Greenhouse gas emissions from alternative calf to beef production systems

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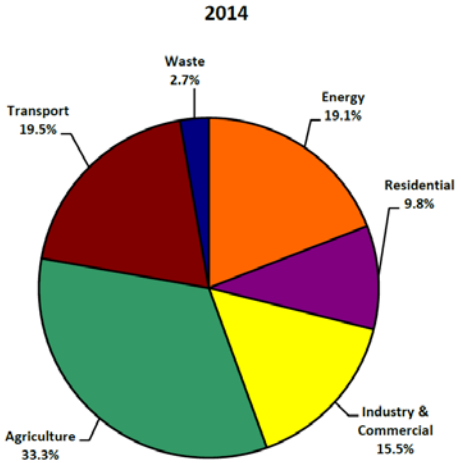
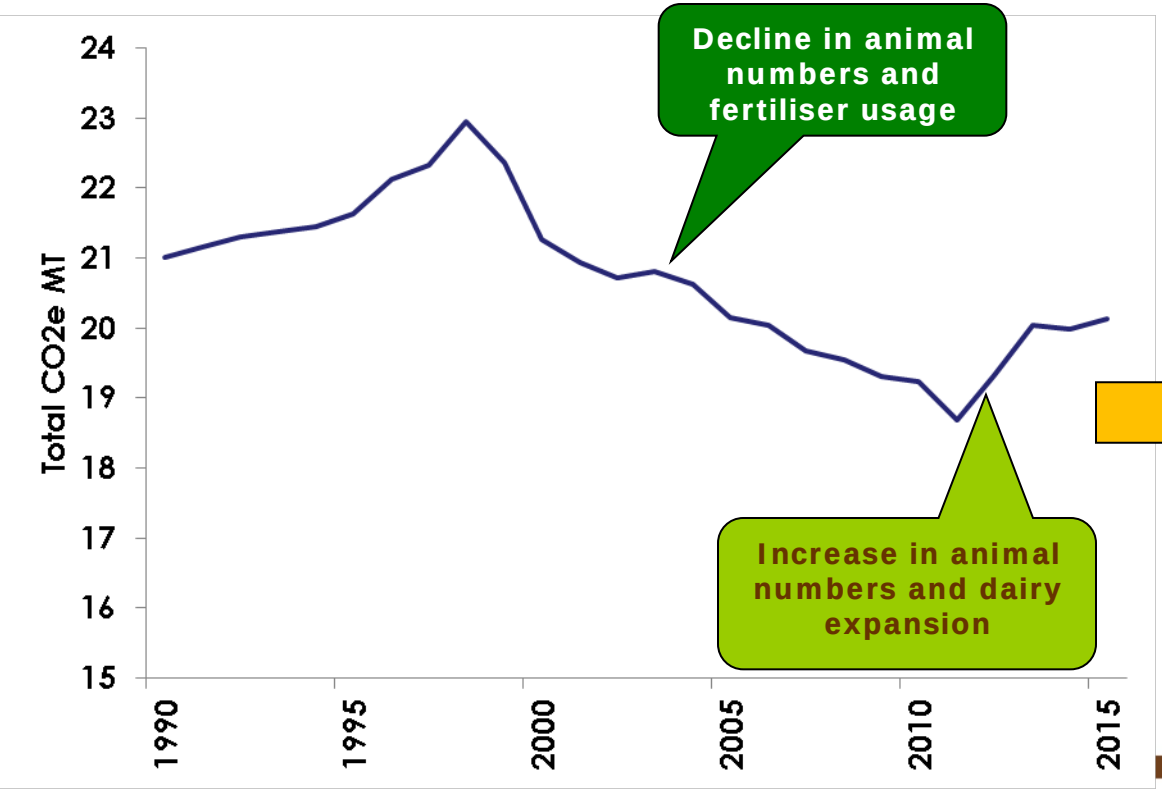
Background

