



# Methane to Markets

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Department for Environment  
Food and Rural Affairs



Developing New Markets in Scandinavia

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# Introduction

- Introduction
- General differences between the Nordic countries
- Focus on the agricultural sector
- Present situation in the Nordic countries
- Case “Biovakka”
- Future developments
- Developing markets in Scandinavia

# Background

- Although the Scandinavian countries are connected by the same culture and long traditions of keeping together, there are significant differences between the countries.
- Geography
- Climate
- Denmark 128 inh/km<sup>2</sup>  
Sweden 20 inh/km<sup>2</sup>  
Norway 12 inh/km<sup>2</sup>  
Finland 16 inh/km<sup>2</sup>  
(UK 243 inh/km<sup>2</sup>)



# AD in Denmark

## Number of plants

- 20 joint biogas plants
- 60 farm scale biogas plants
- 20 projects

## Joint and farmscale biogas plants 2003

Manure	1.742.156 t
Organic residues	450.708 t
Total	2.192.864 t



● Centralised ● Farmscale ■ Projects

Source: Food and Resource Economics Institute, Denmark



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# AD in Denmark

- Longest experience, over 25 years
- Mature technology
- Co-digestion is important
- A solution to multifunctional problems
- Mainly electricity & heat production



## Agriculture

- Improved utilisation and storage capacity
- Relations to neighbours
- Redistribution of manure
- Extraction of surplus of nutrients

## Society

- Decrease dependency on imported fossil fuel
- Decrease emission of greenhouse gases
- Protection of drinking and surface waters



## AD in Norway

- Norway is different!
  - Manure disposal no problem
    - Lower animal density
    - Ground water not a drinking resource
    - Long distances



First biogas plant for manure at Jæren

- Only one AD-installation for manure in Norway so far
- A trend of centralisation of livestock and new regulations may increase the demand

