

Farm-scale biogas production in Northern Europe

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Case Kalmari

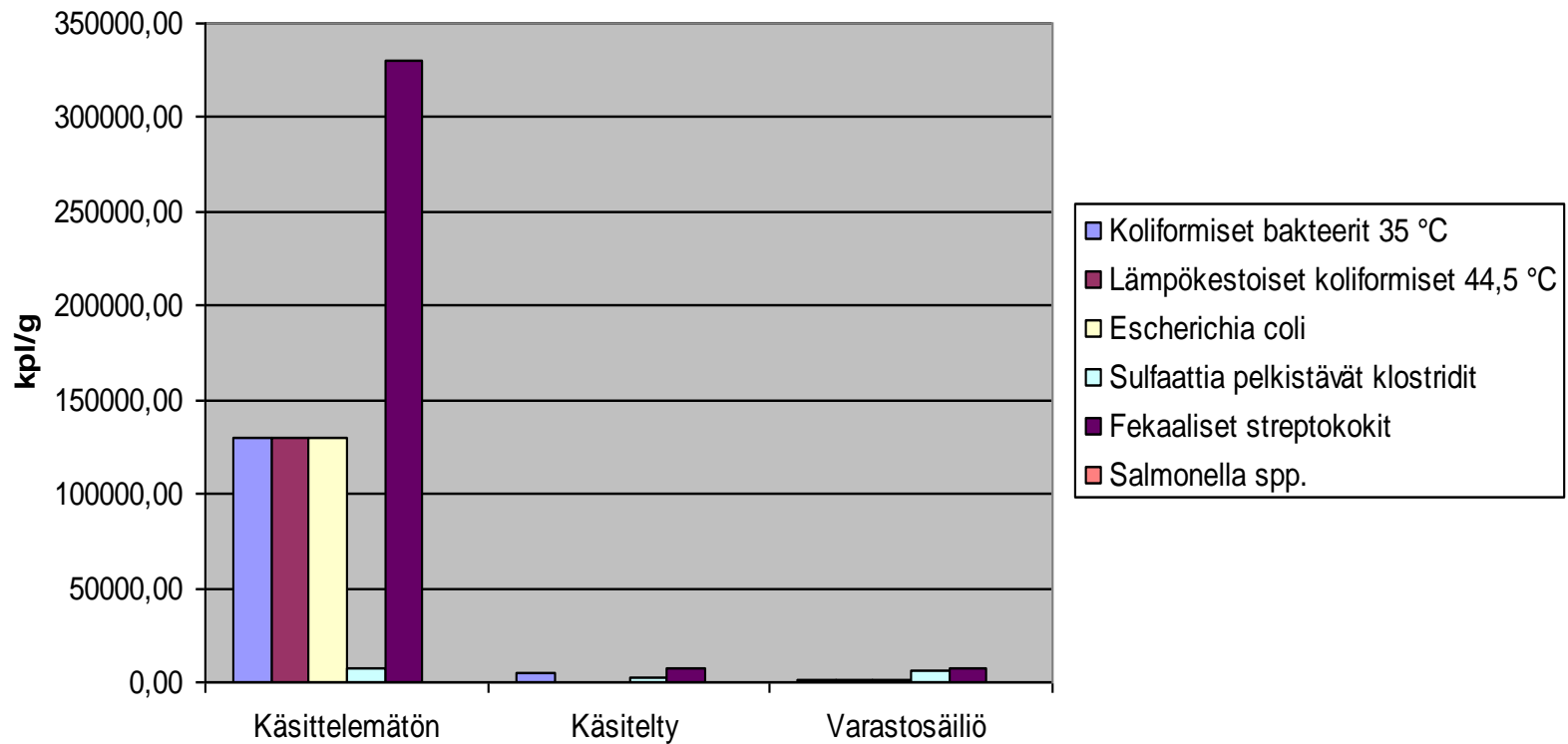


- Kalmari farm is an old family farm, established 1666
- Biogas plant was installed 1998
- Driver was need to get animal manure more hygienic and produce heat for farm estate

