ESTIMATION OF ENTERIC METHANE

COMPARISION BETWEEN NORDIC COUNTRIES AND USE OF HIGH LEVEL TIER APPROACH IN PEF

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Importance of enteric methane in a LCA perspective

J.P. Lesschen et al. / Animal Feed Science and Technology 166–167 (2011) 16–28

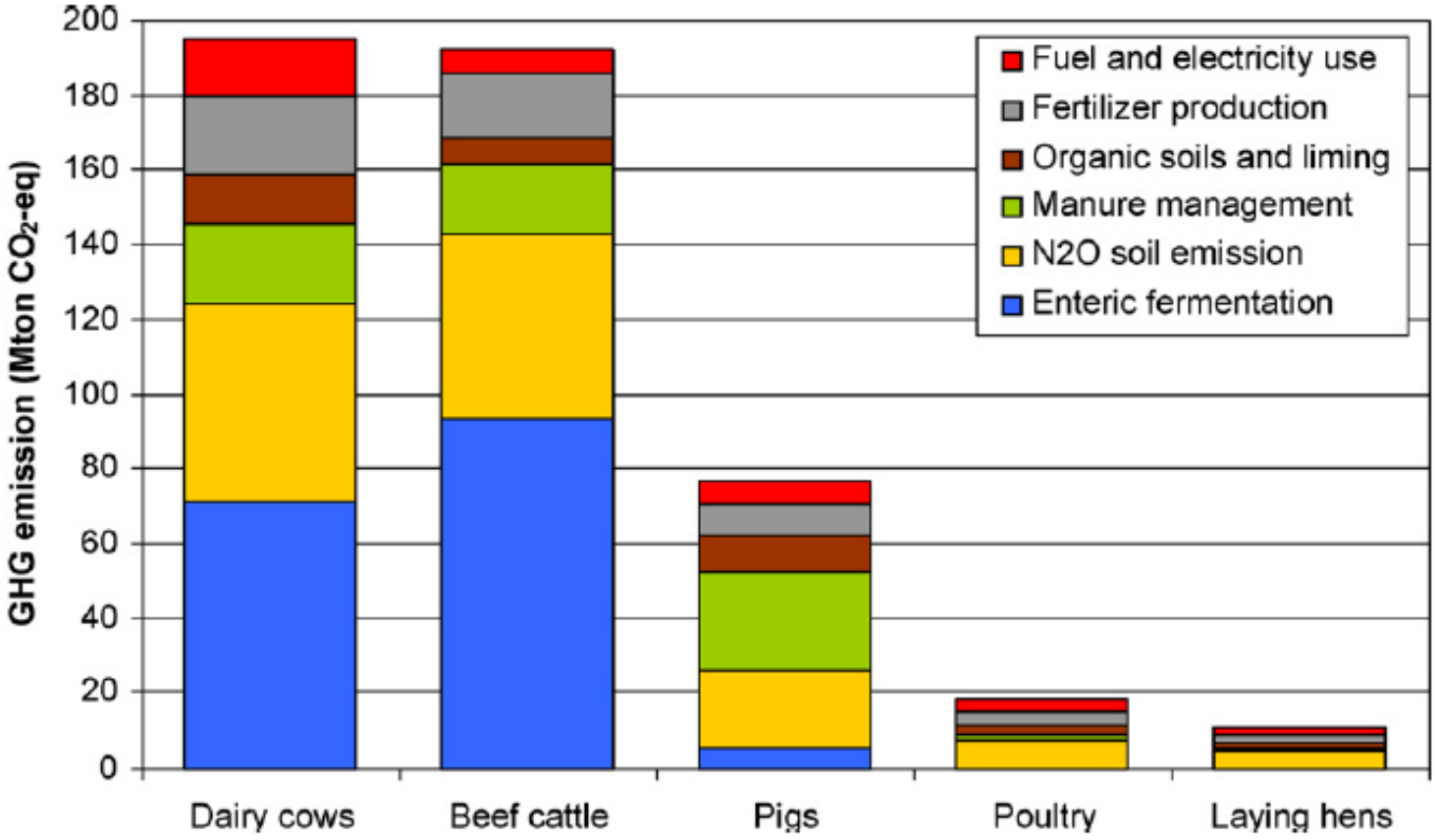
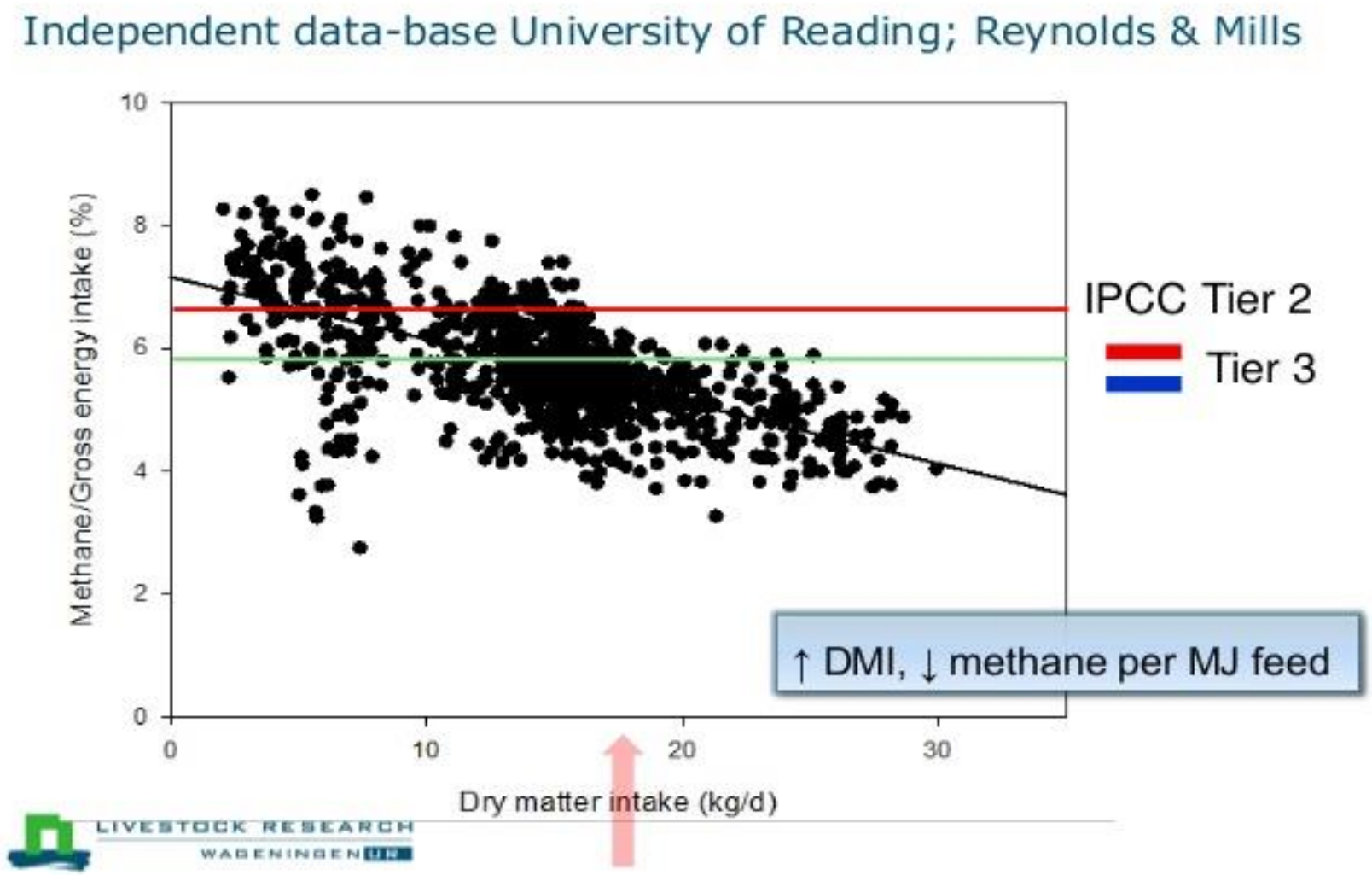


