

IEA Bioenergy Task 37 Energy from Biogas and Landfill Gas  
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# Biogas in Finland – Situation Report

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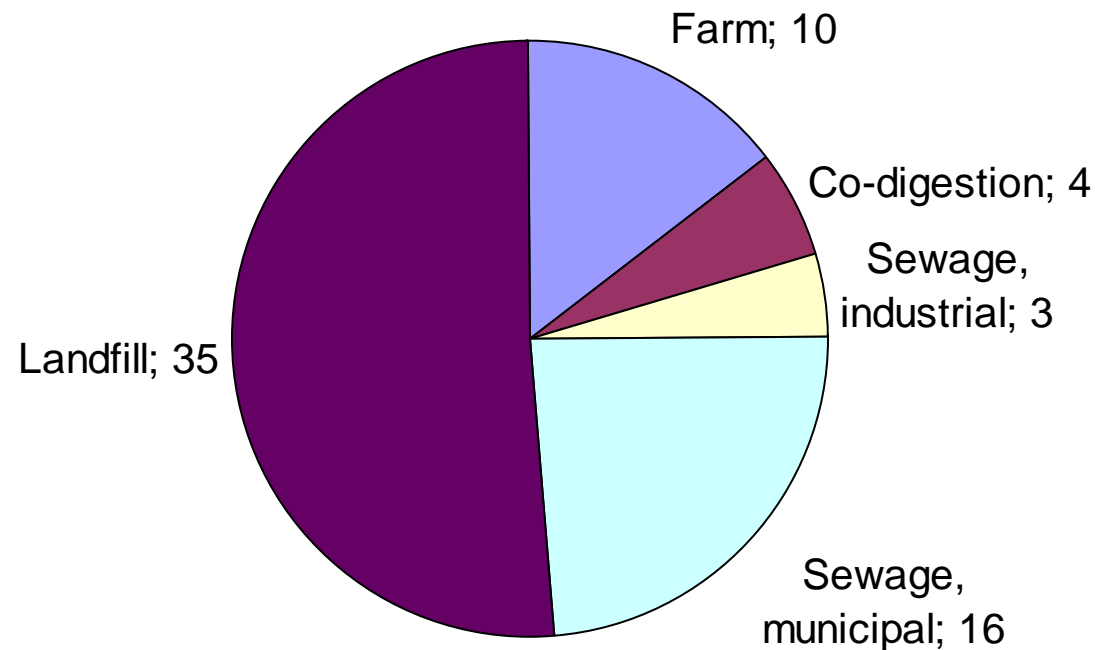
Jyväskylä   
**Innovation**

# 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 2009

- In total 68 biogas production sites in 2009 (including landfills)
- Landfills are currently the largest biogas producer in Finland



Reference: Finnish Biogas Association

## Green dots: Biogas plants in Finland

### Biokaasulaitokset

- Espoo
- Finström
- Forssa
- Hoopavesi
- Halsua
- Helsinki
- Hyvinkää
- Hämeenlinna
- Iisalmi
- Ilmajoki
- Imatra
- Joensuu
- Jyväskylä
- Järvenpää
- Kajaani
- Keräva
- Kotka
- Kouvol
- Kuopio
- Lahti
- Lahti
- Lappeenranta
- Lohja
- Lohja
- Maarianhamina
- Mikkeli
- Mustasaari
- Nivala
- Nokia
- Orivesi
- Oulu
- Pori
- Porvoo
- Raision
- Rautjärvi
- Riihimäki
- Rovaniemi
- Salo
- Säkylä
- Tampere
- Turku
- Uusikaarlepyy
- Uusikaupunki
- Vantaa
- Vehmaa
- Virrat
- Ylivieska

