

# Biogas in Finland

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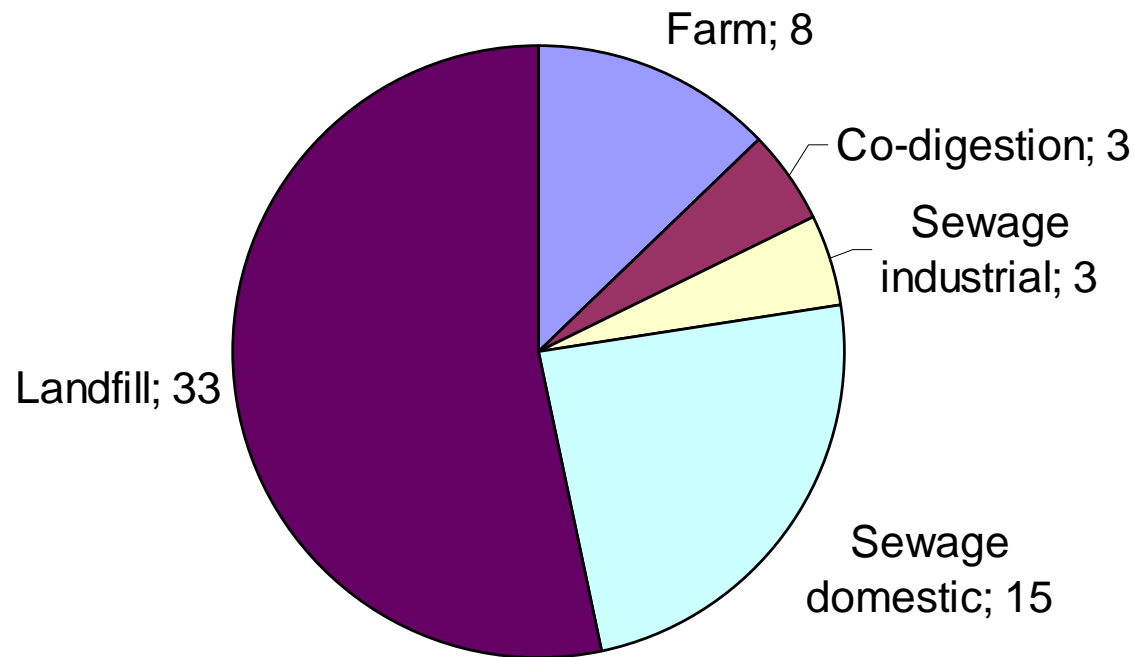
In collaboration with:  
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# Biogas potential in Finland

	Technically feasible by 2015 (TWh)
Municipal solid waste	0.5-0.8
Food industry	0.2-0.3
Sewage sludge	0.2
Manure and straw	3.1-13.6
Energy crops (set aside cropland only)	2.1
Landfill gas	0.7
Total	6.7-17.6

# Biogas plants in Finland 2007

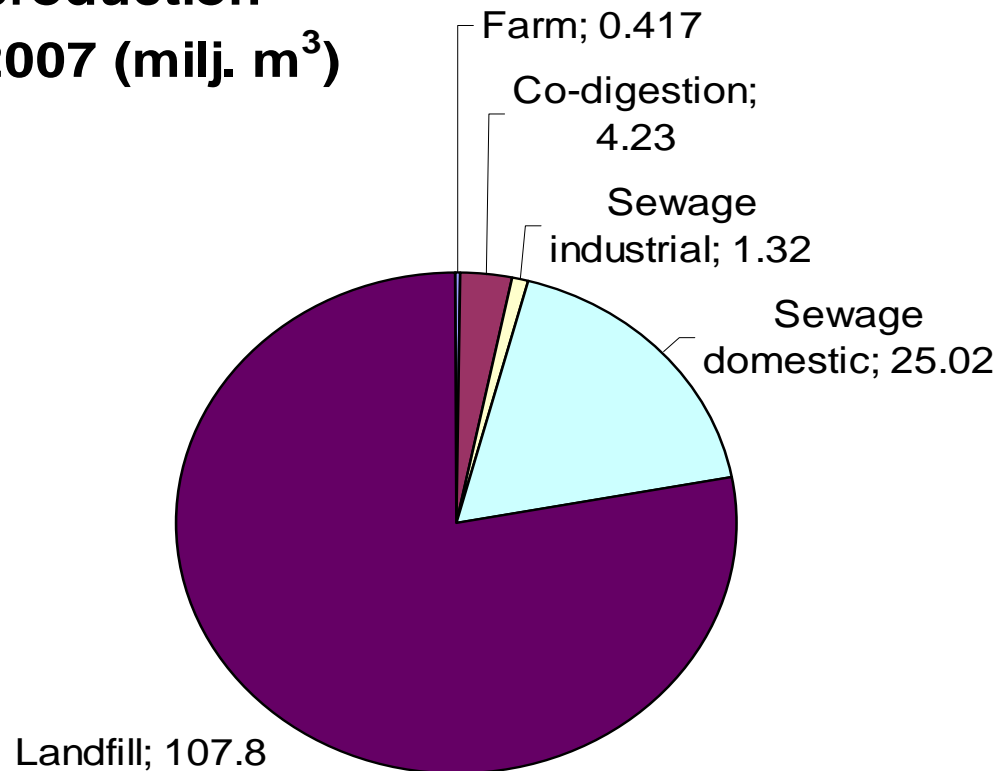
- In total 58 biogas production sites in 2007 (including landfills)
- Landfills are currently the largest biogas producer in Finland