Environmental challenge

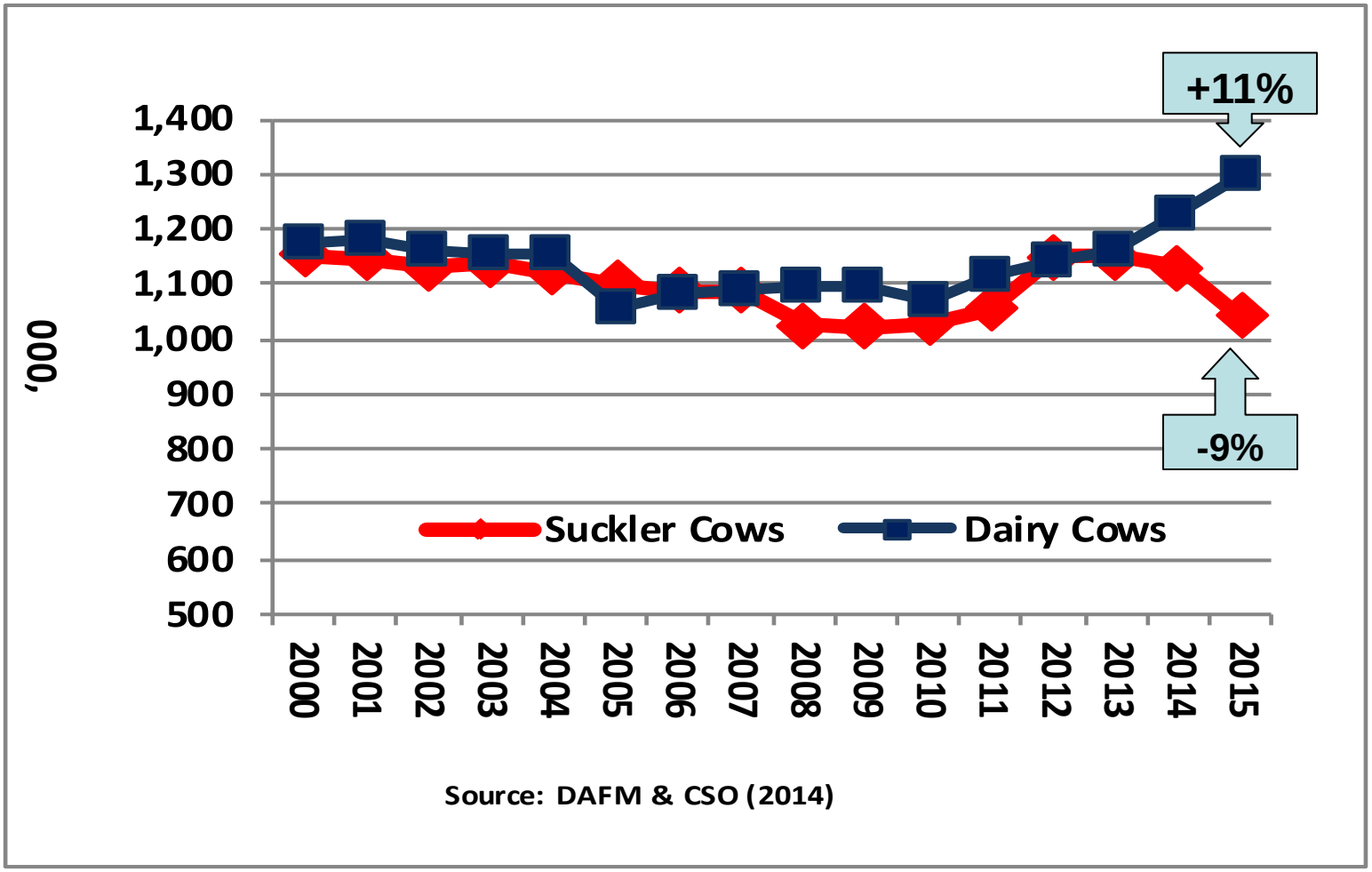
- **Total GHG: agriculture accounts for 32% of Irish national emissions (EU = 10%)**





EU Targets (July 2016) - by 2030 Ireland to reduce emissions by 30% relative to 2005. Emissions trading and carbon sequestration can be applied.