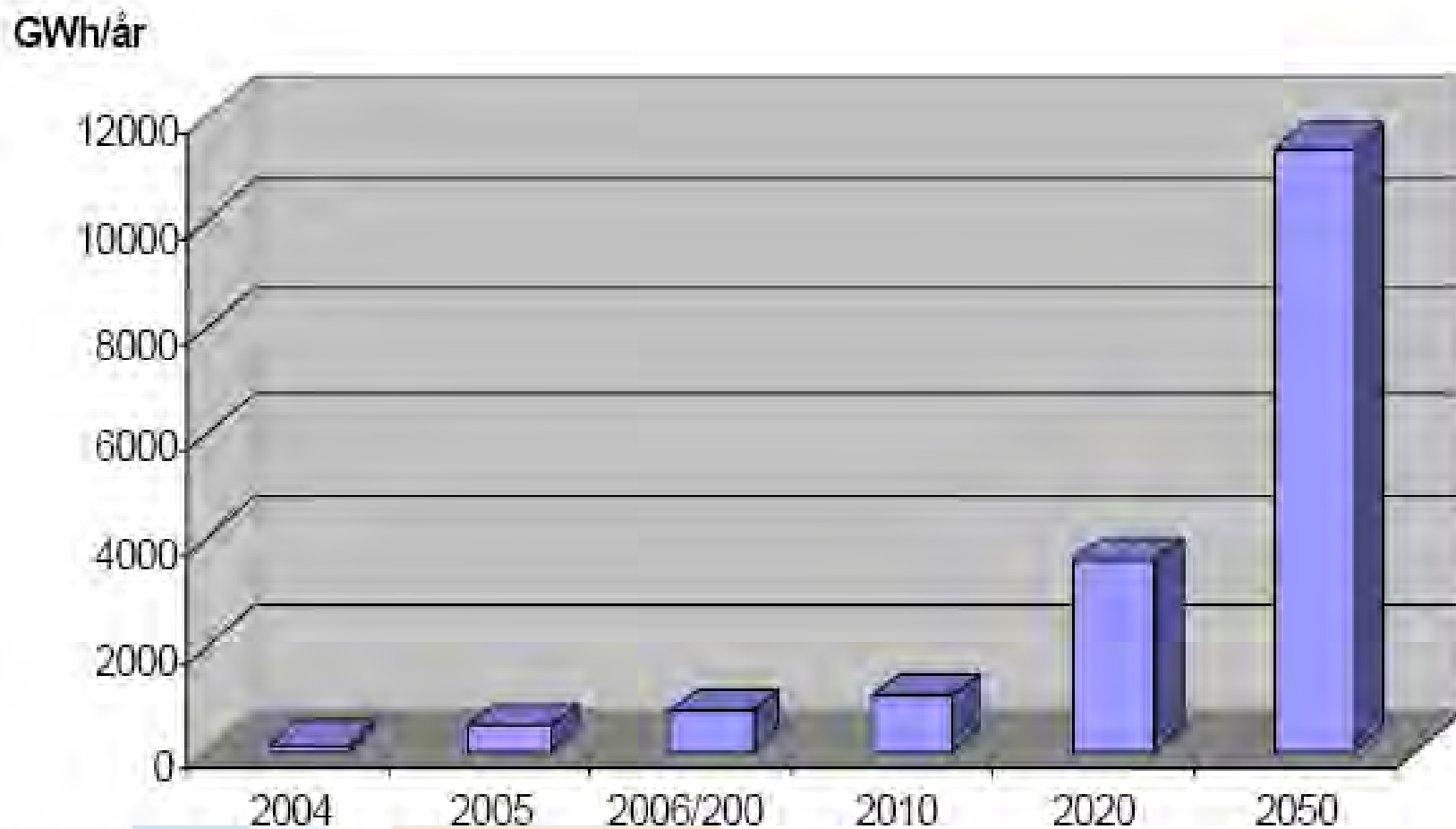
## AD in Sweden

- Sweden focused on bio-energy production on large scale
- About 10 pcs of small local farm scale facilities
- Several co-digestion plants
- Well organized network between producers and consumers
- Impressive visions about Biogas as vehicle fuel in the future
- Already full scale tests for biogas production from crops
- The agricultural sector is prescribed a significant role in the future energy strategy in Sweden





# Biogas used as vehicle fuel



Source: SVEBIO

# Biogas-train Amanda



Svensk Biogas Ab  
Photo: Lasse Heidenberg

# Linköpings Biogas



Svensk Biogas Ab  
Photo: Lasse Heidenberg

<4,5 Mm<sup>3</sup> vehicle gas / a  
50 000 t/a certified biofertilizer  
54 000 t/a processed annually of which 43 000 t/a  
is slaughterwastes



*I make a difference!*

By choosing a biogas fuelled vehicle for the taxi service that I run, I reduce carbon dioxide emissions by 26'000 kgs per year.

This also gives me a competitive advantage since many clients prefer to ride in an environmentally friendly alternative.

What could biogas do for your business?

  
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# AD in Finland

- Only a few agricultural AD facilities in Finland
- Increasing interest
- Estimated that 3 bigger (>100 ktn/a) installations will be established in the next 2-3 years



## Case BIOVAKKA

- The biggest is the Biovakka installation in Vehmaa
- Owned by 20 regional pig farmers
- Capacity
  - Pig Manure 80-90 ktn/a
  - Solid manure 5-10 ktn/a
  - Biowaste&sludge 5-10 ktn/a
  - Sewage sludge 15-30 kt/a
- Technology from Denmark
- Founded by the Ministry of Trade and Industry (34%, 1,6 milj EUR)



## Case BIOVAKKA

- Mesophilic process
- Retention time of approx 3 weeks
- Hygienisation at 70 C for all incoming material
- 11 m<sup>3</sup> CH<sub>4</sub>/Mg input waste
- Desulphurization of biogas
- Electricity production by a co-generator, 330 kW<sub>el</sub>



# Technical Experiences

- Scandinavian climate must be taken into consideration
- Not predictable markets – pig manure replaced with industrial wastes
  - Unexpected odor problems
  - Overproduction of energy –efficient utilization?
- Biovacka is ready to invest in new installations in Finland
- Already signed a contract with the City of Turku – new installation to be constructed for sewage sludge