# Biogas production in Finland 2007

- Total biogas production 139 million m<sup>3</sup> (614 GWh) in 2007
- Co-digestion plants increased their biogas production 10 %, landfills increased 6 % from previous year (2006)

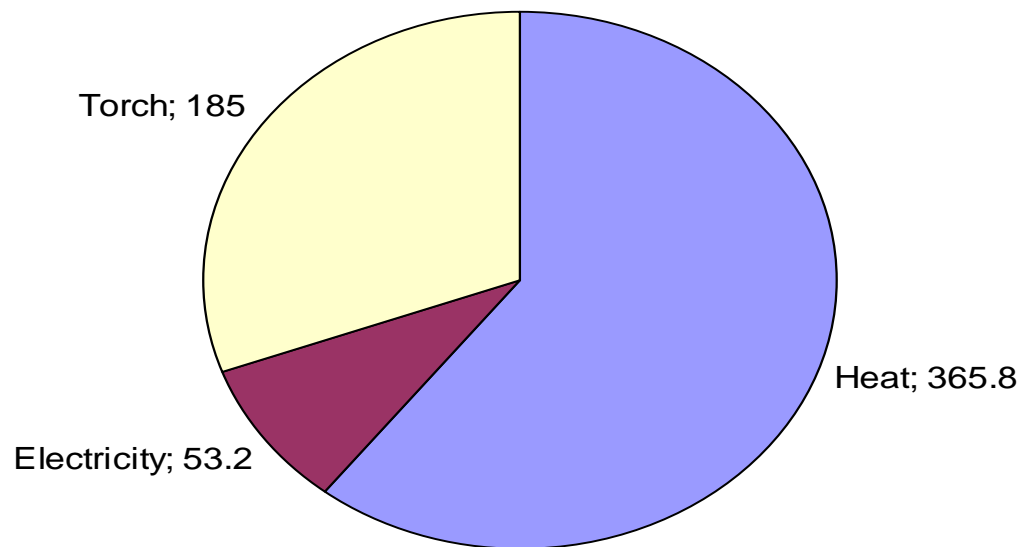
## Biogas production by source 2007 (milj. m<sup>3</sup>)



# Biogas utilization in Finland

- Biogas utilization was 69 % of total production in 2007
- Electricity generation increased 9 % from previous year (2006)
- 185 GWh of energy was wasted due to torching of biogas

**Biogas utilization in Finland 2007 (GWh)**



- Government goal: 1 TWh more biogas production in 2005-2020
- FINBIO goal: 3 TWh more biogas production by 2020
- -> Incentives
- Several centralised and decentralised biogas plants are under planning/licensing/construction at the moment
  - E.g. in Central Finland, 6 feasibility studies under way, one plant under licensing at the moment
  - Biovakka Ltd. has announced their plan to construct 10 centralised plants (currently 2 plants)

