

Lidköping Biogas

An aerial photograph of the Lidköping Biogas production plant. The facility is situated in a clearing surrounded by a dense forest of tall, thin trees. In the upper left, there is a cluster of large, cylindrical storage tanks, some white and some dark grey, with the 'Swedish Biogas' logo on one of them. To the right of these tanks is a large, light-colored industrial building. In the center, there is a complex of pipes, valves, and smaller processing units. To the right of this complex is another large, white cylindrical tank. In the foreground, there is a paved parking area with several vehicles, including a white truck and a blue car. A small, white, rectangular structure is visible in the parking area. The overall scene is a mix of industrial infrastructure and natural greenery.

One of Europe's first production plants for Liquefied Biogas (LBG)

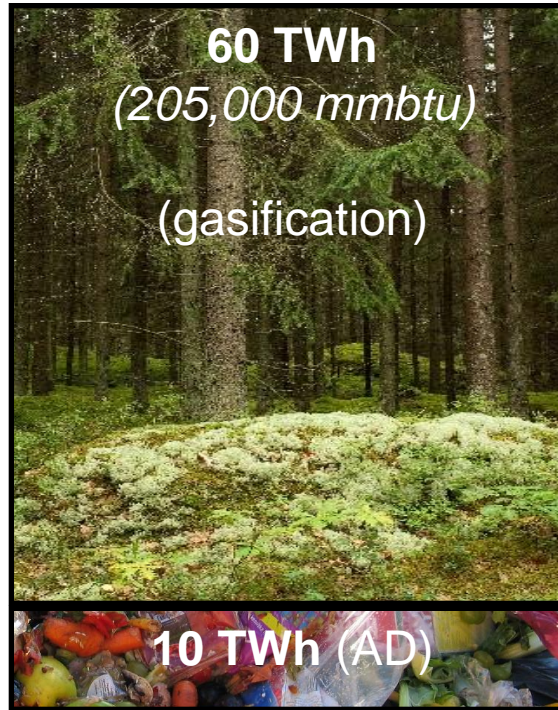
Biogas since long

- 1930's digestion for reduced sludge volumes
- Quick development since 1990 – check poster WP5_24!
- Today 230 biogas plants
- Biogas could substitute natural gas as it is the same molecule
- Biogas often sold as "vehicle gas" mixed with natural gas
- Gas for vehicles today around 60 % biogas

Biogas in Sweden today

- "Best Fuel" according to Green Motorists of Sweden
- 40,000 CNG-vehicles, strong growth
 - ~190 filling stations
- Prioritised fuel for several Public Transport Authorities
 - 20 % of the buses used for public transportation run on gas
- Still less than 1 % of total use of fuel in transportation

Biogas tomorrow



Forest waste

Waste from households, industry and agriculture

The Lidköping LBG plant



- supplies the transport sector with 60 GWh of biogas annually, which corresponds to the need of 6,000 cars driving 17,000 km/yr
- realises the possibility for heavy duty transports to use a clean and waste-based fuel

One plant – three partners



lidköpingbiogas

A large speech bubble containing the lidköpingbiogas logo, with three lines extending downwards to connect it to the partner logos below.

Swedish Biogas
INTERNATIONAL



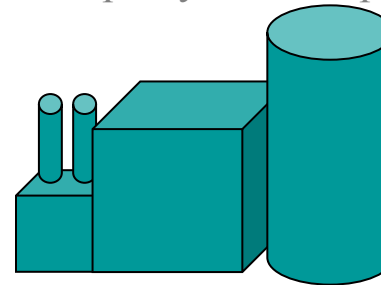
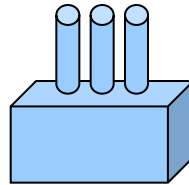
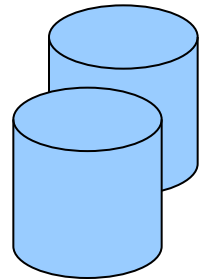
Working together to develop something new

Swedish Biogas International

Göteborg Energi
&
Municipality of Lidköping

Fordonsgas Sverige

Waste from food production →



Tank trailers

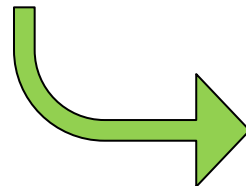
CBG station

Gas production
ca 1200 Nm³/h
ca 65% CH₄
+ CO₂, N₂, H₂O
+ H₂S

Gas upgrading
Water scrubber
SS 155428
CH₄ > 96%
CO₂ + O₂ + N₂ < 4%
S_{total} < 23 mg/Nm³

Polishing
PSA
CO₂ < 10 ppm
O₂ + N₂ < 1%

Condensation
Brayton
Atm. pressure
-163°C



approx. 80 000 ton biofertilizer

Some key figures

- Investment 170 MSEK
incl. 33 MSEK from the state
- Condensation requires
1 kWh per Nm³ biomethane
- LBG at -163 °C
- 9,9 kWh/Nm³ biomethane
- 13,6 kWh/kg LBG
- 5,75 kWh/liter LBG

- Operational since April 2012
- First delivery 29 May 2012
- Grand Opening 19 Oct 2012



More efficient distribution

- Liquefied Biogas will greatly improve distribution logistics
- Three times as much energy per volume unit (vs. biogas at 200 bar)
- 2–5 times as much energy on each transport
- Less compression energy needed for filling



Volvo's Methane-Diesel technology

- Biogas and Natural gas could replace diesel in heavy trucks
- Same efficiency as in Diesel engines
- Can run on diesel if out of methane
- 75 % metan / 25 % diesel possible, depending on driving cycle
- Serial production began 2012
- www.bimetrucks.com



Photo: Volvo

Stigs Center – Europe's first public filling station for LNG/LBG



- At Sweden's busiest filling station for heavy duty vehicles (Göteborg).
- More stations in Stockholm (2011/2013), Malmö (2012), Jönköping (2013), Helsingborg (2014) and Örebro (2014).
- Stations being built in Europe (Blue Corridors), the US and China. Worldwide!



Interest is growing

- More LBG units are planned in Sweden
- More biogas is required to respond to increased demand from transportation sector – and to keep up biogas percentage
- Gasification of biogas is needed for the future – but how to go there?

The next step - GoBiGas!

- The first of a kind
- Gasification of forest residues
- Production of biomethane 160 GWh/y
- Delivered directly to the gas grid
- Starting up now!
- www.gobigas.se

