

Potential and Models for Reducing Greenhouse Gases and Ammonia from Manure

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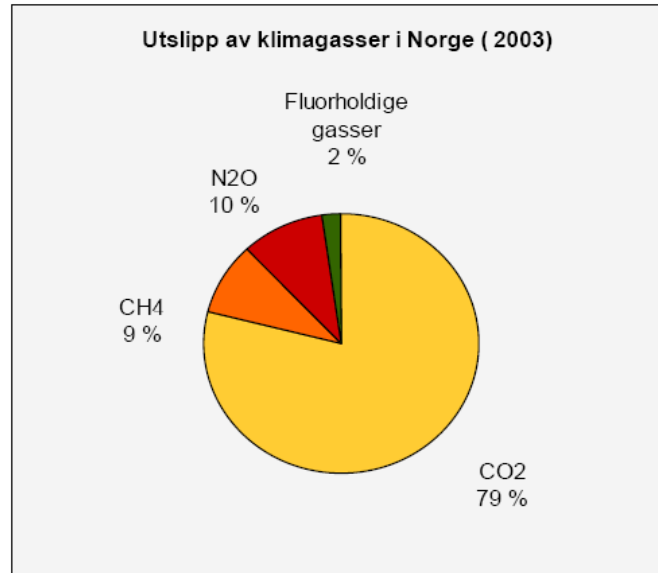
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2111
2005

Norwegian agriculture and greenhouse gases



Kilde: SFT og SSB.

Total 4,8 mill. tones CO₂-ekv.

Enteric fermentation: 44 % (89 kilo tones methane)

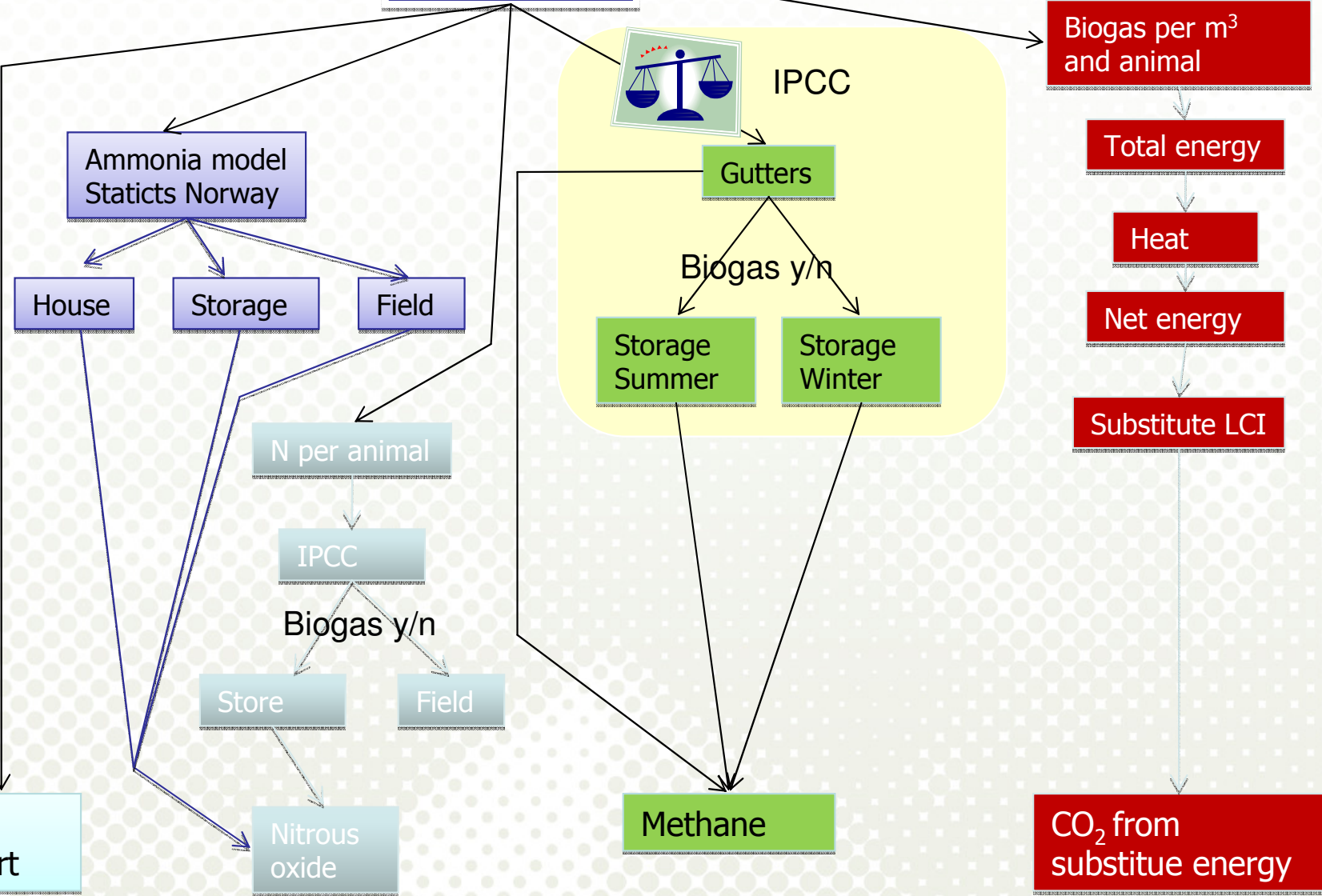
Manure management: 10 % (15 kilo tones methane)