# Incentives



- The government is planning to commission feed-in-tariffs for electricity produced from biogas
- Ministry working group in fall 2007:
  - Average tariff 18 cent/kWh
  - Different tariffs for different types and size categories of plants
  - Additional bonuses for new technology, utilisation of manure, utilisation of heat
  - Tariff in place for 10-15 years for each individual plant
  - Lower tariff every consecutive year of plant uptake
  - Tariff system in place until 2020
- 2. Ministry working group will publish their report in June 2009  
-> Tariff system in force in 2010

# Investment grants

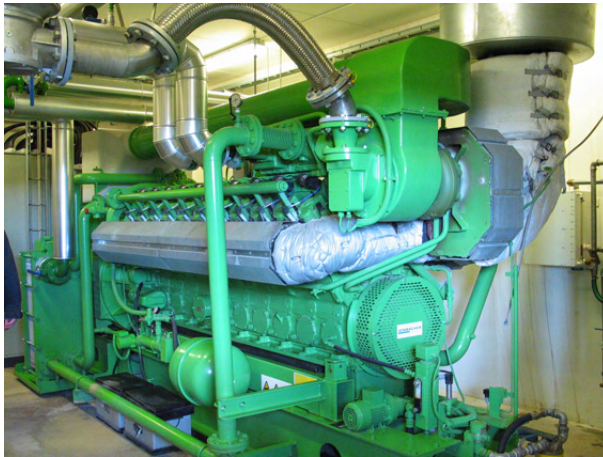
- Investment grants in the order of 15-40% available for construction of biogas plants
- Ministry of Agriculture and Forestry allocated 8 M€ for investment grants in 2008
  - > Applications for 66 M€ (39 applications, total investment 122 M€)
  - > 15 projects were granted (total investment 22 M€)





# Biogas in Finland

- Biogas mainly used in combined heat and power production



- Growing interest for biomethane as vehicle fuel



# CNG as vehicle fuel



- 11 public filling stations for CNG in southern part of the country
- The CNG filling station network is expanding in coming years
  - The national gas grid operator (Gasum Ltd) plans to build 30 public natural gas fuelling stations by 2010
- In total about 500 gas vehicles in operation
- CNG costs about half of the price of petrol (68 cent/l petrol equivalent, 14.04.2009)
- Biomethane and CNG used as vehicle fuel is free from fuel taxes (only VAT)
- Gas vehicles 10-30 % more expensive than petrol vehicles

# Biomethane as vehicle fuel

- One of the first world's first small-scale biogas upgrading systems on farms was introduced in 2003 in Laukaa, Finland
  - About 15 biogas vehicles fuelling (one delivery car and taxi) by 2008
  - Farm's new biogas plant enables biomethane for ca. 200 cars



- Biomethane injection into the gas grid possible in the near future:
  - Cooperation agreement between the national gas company Gasum Ltd. and Biovacka Ltd. in Feb.09: Biomethane produced by Biovacka plants will be fed to the natural gas grid and used as vehicle fuel