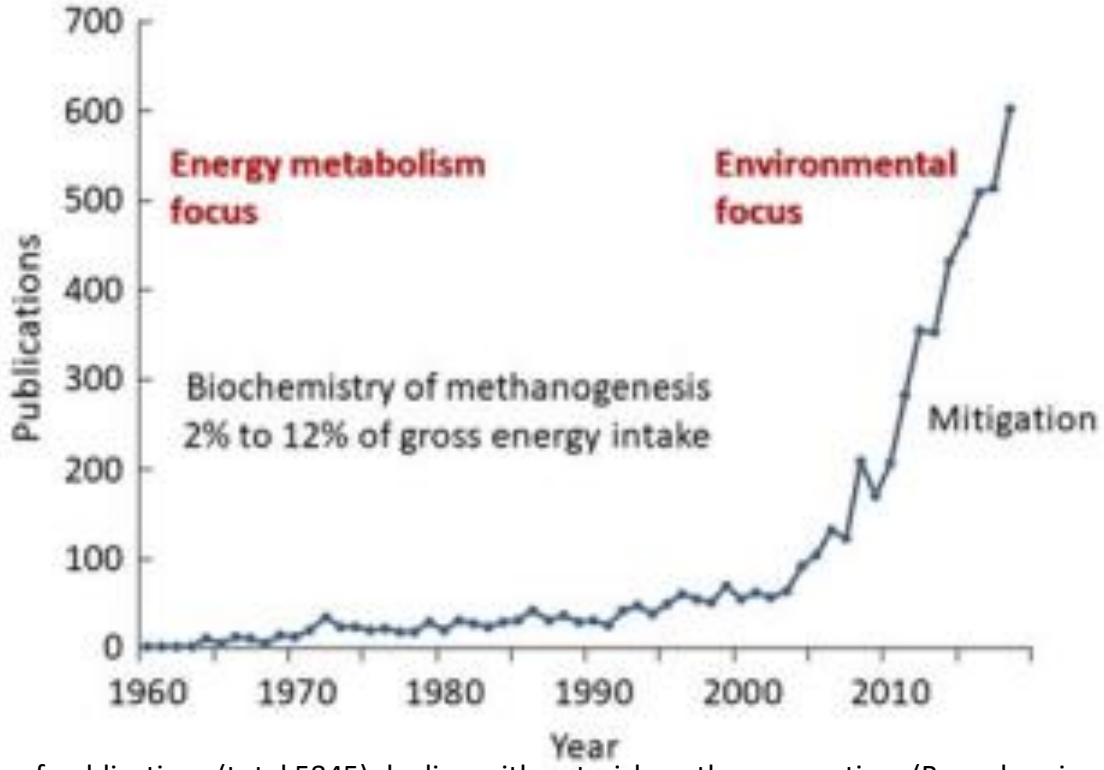
Fig. 7. Total greenhouse gas emissions from the various emission sources associated with livestock production in the EU-27.