Agricultural soils: 46 % (nitrous oxide)

Model

Manure per animal
No of animals

Total manure



Distance
LCI CO₂ truck
3
CO₂ transport

N per animal
IPCC
Biogas y/n
Store
Field
Nitrous oxide

IPCC
Gutters
Biogas y/n
Storage Summer
Storage Winter
Methane

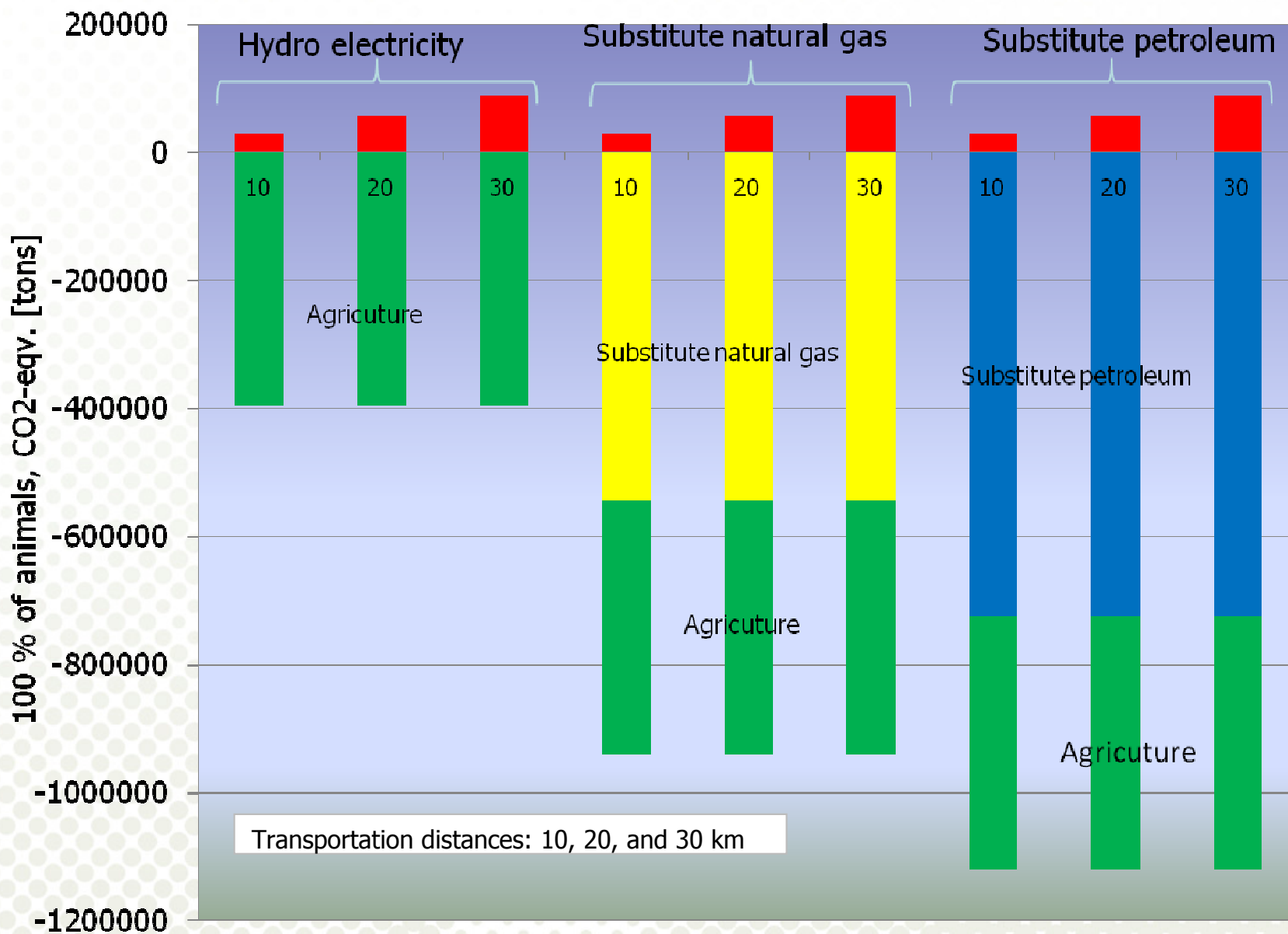
Biogas per m³ and animal
Total energy
Heat
Net energy
Substitute LCI
CO₂ from substitute energy

Result – reduced greenhouse gas emission

Emission of greenhouse gas from animal farms for non biogas treatment, biogas treatment, and reduction in quantity as percentage.

	No biogas [Tones CO2-ekv.]	Biogas, 100 % [Tones CO2- ekv.]	Reduction [%]
House	3272	3272	0
Storage	450184	57034	88
Indirectly ammonia	12824	357	97
Leakage, 2 %	0	9240	
Sum animal farms	466280	51423	89

Result - Greenhouse gas reduction (tones CO2-eqv.) for cooperative plants with various transportation distances.



Conclusions

- Biogas could reduce greenhouse gas emission from agriculture with 89 %
- Biogas also reduced nitrous oxide produced by ammonia emission with 97 %
- Transportation of manure gave only little greenhouse emission compared to the reduction that could be achieved
- The reduction potential of greenhouse gas emission is depending on the use of the gas (which type of energy does it substitute)