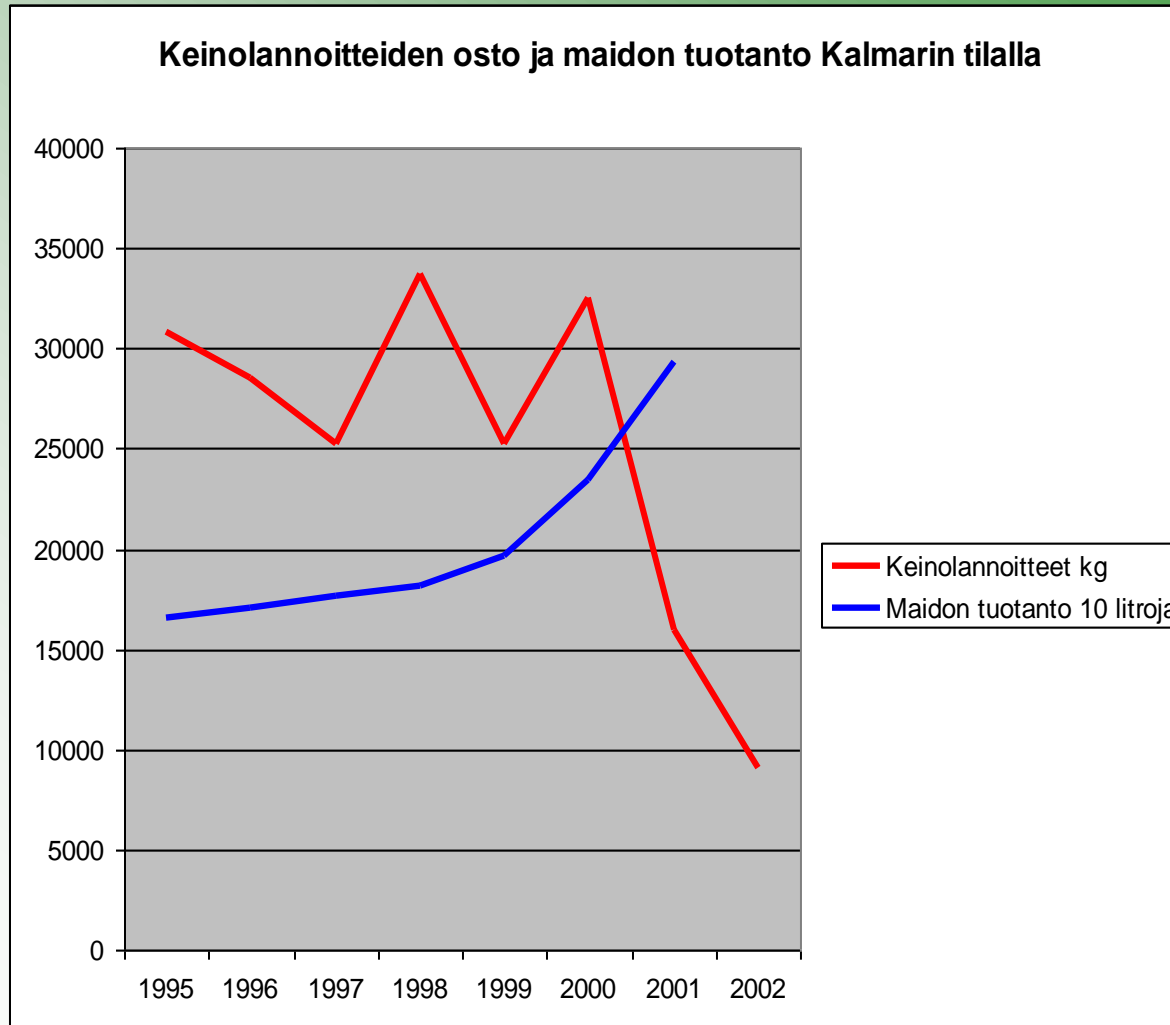
First notices

- Milk production and animal health was increased
- 99 % reduction in manure pathogens
- Artificial fertiliser need reduced due better nutrient availability

Patogeenien määrät käsittelemättömässä, käsitellyssä sekä varastosäiliön lannassa 4.7.2000



(Luostarinen Sari, Pro-Gradu 2001 Jyväskylän Yliopiston Bio- ja Ympäristötieteiden laitos)



