



# **IEA Task 37**

## **Energy from biogas and landfill gas - Country report Finland**

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# News in brief

- Working group proposed policy for biogas electricity feed-in tariff. The work on exact tariff is in progress. The implementation seems to be delayed until autumn.
- New renewable energy policy for traffic fuels: Petrol and diesel in public filling stations should contain minimum of 2 % renewable fuel starting at 2008, 4 % 2009 and 5,75 % 2010
- Standard for biogas as vehicle fuel in preparation
- Processing digestate for biofertiliser started in Vehmaa (100 000 tons) biogas plant
- Continued interest in planning and building new biogas plants: one new plant online in early 2008, ca 10 centralised plants are under planning or building phase, altogether 20-30 MW

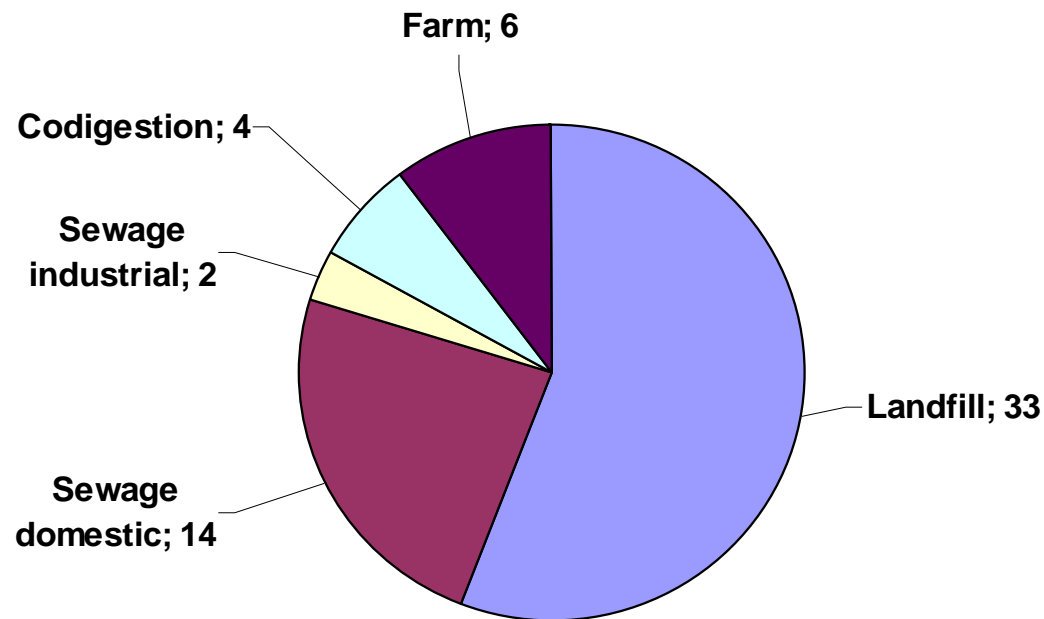
# Biogas plants in Finland

Total 59 biogas plants 2007

Landfills are currently the largest biogas producer in Finland

At least two new co-digestion plants are coming online in 2008

**Biogas plants in Finland 2007**



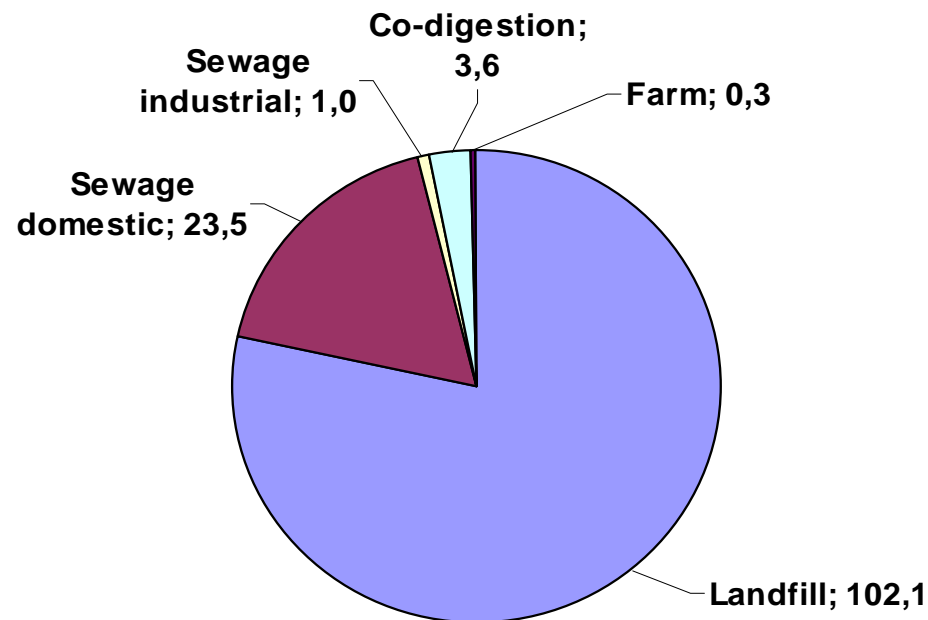
# Biogas production in Finland

Total biogas production 130,4 million m<sup>3</sup> (577 GWh) in 2006

Co-digestion plants increased their biogas production 46 %,

landfills dropped 16 % from previous year (2005)

