



Organic farming and Biogas

REVISION – Workshop

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Developing self-sufficiency in organic farming?

Biogas is the perfect tool to enhance the desired development in organic farming



5 Major challenges

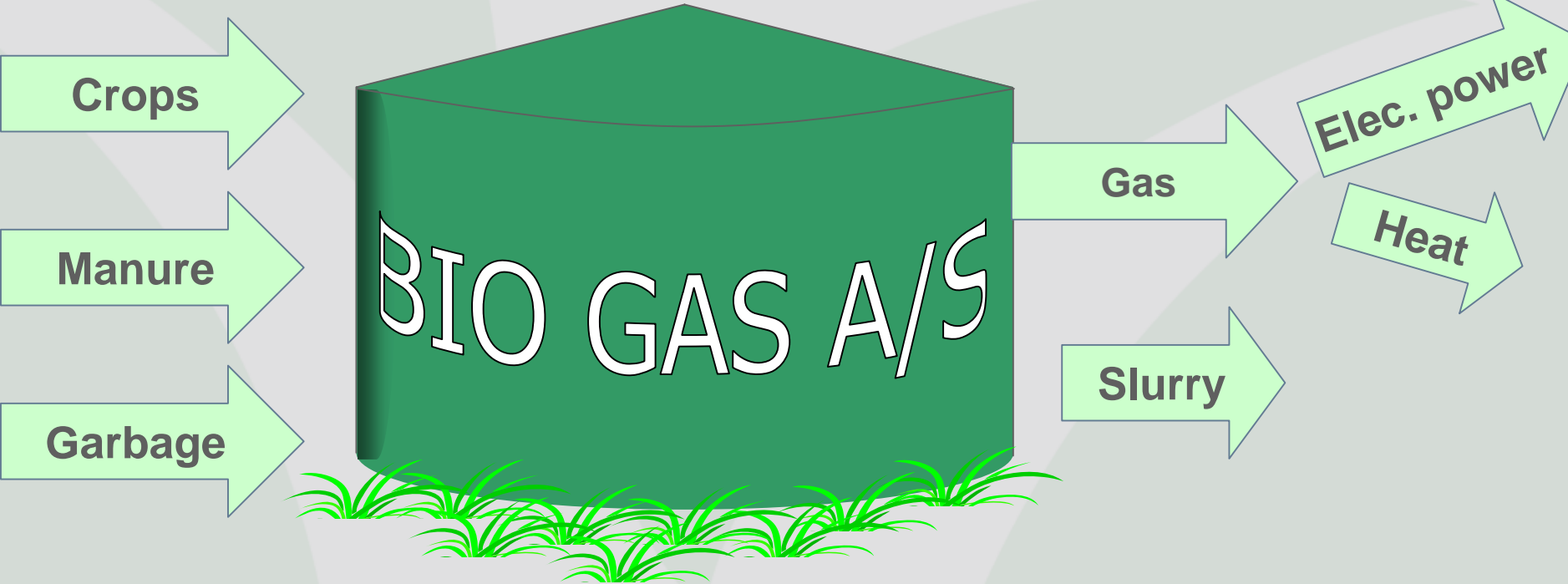
- Growth in organic demands
- Independence of conventional manure
- Improve crop rotations
- Improve environmental profile
- Initiate energy production