Lähde: Joensuu-yliopisto, Ekologian tutkimuskeskittävän raportteja n:o 5

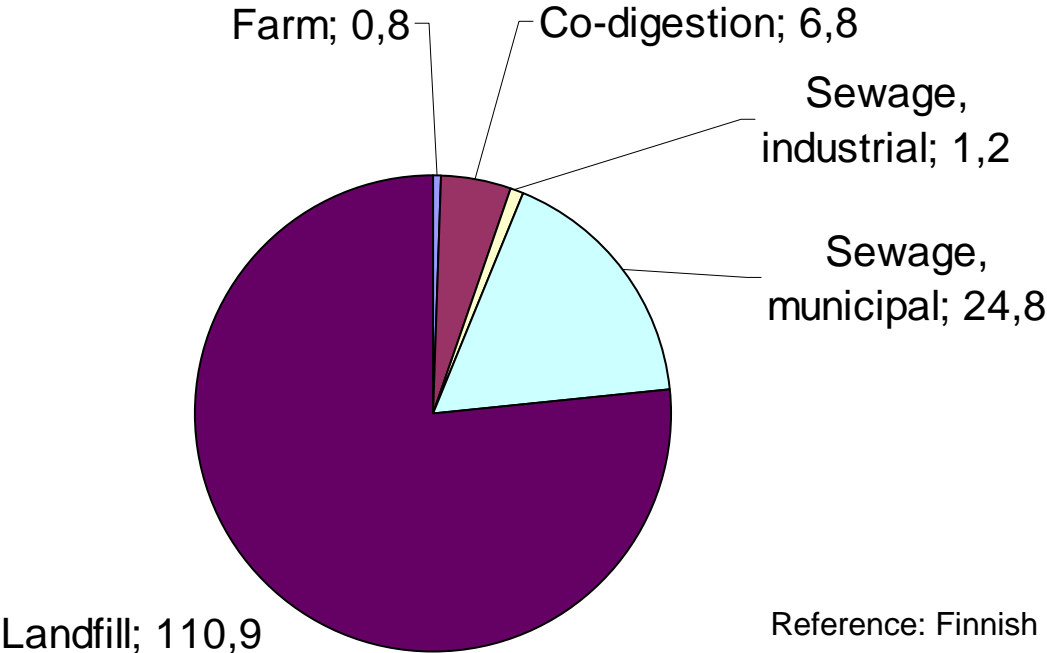


Red line:  
Natural gas  
pipeline

# Biogas production in Finland 2009

- Total biogas production 145 million m<sup>3</sup> (640 GWh) in 2009
- At least 5 new co-digestion plants in 2009-2010