# Future developments - Factors enhancing the market of Biogas

- European biofuelstrategy – 5,75 % biofuel 2010
- Oil price
- Development of competing technologies
  - Thermal gasification
  - Biodiesel
  - Bioethanol
- Technology available
  - AD technology
  - Biogas purification
  - Biogas – flexifuel vehicles

# Future developments - Factors enhancing the market of Biogas – Strategy in Sweden

- The task of the oil commission was to propose measures **preparing the Swedish society** technically and economically for an **oil independent development**
- It will generate export, job opportunities and regional development
- Goal ->2020
  - No oil should be used for heating residential and commercial buildings
  - Road transport including agricultural, forestry, fisheries and building sectors should reduce its use of oil by 25-40%
  - Industry should reduce its use of oil by 25-40%

# Future developments - Factors enhancing the market of Biogas - Case Sweden

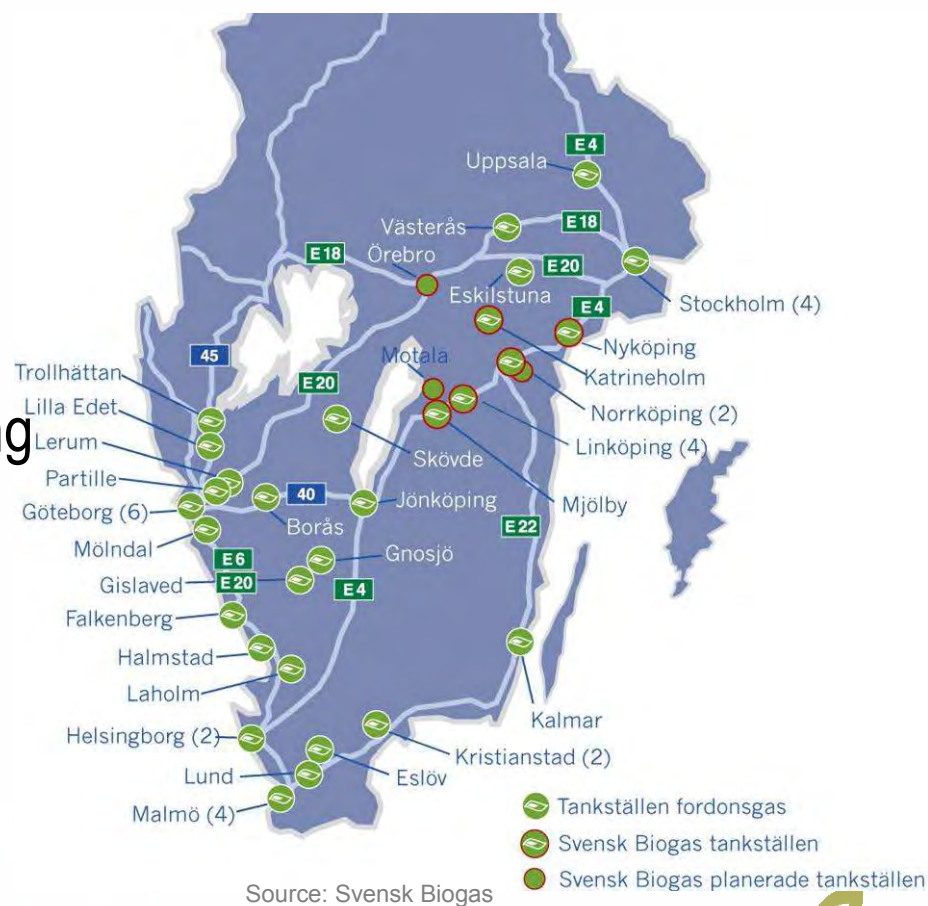
- By local legislation
  - Compulsory for large filling stations to provide biofuels (Sweden)
  - State and municipal vehicle fleet should consist of 25-35 % of environmental friendly cars (Government proposal)
- Economic incentives
  - Necessary in the start-up phase
  - Not obliged to pay entering or parking fees in the Stockholm City
  - Economical contribution, 10-18 000 SEK/environmental friendly car.
  - Lower tax, 40% on company cars
  - No CO2 tax and no energy tax (2004-2008)

