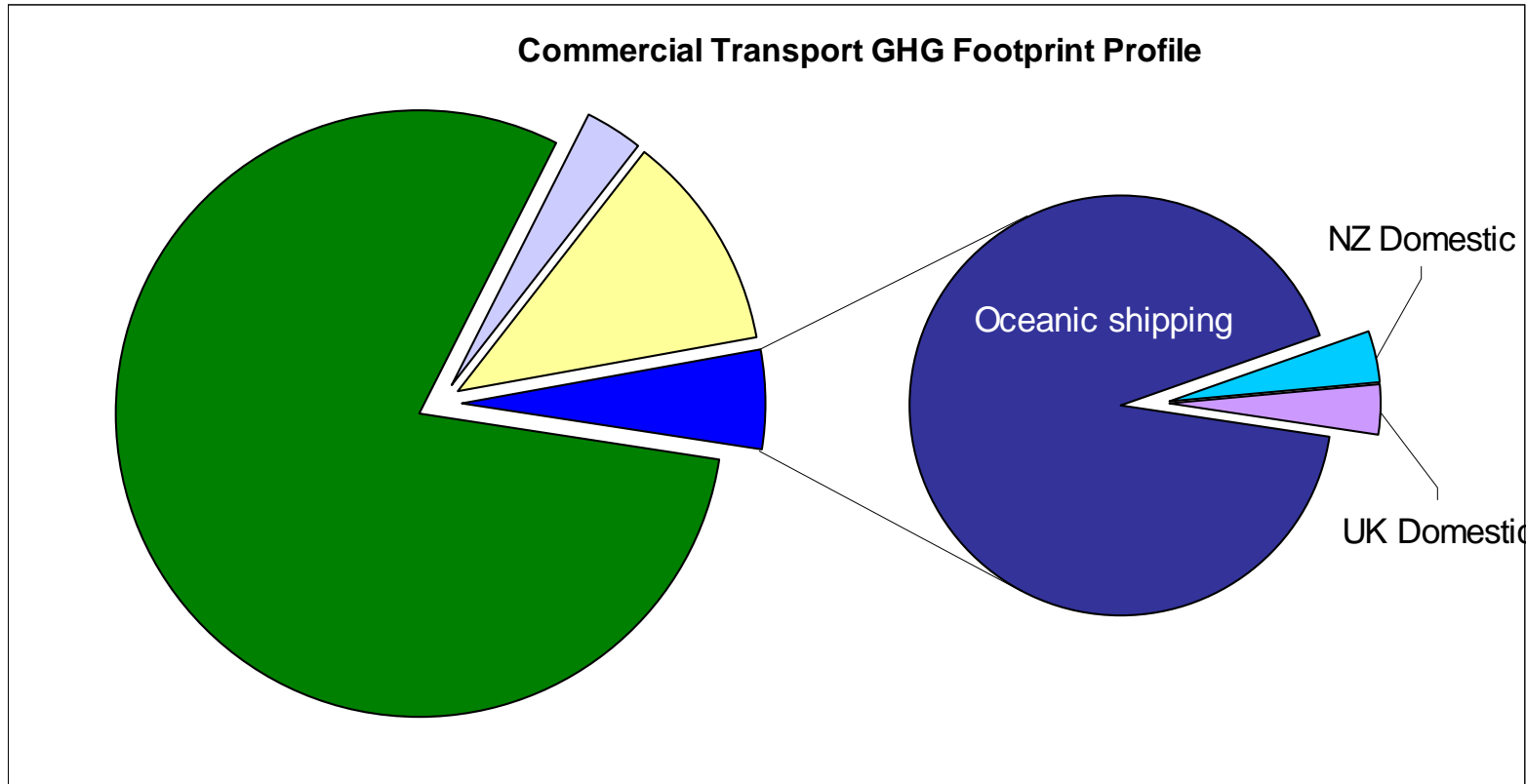


Lamb: meat processing stage

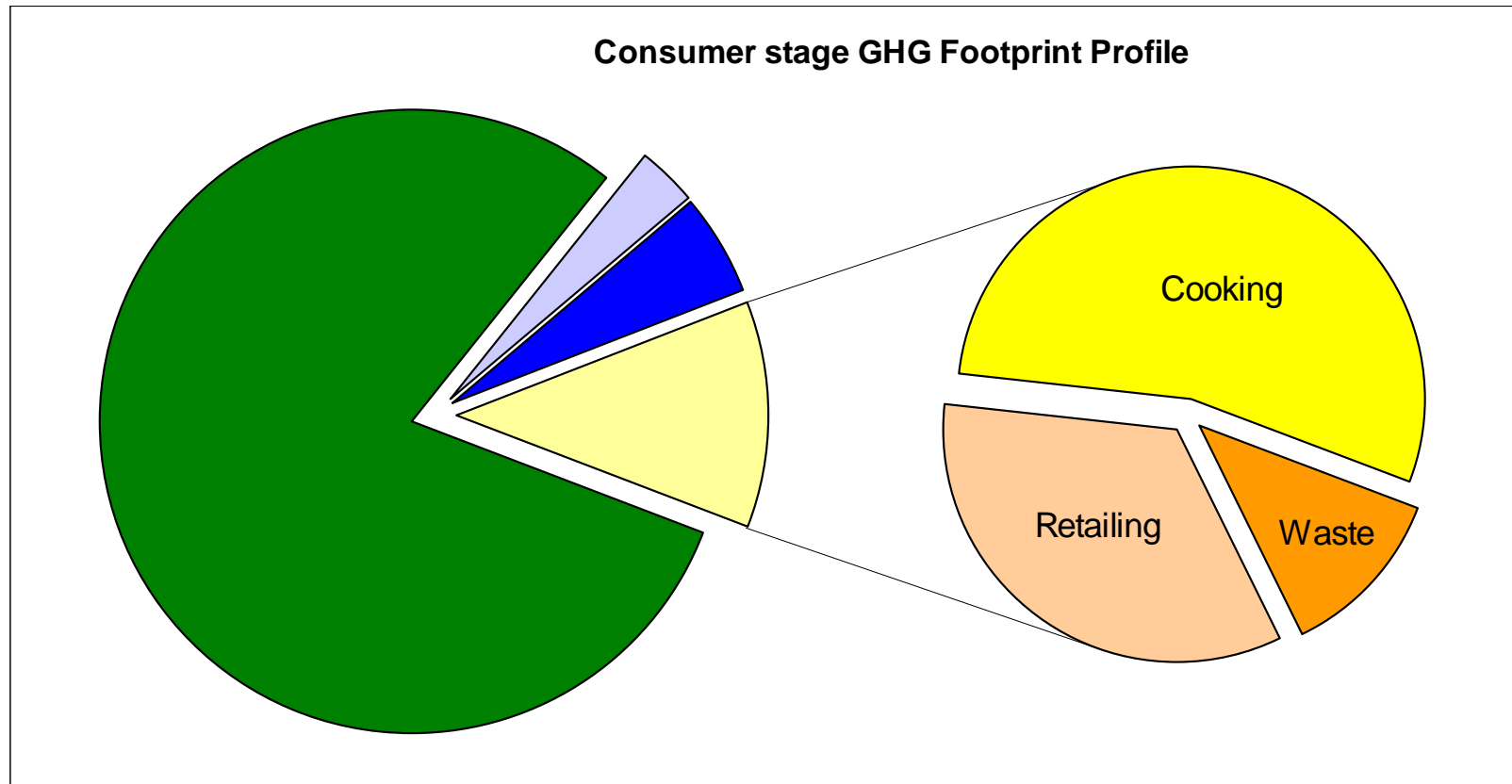