## Biogas production by source 2009 (million m3)

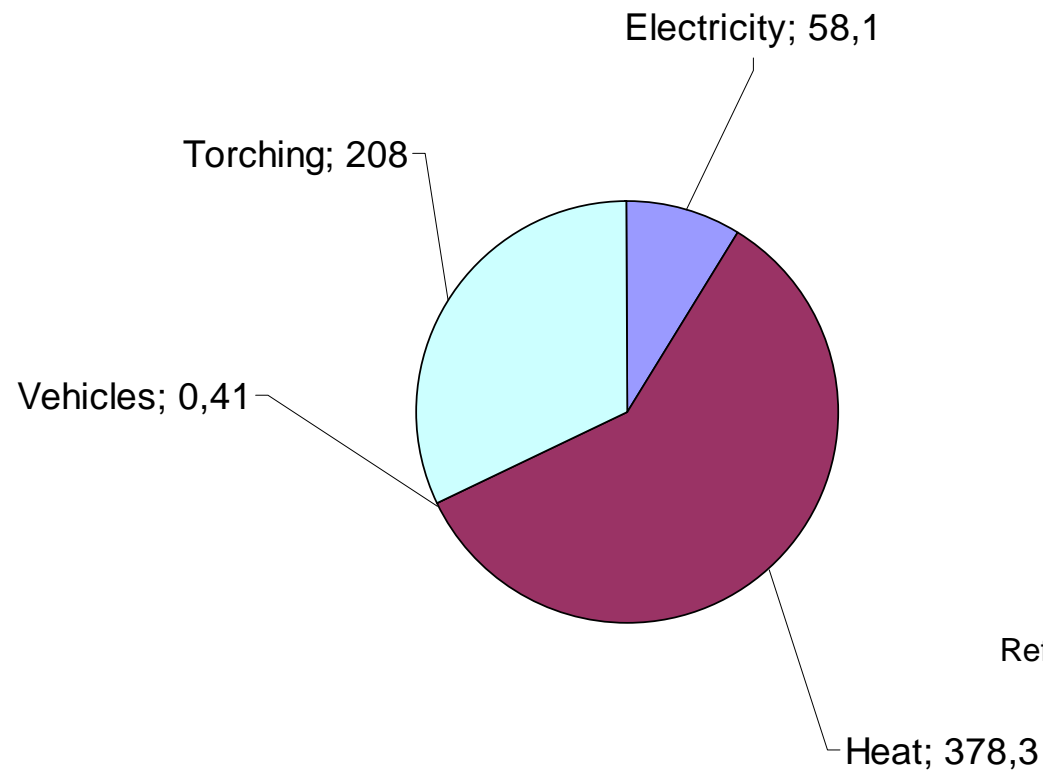


Reference: Finnish Biogas Association

# Biogas utilization in Finland

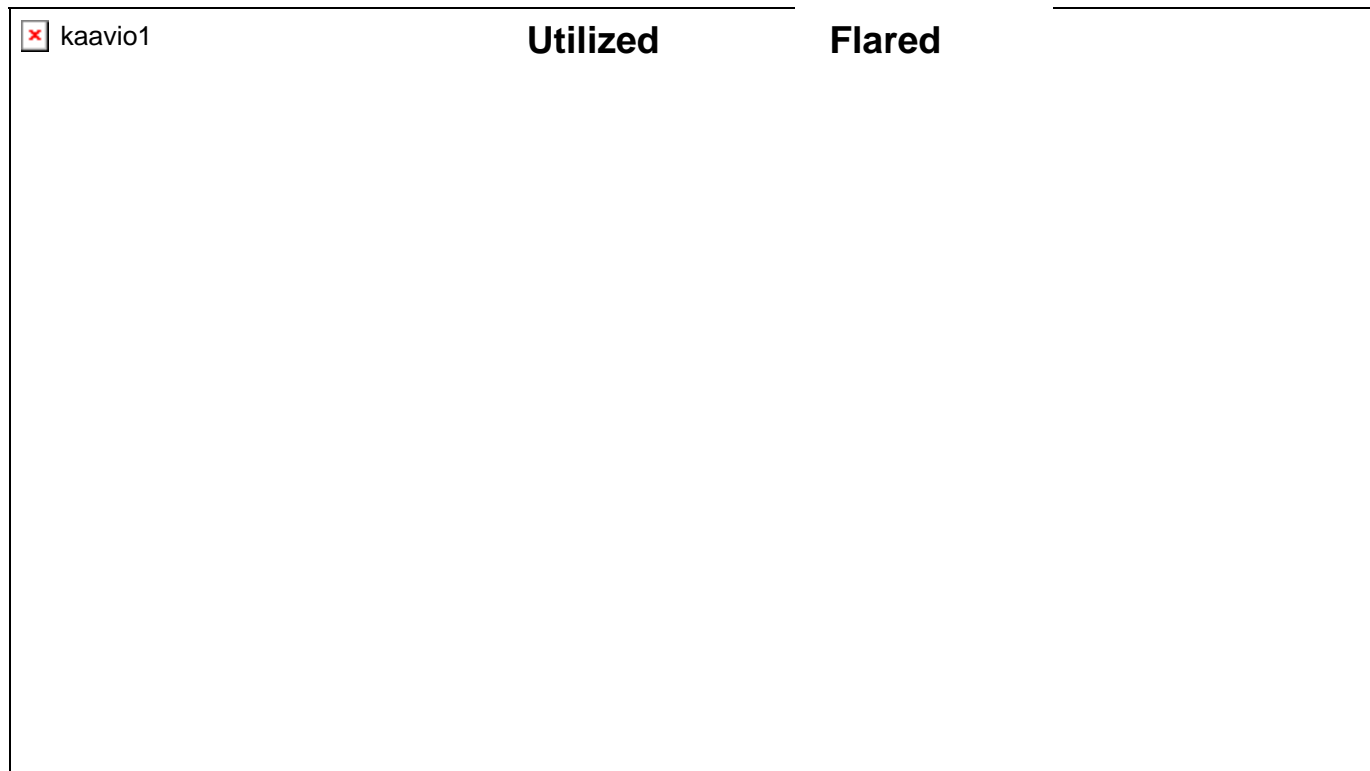
- Biogas utilization was 68 % of total production in 2009
- 208 GWh of energy was wasted due to torching of biogas (32 %)