Production level is important for methane per kg drymatter feed



Reynolds (2011); Bannink (2016)

Large development in scientific knowledge



Number of publications (total 5845) dealing with enterisk methane over time (Beauchemin et al., 2020)

Mitigation options

Mitigation
Productivity
- Milk yields
- Feed intake
Feedration
- Concentrate / Roughage
- Fatty acids (10 g)
- Additives
Genetic
- Methane selection
- Cross breeding (feed efficiency)
Management
- Extended lactation (intake)
- Holistic grazing

? How to include in PEF

How to estimate in PEF?

PEF Dairy Products

The PEFCR for dairy products refers to IPCC (2006) Tier 2 as minimum requirement, which is national data for feed intake combined with a methane factor (Ym) related to milk production level.

			Methane conversion factor	
Production level, kg milk annual per cow	Feed Digestibility, % of DM	NDF, % of DM	CH4, g per kg DMI	Ym, % of GE
< 5000 kg	<62	>38	21,4	6,5
5000-8500 kg	63-70	>37	21,0	6,3
8500 kg	>70	>35	20,0	6,0
8500 kg	>70	<35	19,0	5,7

From Animal Working Group

As part of updating of the PEF for agriculture products working group has look into a range of areas, of which enteric methane is one of them. The recommendation was to use an approach based on national data for drymatter intake and content of NDF, as input to the formula after Niu et al. (2018).

CH_4 g per animal per day = 33.2 + 13.6 x DMI (kg per day) + 2.43 x NDF (% in DMI)

They also notes that where relevant Tier 3 /advanced Tier 2 approaches can be used in the form of country specific methods for estimating enteric methane emission, which are often based on an extensive understanding of the local animal and dietary factors affecting enteric methane emission

How to estimate in Nordic countries?

The Nordic emission reports

Sweden and Norway use a Tier 3 approach based on models from Nordic experiments, while Finland and Denmark use a Tier 2 approach with national data and in Denmark this is combined with a national estimated Ym factor, while Finland use the IPCC standard.