Further development

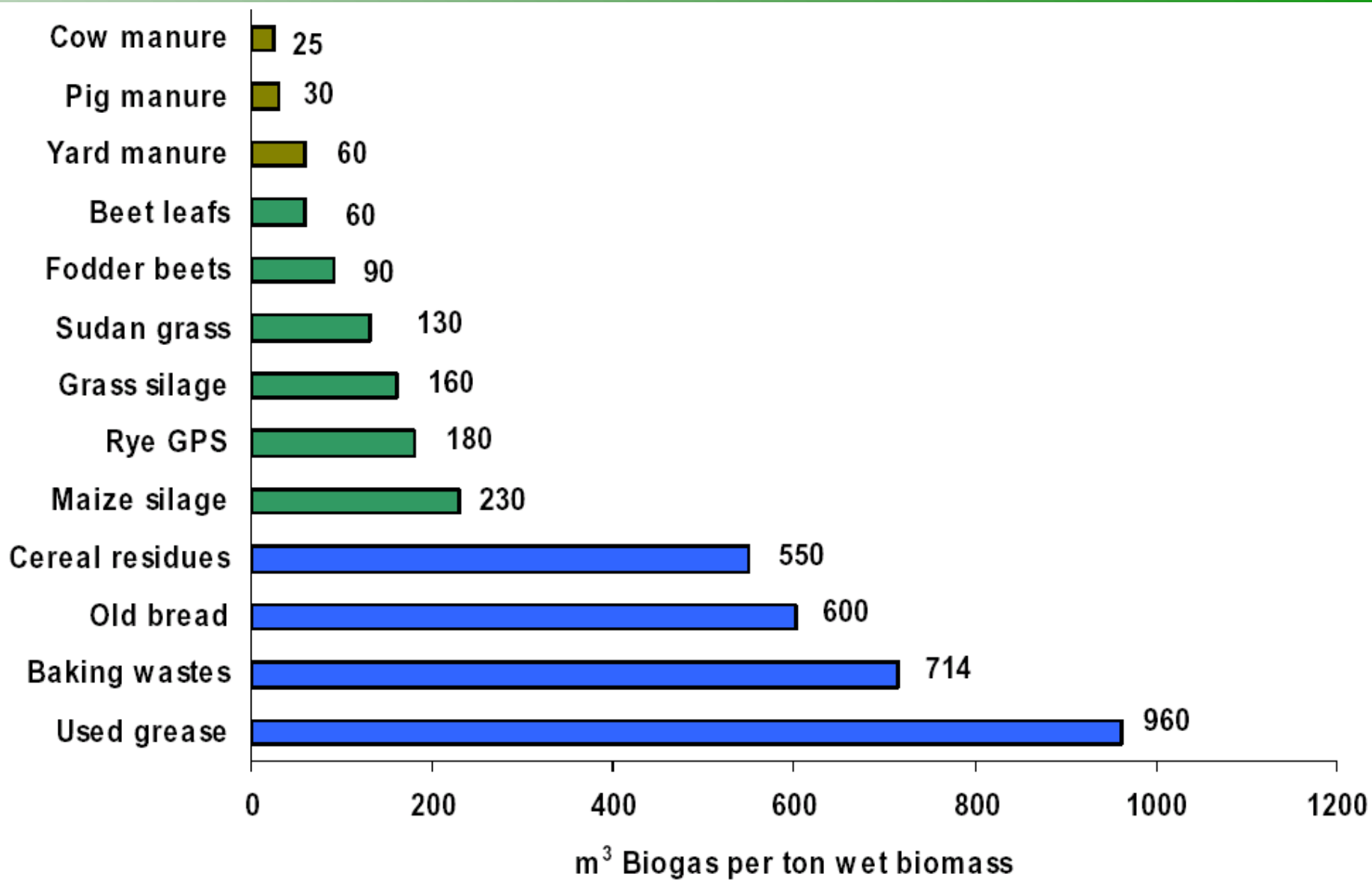


- CHP production to remove day time electricity purchase from grid
- Vehicle fuel production since 2002
- 10 fold larger bioreactor with more diversified feedstock capabilities in 2008
- Founding of Metener Ltd

Current status



- Cow manure 2000 t / v
- Animal by-products 500 t / v
- Plant based food industry waste 200 t / v
- Sufficient heat production to cover farm, workshop and crop drying need
(200 MWh / a)
- 2/3 of needed electricity (100 MWh/ a)
- Biomethane sales 1100 MWh / a



(Weiland 2005)