Two-fold variation between plants in CO₂-equiv/kg lamb

Lamb: transport stages

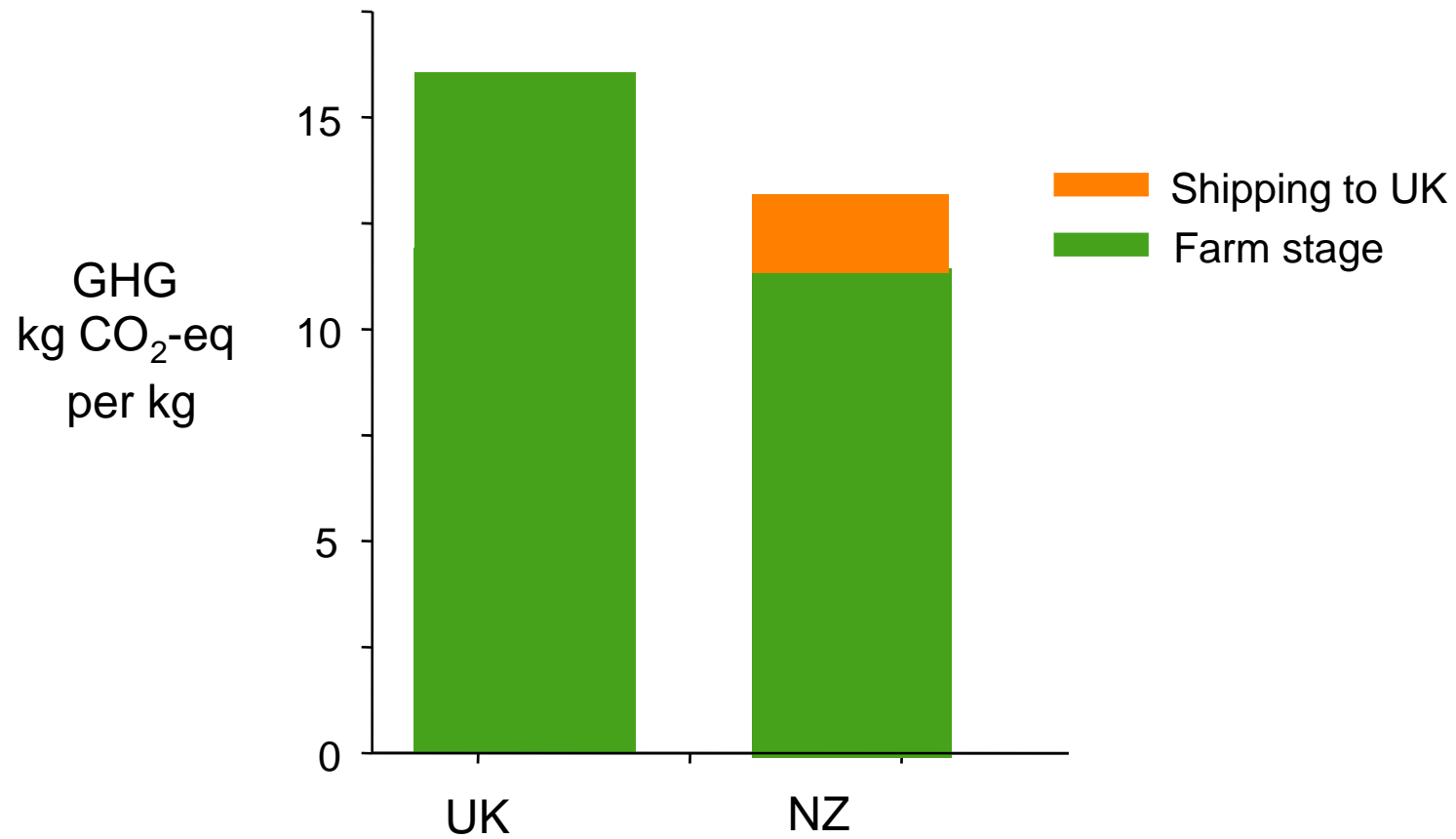


Lamb: retail and consumer stage



Increase of up to +7% if we add in customer travel

Comparison of UK and NZ lamb



Williams et al. 2008

The future?