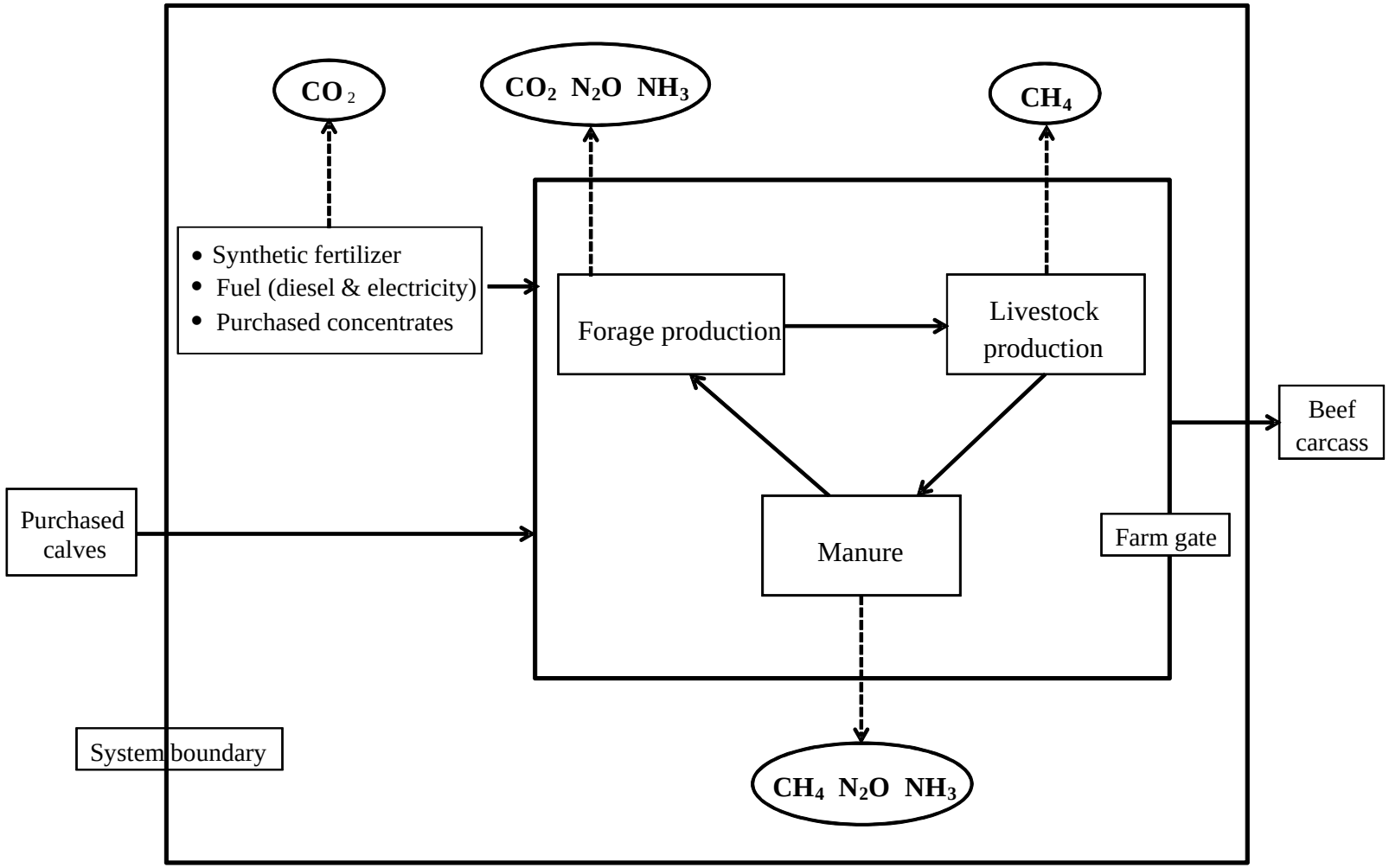
Beef systems comparisons



Objective: to compare the GHG emissions from alternative dairy calf to beef production systems

Methods

GHG Emissions Model (Foley et al., 2011)