# Future developments - Factors enhancing the market of Biogas - Case Sweden

- Results
  - Regionally more demand than possible to produce
  - 2005 compared with 2004: + 400% (environmentally friendly cars)
  - August 2006 13% of sold new cars are environmentally friendly cars
  - Now 3 % biofuels in total
- Biogas most suitable for local fleets in city areas
- Local strategies made in three cities in Sweden
  - Gothenburg
  - Linköping
  - Stockholm

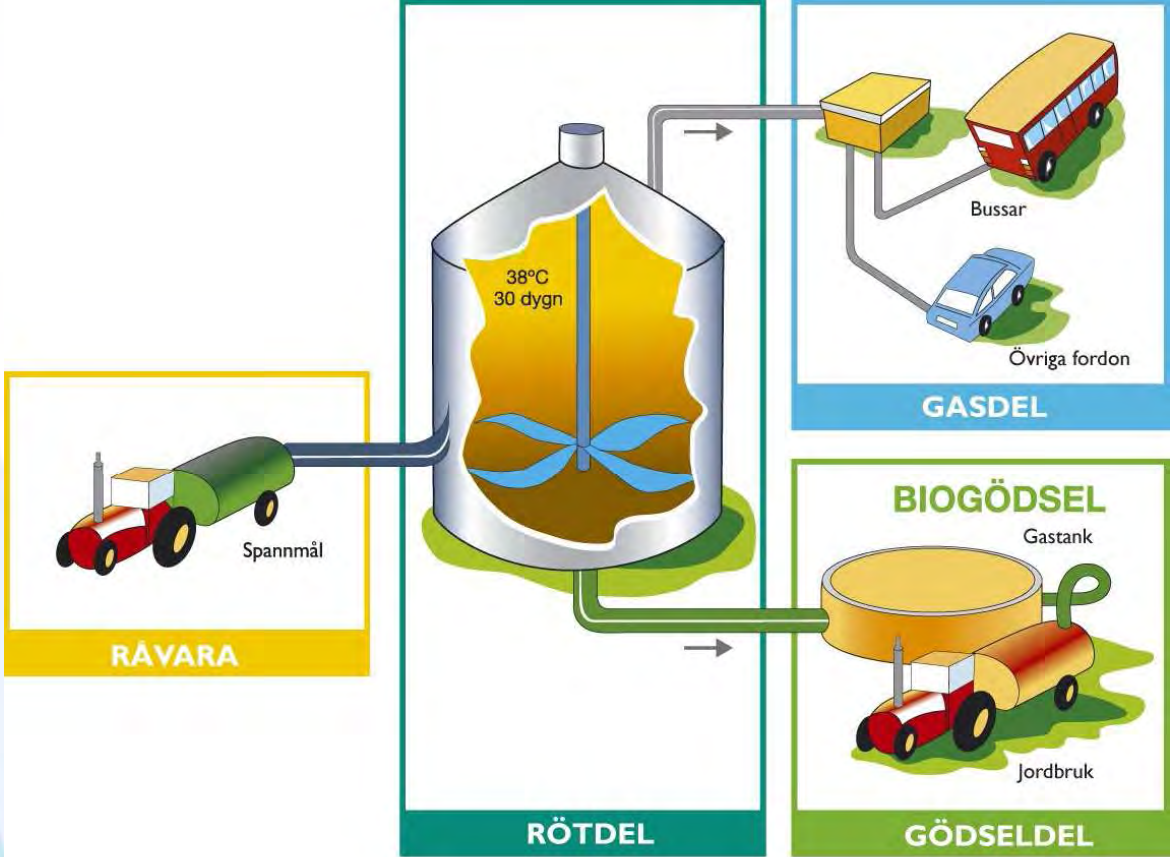
# Biogas on the market

- Compatible alternative
  - Dependant on infrastructure
  - Existing natural gas grid gives advantages during start-up
  - Biogas is cheaper in short and long term (15-20%)
  - Local production of energy





# Greengas by Svensk Biogas





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Thank You for Your  
attention!

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