## Biogas utilization in Finland 2009 (GWh)



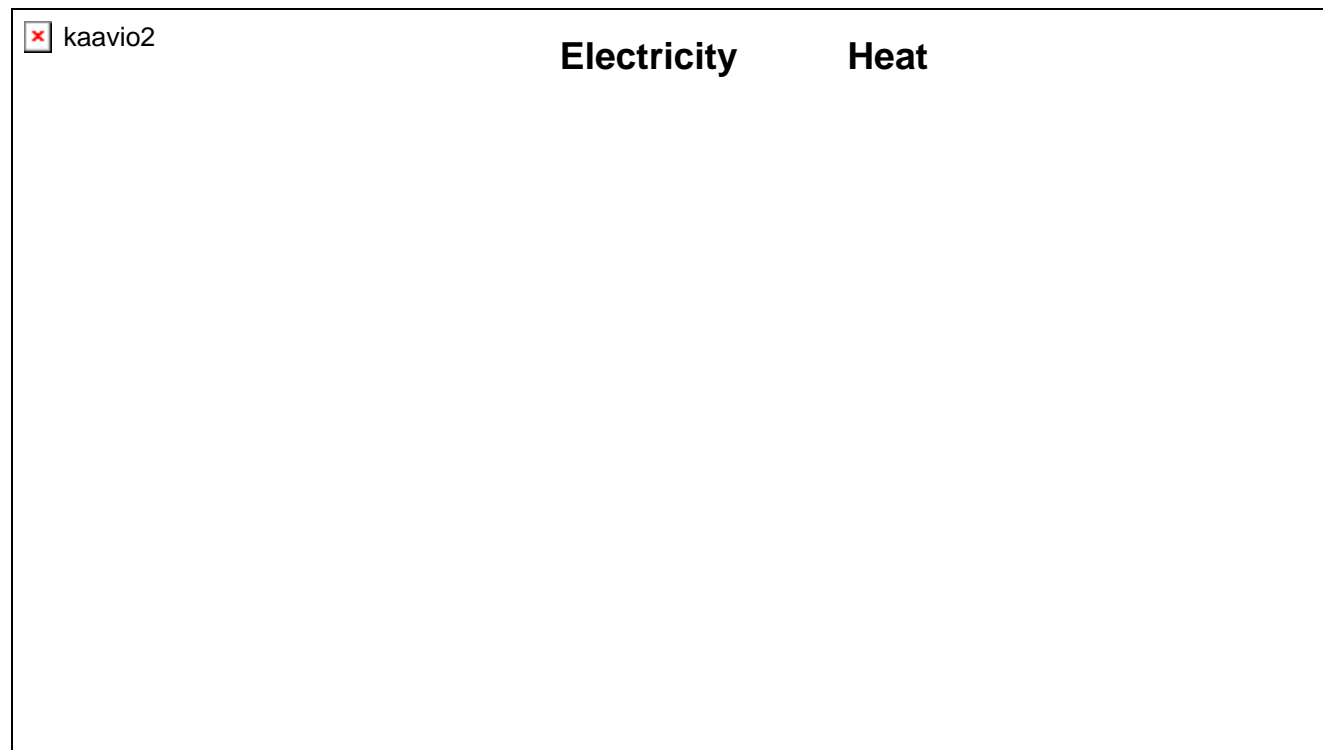
Reference: Finnish Biogas Association

# Biogas utilization in Finland 1994-2009



Reference: Finnish Biogas Association

# Heat and electricity production from biogas 1994-2009



Reference: Finnish Biogas Association

# Objectives

- Government goal: 1 TWh more biogas production in 2005-2020
- Finnish Bioenergy Association goal: 3 TWh more biogas production by 2020
- -> Incentives



# Incentives



- The feed-in-tariff system for electricity produced from biogas to force on March 25, 2011
- Preparation of the system took 4 years!
- Guaranteed price 83.5 €/MWh + 50 €/MWh heat bonus, if 50 % total efficiency is obtained (=133.5 /MWh).
  - Generator power  $\geq$  100 kVA (~85 kWe)
  - Only new plants
  - All new parts (old sludge tanks etc. cannot be used)
  - Landfill gas and municipal plants excluded
  - Plants can be included in the feed-in-tariff scheme for 12 years
- 2 M€ reserved in 2011 budget
- Biogas plants can be accepted to the feed-in-tariff scheme until their total efficiency reaches 19 MW (only 10 x 2 MW plants)

# Investment grants

- Investment grants in the order of 15-40% available for construction of biogas plants
- An alternative to joining the feed-in-tariff system



# Biogas in Finland

- Biogas mainly used in combined heat and power production



- Growing interest for biomethane as vehicle fuel



# CNG as vehicle fuel



- 16 public filling stations for CNG in southern part of the country
- The CNG filling station network is expanding
  - The national gas grid operator (Gasum Ltd) plans to develop the network of public natural gas fuelling stations actively
- In total about 1,000 gas vehicles in operation
- CNG costs about half of the price of petrol (80 cent/l petrol equivalent, 03/2011)
- Gas vehicles approx. same price as diesel vehicles, 10-30 % more expensive than petrol vehicles

# Biomethane as vehicle fuel

Photo: Metener Ltd.