# Kalmari farm – Sustainable farming

Crop production

Digestate post-storage & gas storage

Manure pre-storage

Digester

Crops

Industrial by-products



Combined heat and power



Biofuel



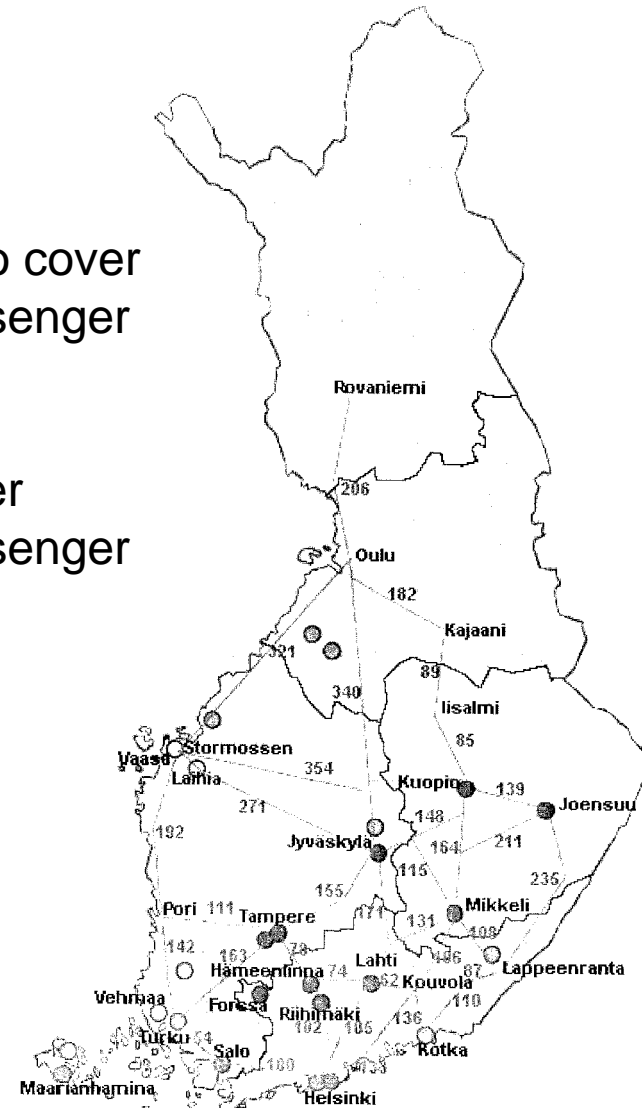
 **Metener Oy**  
*Biokaasuteknologiaa*

<http://www.metener.fi/>

12.5.2009 Annamari Lehtomäki

## Biogas plants in Finland in 2005, Their distance in road km (MK Protech Ltd. 2006)

- Produced biogas would be sufficient to cover the fuel consumption of ca. 10 000 passenger cars each year
- Landfill gas would be sufficient to cover the fuel consumption of ca. 37 000 passenger cars each year



# BAT documentation

- Finnish Environment Institute is working on a "Best Available Technology" document and instructions concerning biogas plants
- To be used by public authorities in granting environmental permits



# Research topics

- Demonstration of various types of biogas concepts
- Processing digestates to more valuable and safe products
- New feedstocks, e.g. from pulp and paper & biorefinery industries
- Crop cultivation methods and less demanding crops
- Overall economics and environmental impacts in practice





# Central Finland Biogas Programme

- Focus of the project is enhancing the production and utilisation of biogas in Central Finland.
- The target is to promote biogas business activity, generate new biogas plant investments, promote biogas delivery and use as traffic fuel and strengthen knowledge and expertise in biogas field in Central Finland
- The project actions include:
  - Biogas energy potential in Central Finland
  - Feasibility studies for biogas plant investments
  - Techno-economical analysis of biogas upgrading and delivery for transport in Central Finland
  - Biogas study tours & seminars



KESKI-SUOMEN LIITTO

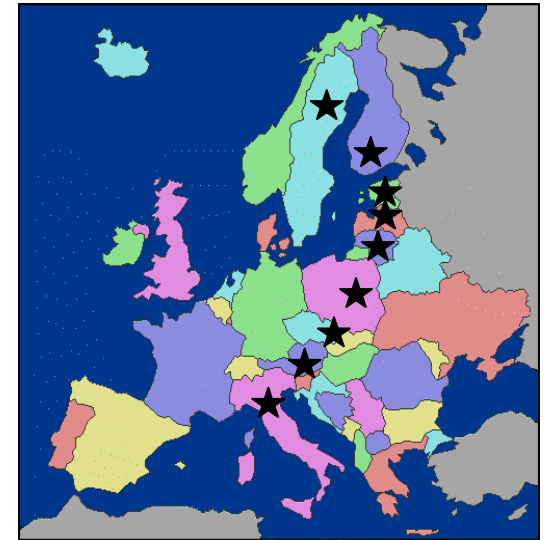


Euroopan unioni  
Euroopan aluekehitysrahasto



# GasHighWay - Promoting the Uptake of Gaseous Vehicle Fuels, Biogas and Natural Gas, in Europe

- The project aims at increasing the use of these environmentally benign vehicle fuels in transport sector and promoting the production and upgrading of biogas for vehicle fuel, as well as injection of the upgraded biogas to the natural gas grid
- The long-term objective of the project is to promote the realisation of a network of filling stations for biogas and natural gas reaching from the northernmost tip of Europe, Finland, to the south, Italy, in other words: the **GasHighWay**
- Finland, Sweden, Estonia, Latvia, Lithuania, Poland, Germany, Czech Republic, Austria, Italy, and Spain
- Funded from the IEE – Intelligent Energy for Europe-programme
- 2009-2012, 1.8 M€



**Thank You for Your Attention!**