Emission Factors – IPCC 2006

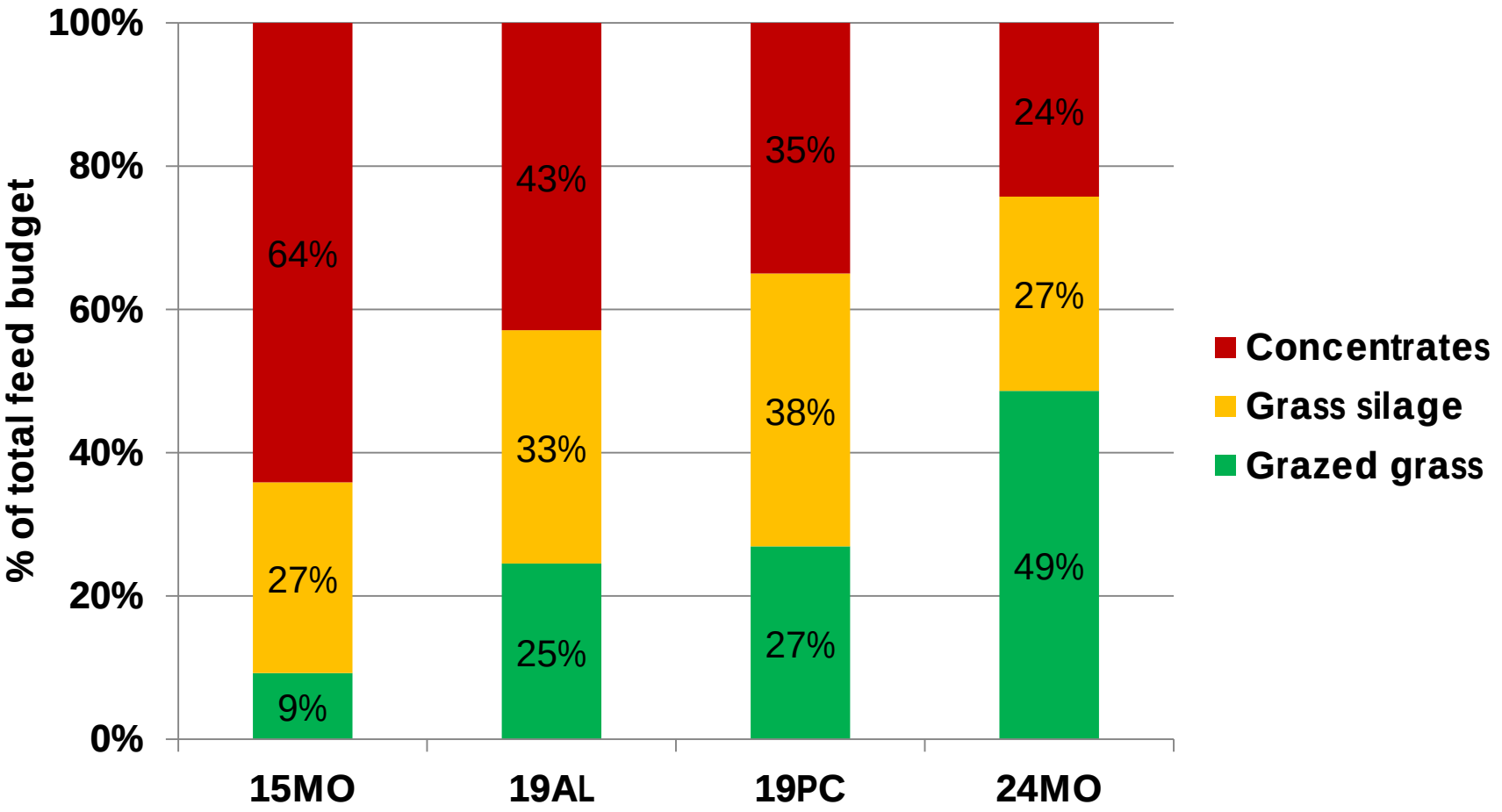
Physical data

- Two year study using February born Hol-Fr bull calves
- Supplemented with 1 kg or 2 kg for first grazing season
- Four production systems post housing

	15MO	19AL	19PC	24MO
First winter management	Build up to finishing	Stored prior to turnout	Stored prior to turnout	Stored prior to turnout
Second grazing season	-	Feb-June	Feb-Sep	Feb-Nov
Finishing system	Indoor; ad lib conc	Indoor; ad lib conc	5 kg at pasture	Indoors; 5 kg plus silage

No difference in GHG between years or level of supplementation in first grazing season

Feed budget (kg DM basis)