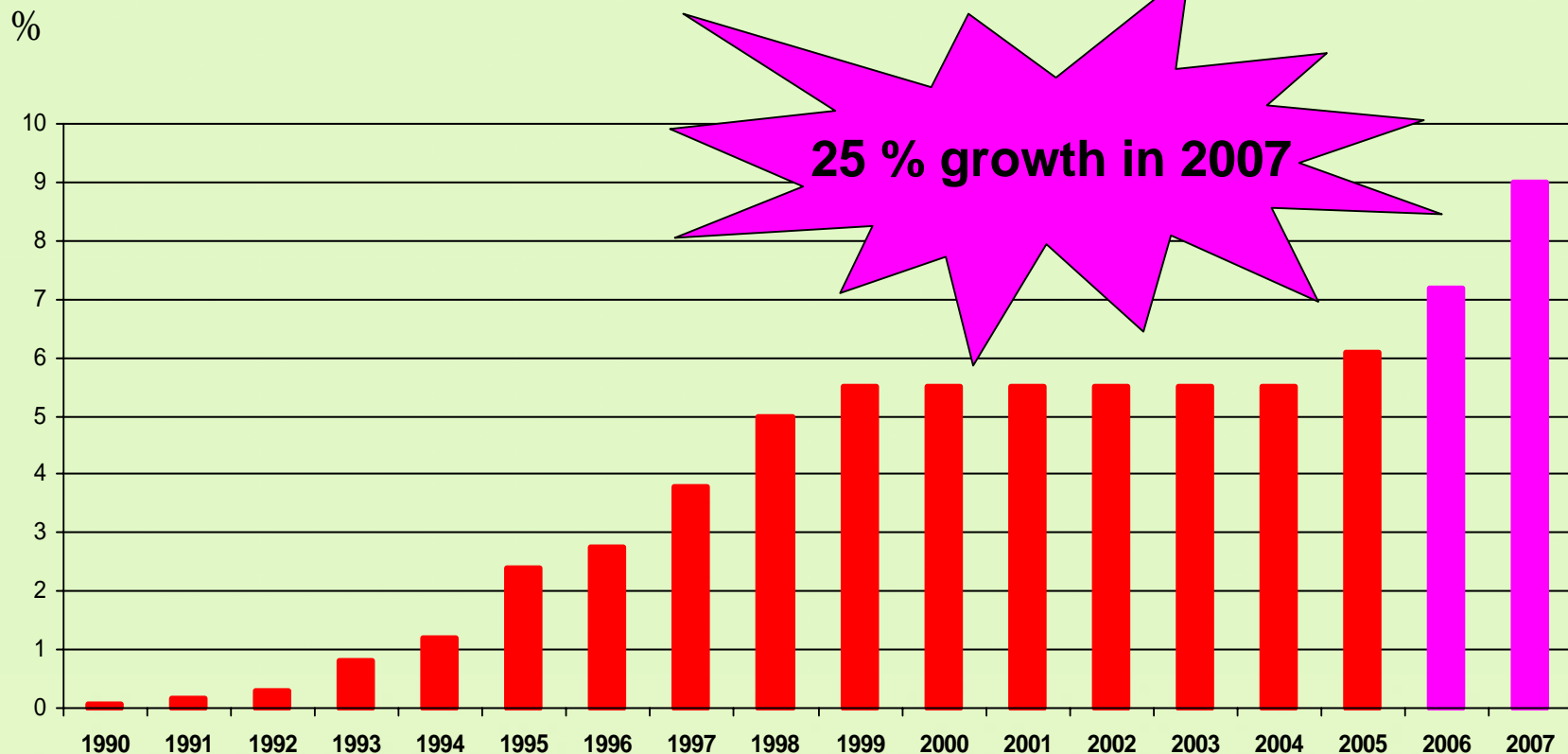


Biogas is the answer!

Biogas – Basic!



The organic market share 1990 - 2007



Kilde: GfK ConsumerScan

Anm: 2005 beregnet på baggrund af tal fra Danmarks Statistik

2006 estimeret på baggrund af tilbagemeldinger fra virksomheder og detailkæder

2007 estimeret på baggrund af detailkædernes aktuelle planer for sortimentsudvidelse på økologi

ØKOLOGISK LANDSFORENING



Conventional manure?

- 4.200 tons nitrogen imported (24 kg per ha.)
- Uncertainty among some organic producers
- Limits to conversion
- A dilemma and incredibility
- **Biogas slurry can replace conventional manure**



Perennial weeds

Maintaining arable crop rotation and preventing infestation of perennial weeds is impossible without some sort of green manure management.



Organic crop rotations - DK

- Effect of green manure is low on sandy soils because of leaking of nitrogen.
- Accumulated nitrogen in green manure is larger than the demands of a grain crop
- Exploitation of green manure for biogas makes nutrition management more flexible by the option of moving and distributing nutrients.
- Askegaard et al. (2004) - Grøn Viden nr. 298 - 2004