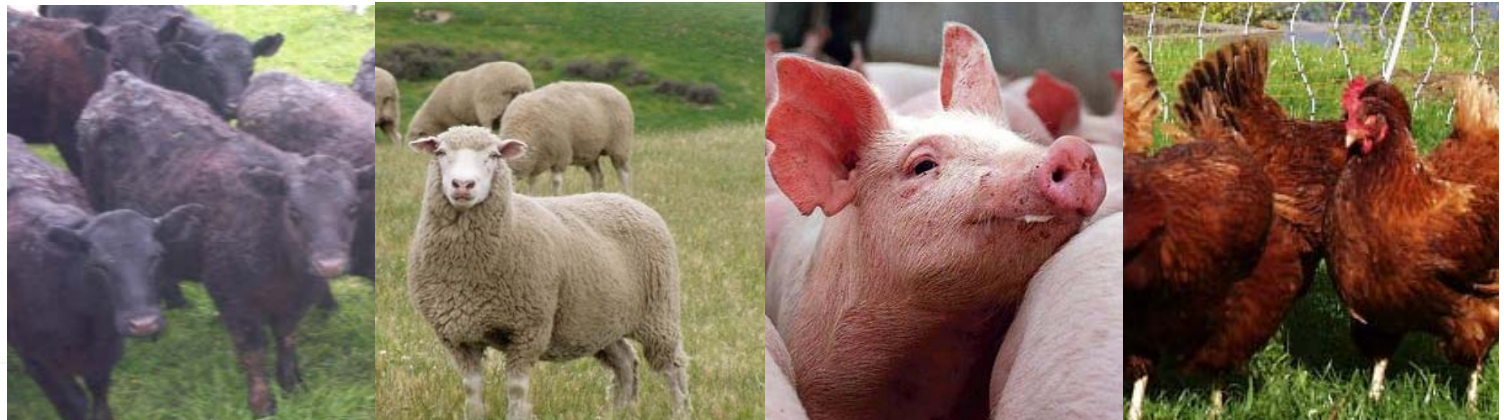
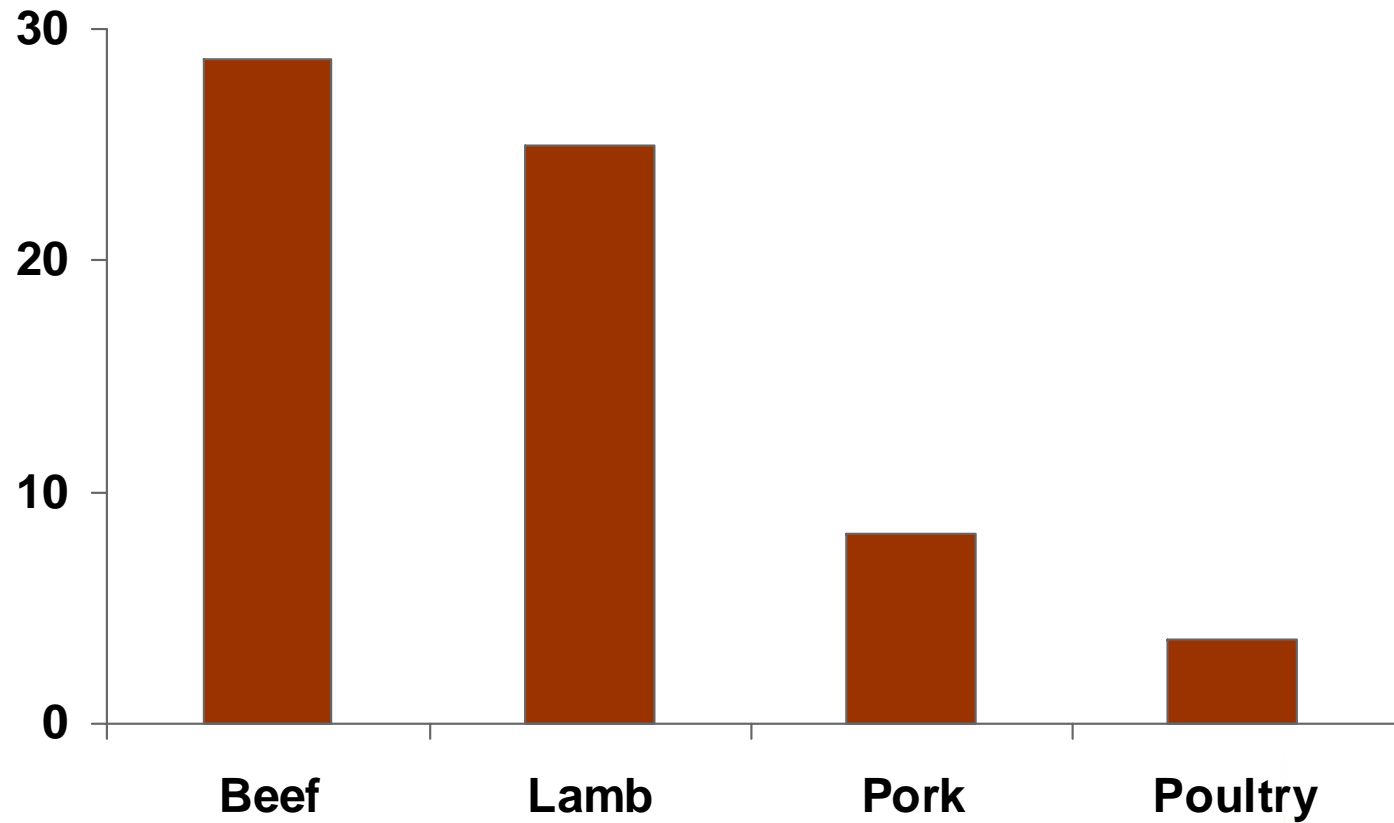


Lamb carbon footprinting:

- Common methodology internationally
- Understand farm variability and system differences
(being integrated into OVERSEER farm model)
- Define reduction options & cost-effectiveness



Carbon footprint
(kg CO₂-equiv
per kg
meat)



From:
*Weidema et al. 2009 &
Williams et al. 2008*