Production Systems Comparison

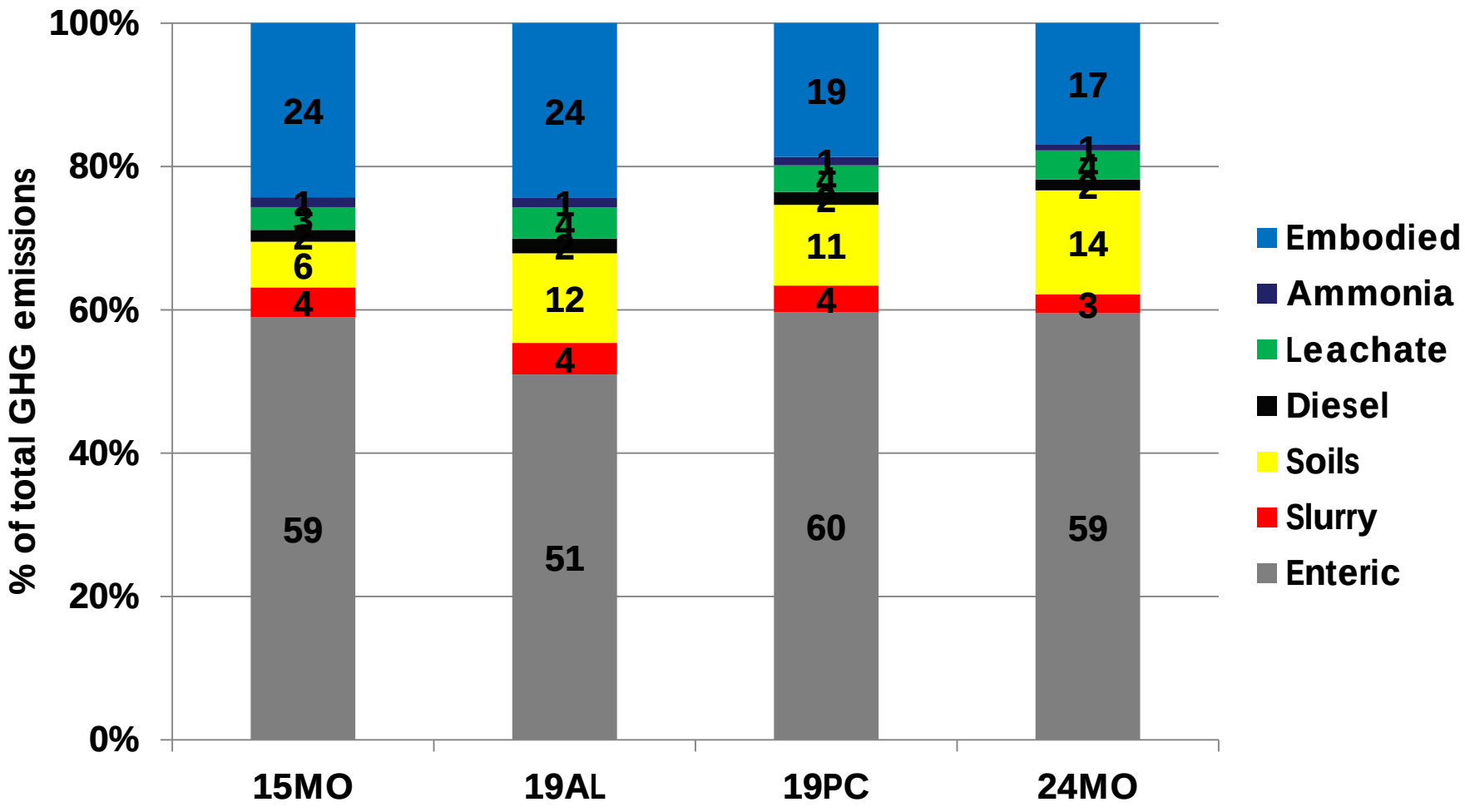
	15MO	19AL	19PC	24MO
Area farmed (ha)	14.6	31.4	30.6	60.3
Stocking rate (LU/ha)	7.2	3.3	3.4	1.7
Animals sold (hd)	190	189	189	186
Slaughter weight (kg)	501	546	500	566
Carcass weight (kg)	259	275	261	285
Live weight output (kg/ha)	6,635	3,286	3,099	1,748
Carcass output (kg/ha)	3,426	1,654	1,617	879

Production Systems Comparison

GHG emissions

	15MO	19AL	19PC	24MO
Per farm (t CO_2e)	457	488	531	755
Per hectare (t CO_2e)	31.7	15.5	17.4	12.5
Per Livestock Unit (t CO_2e)	5.1	3.9	4.3	3.8
Per head finished (t CO_2e)	2.4	2.6	2.8	4.1
Per kg carcass weight (kg CO_2e)	9.4	9.5	10.9	14.4
Per kg live weight (kg CO_2e)	4.9	4.8	5.7	7.2

Contribution Analysis



Summary

- Agriculturally derived GHG represent a significant share of Irelands' total national emissions
- Shift in profile of the bovine herd will lead to a reduction in beef carbon footprint
- A range of dairy beef systems were evaluated differing in dietary contribution from pasture and age at slaughter
- Earlier finishing resulted in higher emissions per hectare and per livestock unit but lower emissions per kg beef
- Enteric fermentation represented 50-60% of total GHG emissions with embodied emissions also a substantial contributor

Thank You

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