- One of the first world's first small-scale biogas upgrading systems on farms was introduced in 2002 in Laukaa, Finland
  - > 40 biogas vehicles fuelling, capacity 400 m<sup>3</sup> methane /day
- Construction of the first upgrading plant to inject methane into grid on-going, expected to start operation in 2011
- Biomethane is expected to be distributed at the existing CNG filling stations by the end of 2011



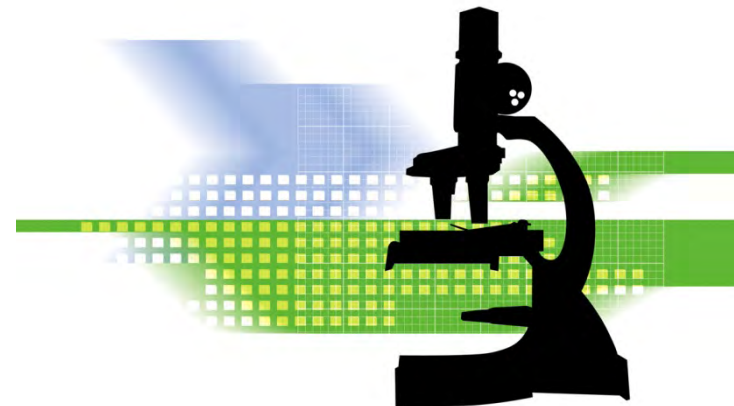
# Tax policy



- Biogas as vehicle fuel free from fuel tax
- Increase in CNG tax, expected 20 cnt/kg by 2015
- Vehicle tax consists of two parts: Basic tax + Tax on the propelling force
- Gas vehicles have been exempted from the Tax on the propelling force, but this is going to change in 2013 -> ~250 € yearly tax for passenger cars, ~90 € for vans

# Biogas - Research Activities

- Processing digestate to value added products
- Developing sustainable crop cultivation for biogas production
- Developing use of biogas as vehicle fuel
  
- Main actors:
  - University of Jyväskylä, [www.jyu.fi](http://www.jyu.fi)
  - Agrifood Research Finland, [www.mtt.fi](http://www.mtt.fi)



# Biogas Tractor

- The Finnish company Valtra Ltd. has developed a Dual-Fuel Biogas Tractor
  - 70-80 % of power is generated by biogas, small amount of diesel or biodiesel is used for ignition
- Biogas concept tractor was presented in Sweden in summer 2010
- Testing and further development work is going on
- Problem: EU does not yet have regulations for Dual-Fuel – vehicles!



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

The project is coordinated by Jyväskylä Innovation Ltd. (Finland)

## Aim of the Project:

- To increase the use of environmentally-benign gaseous vehicle fuels in the transportation sector
- To promote the production and upgrading of biogas for vehicle fuel
- To facilitate the increase of the use of upgraded biogas in the natural gas grid

## The long-term objective of the project

to promote the realisation of a network of filling stations for biogas and natural gas from Sweden and Finland in the North to Italy in the South

- Countries include: Finland, Sweden, Estonia, Latvia, Lithuania, Poland, Germany, Czech Republic, Austria and Italy
- Funded from the IEE – Intelligent Energy for Europe-programme 2009-2012, 1.8 M€
- <http://www.gashighway.net/>



# BIONUTCUT- Realizing the Potential of Biogas Technologies in Cutting Down the Nutrient Loads in the Baltic Sea Region

## Aim of the Project:

- Advancing the **uptake of biogas technologies in treatment of organic wastes and side streams from municipalities, industry and agriculture** in the Baltic Sea Region
- **Decreasing the nutrient loads to water bodies** from treatment of waste and side streams in the Baltic Sea Region through uptake of biogas technologies, which enable **efficient recirculation of nutrients**
- A **practical and business-oriented approach** has been selected to tackle this opportunity, aiming at **promoting the investments**

The project will focus in targeting the following countries: **Finland, Russia, Poland and Baltic countries**

- Project application to the EU Baltic Sea Region Programme in March 2011
- 2,7 M€, 2012-2014



**Thank You for Your Attention!**