## Biogas production by source 2006 (millions of m<sup>3</sup>)



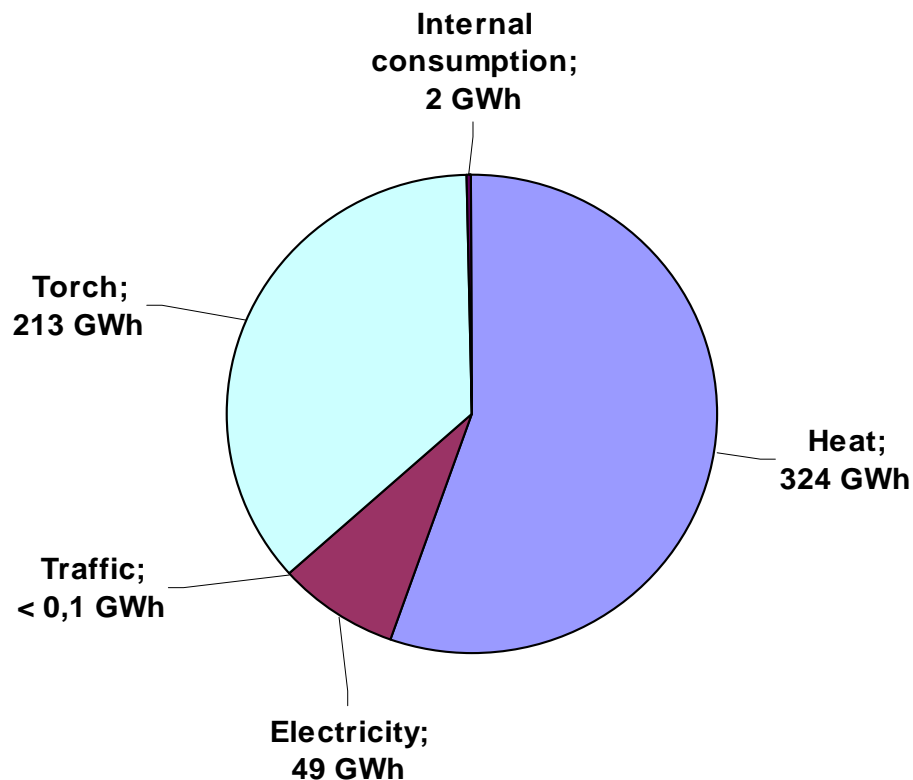
# Biogas utilisation in Finland

Biogas utilization was 62 % of the total production in 2006

Electricity generation increased 15 % from previous year (2005)

213 GWh of energy was wasted due to torching of biogas

**Biogas utilization in Finland 2006 (GWh)**



# Traffic biogas utilisation

- About 10 biogas vehicles (one taxi) by 2008 outside the natural gas grid, about 200 gas vehicles total (CNG/CBG)
- One farm-scale biogas upgrading and fuelling station in Laukaa near Jyväskylä, current fuelling capacity ~20 cars, capacity expansion planned up to 200 cars (new 1000 m<sup>3</sup> biogas reactor under construction)
- Currently 8 public natural gas fuelling stations in southern Finland (April 2008), more opening in near future

# Natural gas grid in southern Finland

National gas grid operator (Gasum Oy) plans to build 30 public natural gas fuelling stations by 2010, some could be build outside the gas grid using liquefied natural gas transported by trucks.

Biomethane injection to the grid possible, not yet practiced



Source: Gasum Oy

# Legislation: Digestate

- EC Animal By-Products Regulation 1774/2002 + amendments
  - Sterilisation/hygenisation
  - Hygienic quality (*E. coli*/*Enterococcaceae* <1000 cfu/g in four samples and <5000 cfu/g in one sample, free of salmonella)
  - Approval from Finnish Food Safety Authority
- Sludge Directive 86/278/EEC (updating ongoing)
- Nitrate Directive 91/676/EEC
- Finnish national regulations
  - Guideline on the use of sewage sludge in agriculture
    - Hygienisation for >30 min at 70 °C + AD 33-35 °C
    - AD 33-35 °C + composting/ageing/thermal treatment
    - AD 55 °C, feeding interval >4 hours
    - *E. coli* <1000 cfu/g
  - Law 539/2006 for Fertiliser Products and Decree 12/07 of Ministry of Agriculture and Forestry for Fertiliser Products
    - Groups: inorganic fertilisers, organic fertilisers, soil conditioners etc.
    - Standard names, treatment demands, nutrients and other parameters, product description, methods for analysing
    - *E. coli* <1000 cfu/g, free of salmonella, free of several plant diseases causing pathogens
    - Approval from Finnish Food Safety Authority
  - Agricultural Environmental Aid
    - Specified limits for spreading ammonium nitrogen and phosphorous into different soils and to different plants





# Ongoing R&D

- Development and demonstration of landfill gas upgrading to traffic biofuel
- Research on processing digestates
- Fuel cells and micro-turbines to use landfill gas

# UNIVERSITY OF JYVÄSKYLÄ

## New Energy Power plant

Microturbine (Sarlin)

$P_{el}$  130 kW and  $P_{th}$  230 kW

Solid oxide fuel cell (SOFC;  
Wärtsilä)

- $P_{el}$  20 kW and  $P_{th}$  14-17 kW

Energy for 150 houses

Landfill gas from Suvilahti  
landfill (closed)

Landfill gas  
District heating/cooling/electricity  
Low temperature network system