Across countries the annual data needed for calculation of enteric methane are

S: Milk yield, roughage % of DMI and DE

N: Milk yield, concentrate % of DMI

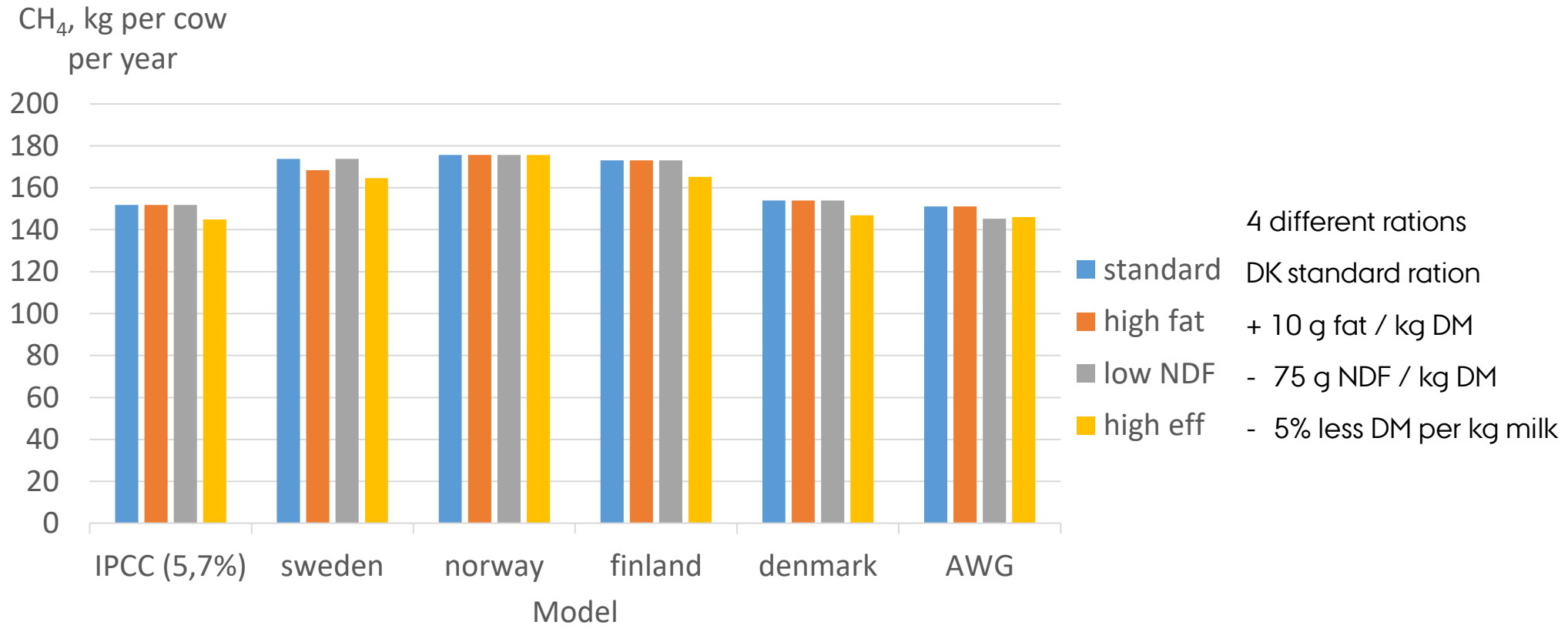
F: Milk yield (and other performance data), DE forage

DK: Feed dry matter intake, (GE)

National enteric methane – dairy cows – compared for Nordic countries and within country with IPCC

	Year	Milk	Intake		Ym factor, %		Methane, kg per cow annual			
		Kg annual	Kg DM annual	GE, MJ per day	Country specific	IPPC, Tier 2	Country report	Tier 1 (W. EU)	Tier 2 (GE)	Tier 2 (DMI)
Sweden	2018	9385	6315	331	6,45	6,0	140	126	130	126
Norway	2020	8463		363	6,34	6,3	151	126	150	
Finland	2020	9309		378	6,50	6,0	161	126	149	
Denmark	2020	10950	8029	416	5,78	5,7 [1)]	158	126	164	161

Enteric methane – dairy cows – compared for 4 different rations (mitigation options 5% reduction) using IPPC (Tier2), inventory models in the Nordic countries or model by Animal working group (AWG)



Conclusion

Using different IPPC approved methods and national model to estimate enteric methane shows

- Level of emission, kg CH_4 annual per cow, and the raking of countries change across models.
- Mitigation options is only captured partly across models and if captured with some variation in the amount of methane.

- For estimating the product footprint across countries is the use of different models problematic

  if the level of emission change due to the model parameters and not the production data.

- It is therefore problematic that the AWG allow the use of national models, even in the case that they are approved by IPCC.

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