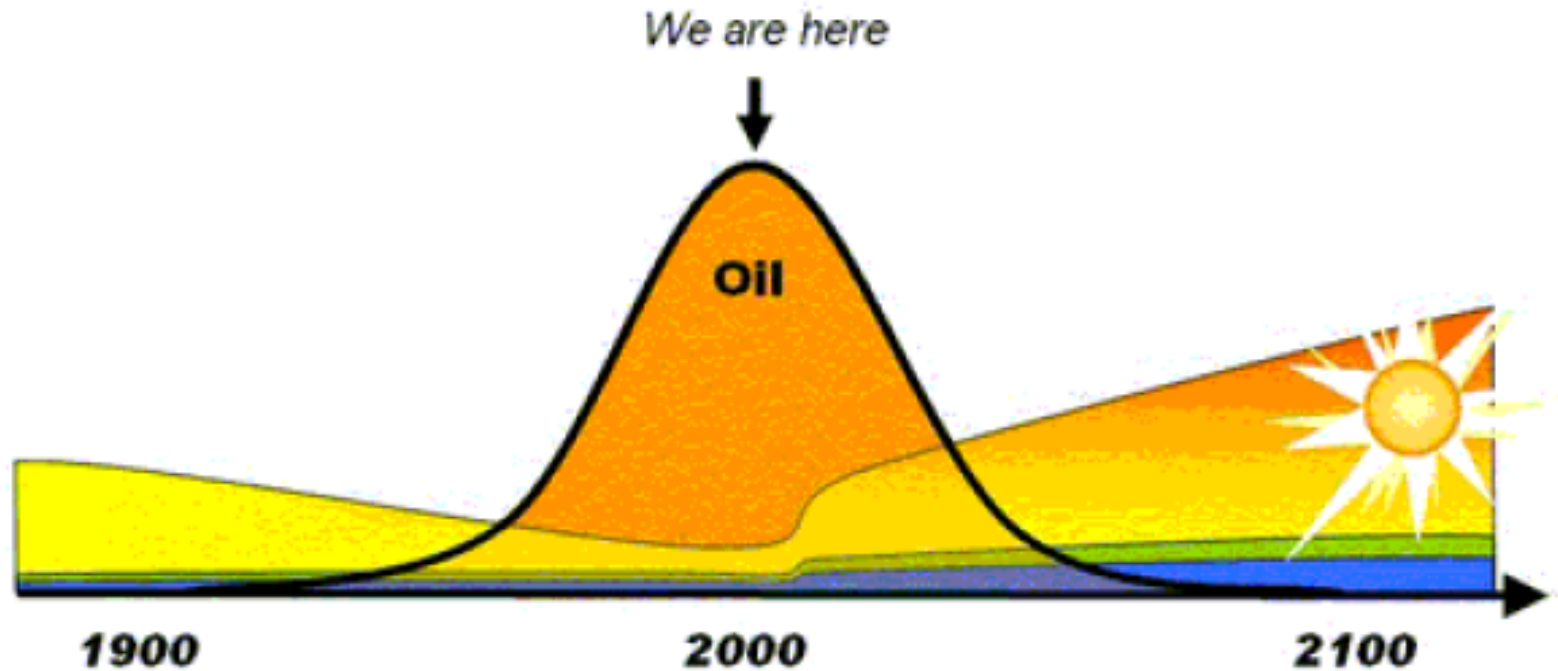


Exploitation of clover grass for biogas can:

- Lower N-surplus after clover grass
- Maximise N-fixation
- Lower N-surplus on farm level
- Lower evaporation of ammonia and methane (Climate gasses)



Wake up!!!



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Energy in clover grass

	Methane, m³	Elec. power, kWh	Varme, kWh
Cattle, 1 LU	300	1.200	1.500
Pigs, 1 LU	275	1.100	1.375
Clover grass, 1 ha á 30 tons, 18 % DM	1700	6.800	10.200

Energy in clover grass

10 % of acreage (39 hectares mixed farming)
with clover grass for biogas:

- From net consumer: (-220 GJ)
- To net producer (+127 GJ)

(Dalgaard et al, 2004), FØJO-rapport nr. 19



Results from Germany and Sweden

- 15-23 pct. higher grain yield
- 22 pct. higher N-uptake in grain



How much clover grass is necessary?

Share CG (%) in rotation	Share N-demanding crops (%)	Kg N pr. ha. N-demanding crop
17	63	54
20	60	67
25	55	91
33	47	140

- 200 kg N harvested in clover grass
- 20% share non-N-demanding crop

	Case 1	Case 2		Case 3
Area	445 ha.	424 ha.		127 ha.
Energy crop ha (per cent of area)	53 ha. (12 %)	218 ha. (51 %)		25 ha. (20 %)
Biogas plant size and investment	450 m ³ €0.5 mill	3000 m ³ €1.2 mill		No on-farm biogas plant
Conventional pig slurry	Yes	Yes	No	Yes
Change in farm economy €	8,100	32,800	17,000	6,133
Biogas plant, present conditions €	- 30,000.	9,093	- 20,187	-
Biogas plant, improved conditions €	- 4,533	116,700	61,300	-

Conclusion

- Organic farming can be independent of conventional manure and apply 50-100 kg N per ha. from biogas slurry
- Extra biomass can raise the fertiliser level
- Biogas slurry contribute with N-resources not available to day
- Smaller biogas plants are just about profitable, but larger plants are even better
- Crop rotations, fertility and productivity are improved by arable systems with biogas
- Environmental profile and energy balance will be improved too



Perspectives

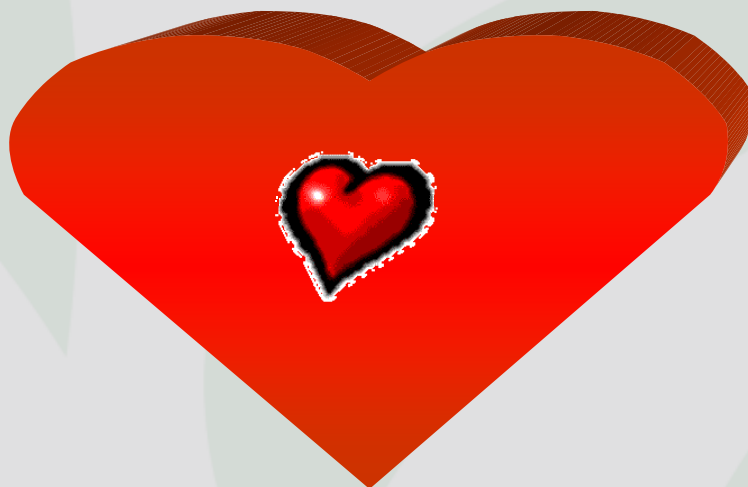
A self reliable and self sufficient organic farming system is possible and..

- More farmers will be interested in organic when they understand the independence of the system
- More consumers will prefer organic products which repress fossil energy consumption and prevent global warming.

This is essential for development of organic farming



This is indeed a win-win-situation



Thank you for your attention