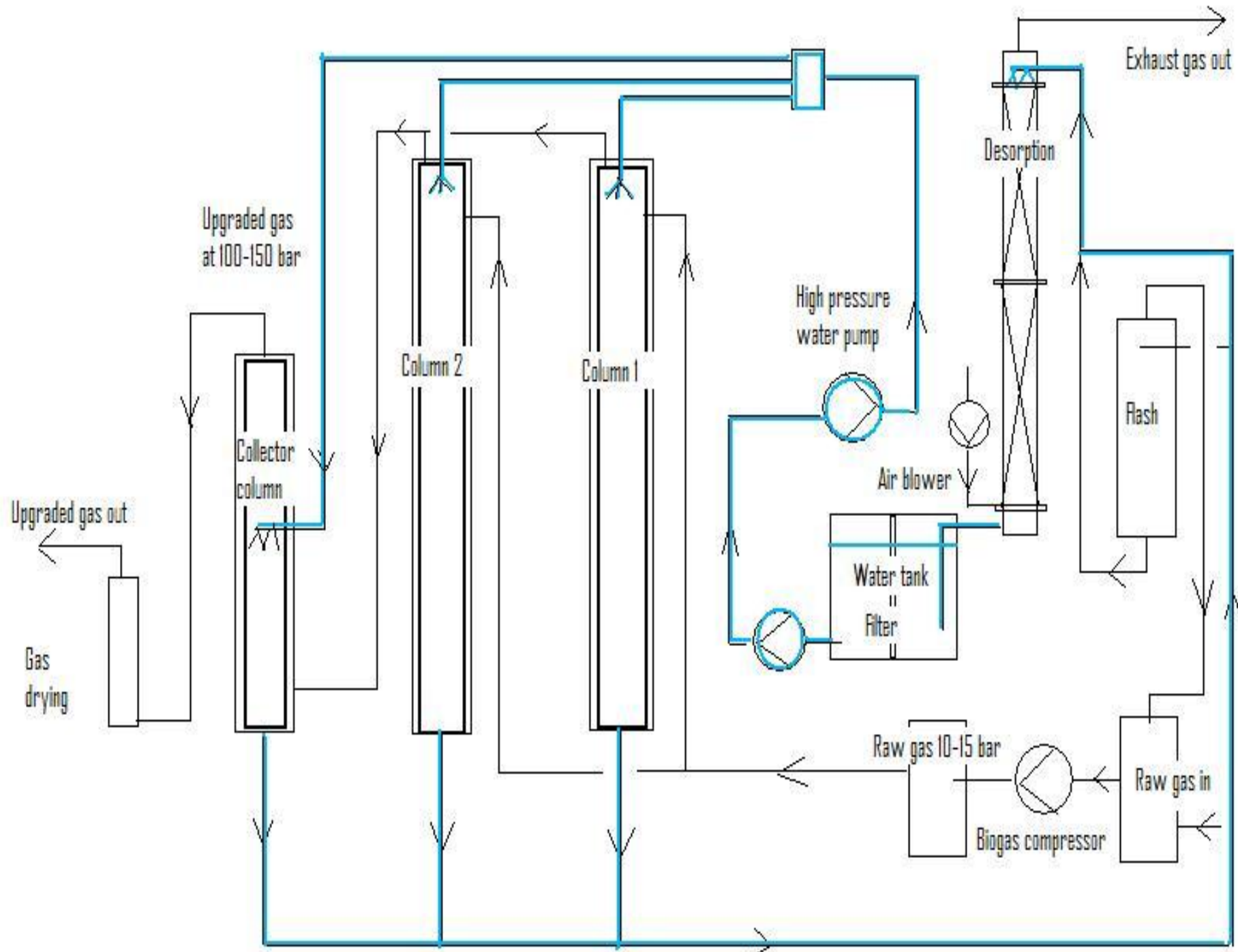












- High pressure absorption system and filling station total energy use is 0,9 – 1,0 kWh/Kg product gas upgraded and pressurized.
- Water use 0.02-0.03 m³ / Kg of product gas.
- Maintenance cost estimate 0.04-0.08 Euro / Kg of upgraded and pressurized gas. Methane content of upgraded gas is 92-95 % CH₄



Lightweight gas bag on cyclist's back provides him with cheap source of power. But not only is it inexpensive — more important, it's available!

Three-wheeled German delivery truck utilizes a huge methane bag on its roof so that it can put in a full day of work without any refueling.



Street scene in Munich: city buses have methane trailers attached which don't hinder efficiency. They're almost big enough to carry the cow, though.

Rotary tiller is powered by manure gas dispensed from a bag on the farmhand's back. This type of power turns the farm into a self-sufficient unit.



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