

Application of biomethane in private and public transport

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Biofuels & Bioenergy

Advantages of biogas production

Anaerobic Digestion (AD) is the most promising method to

- upgrade waste water from household and industry
- stabilize sewage sludge
- improve fertilizer quality of animal waste
- digest energy crop to produce biogas
- treat the organic fraction of municipal solid waste

Advantages of biogas production

The environmental advantages are evident:

- Hygienisation of waste material (at 55°C)
- reduction of GHG emissions (in landfills)
- substitution of fossil fuels
- production of a valuable fertilizer

Dry fermentation systems

Dranco



Kompogas



Valorga

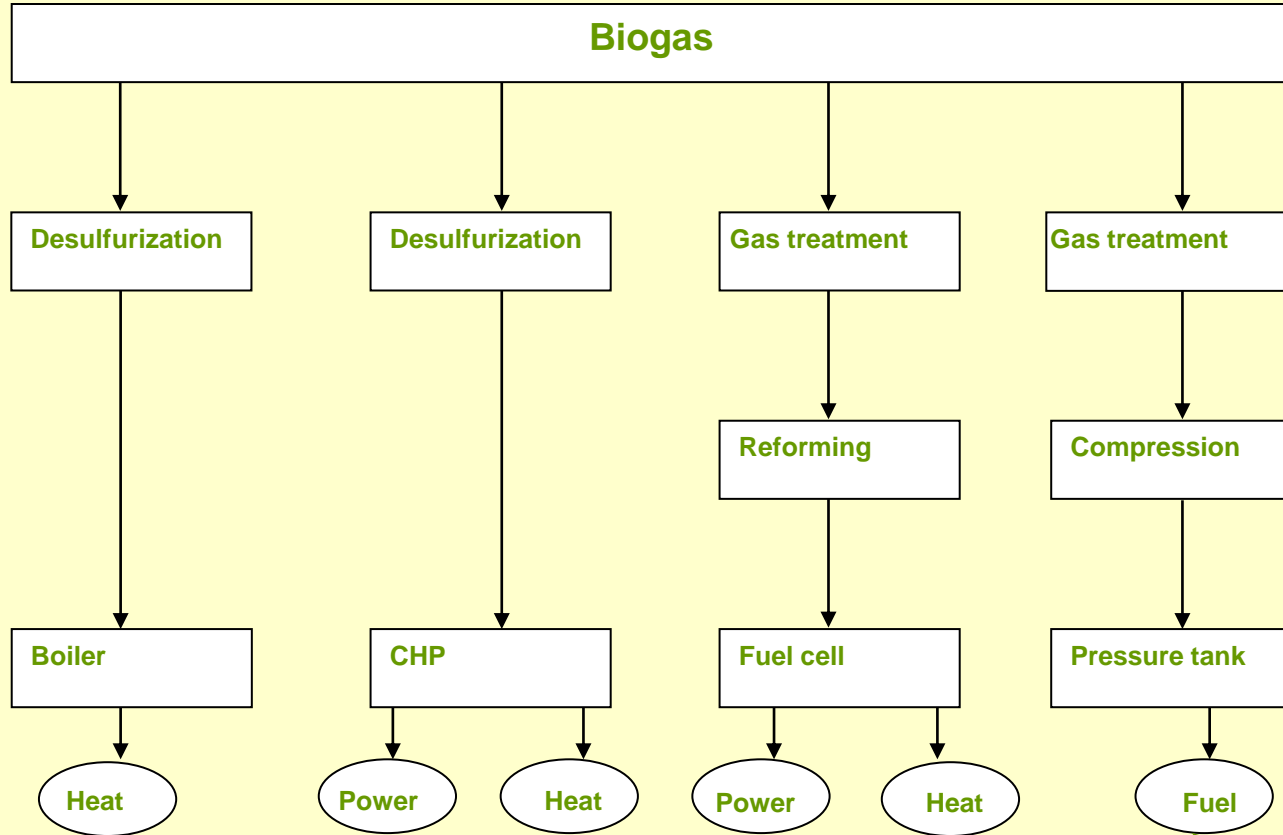


Wet fermentation systems

Agricultural type digester



The opportunities for biogas utilisation



Electricity production



NOV E

Driving with biogas has a long tradition



Classic beetle

NOVA Energie

Citroen



The choice of makes is increasing

**Citroën
(Werk)**



C3

Berlingo First X

**Fiat
(Werk)**



Doblo

Multipla

Panda



Grande Punto

**Ford
(Schweiz Retrofit)**



S-Max

Fusion

C-Max



Focus Station Wagon

Focus Limousine

Focus ST



Mondeo Station Wagon

Mondeo Limousine

Galaxy



Kuga

**Mercedes-Benz
(Werk)**



B170

**Opel
(Werk)**



Zafira

Combo Tour

Zafira Turbo CNG

**Peugeot
(Schweiz Retrofit)**



207 Limousine

207 Station Wagon

207 CC



807

308 Limousine

**Volkswagen
(Werk)**



Touran

Caddy Life

Passat TSI



Passat Variant TSI

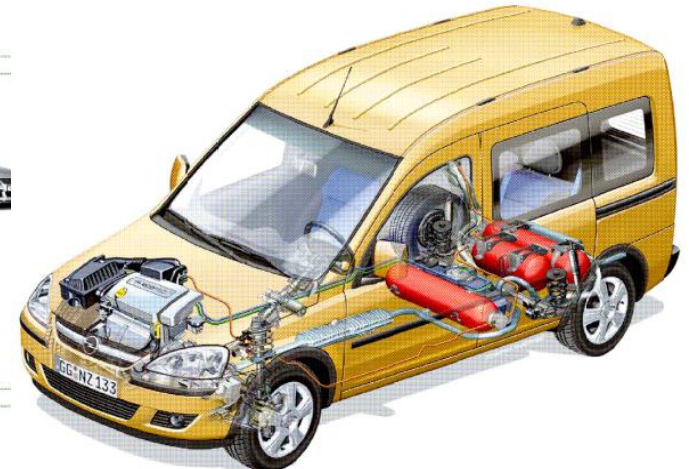
**Volvo
(Schweiz Retrofit)**



V70 2.0 Multi-Fuel

V50 Multi-Fuel

V70 2.5 Turbo Multi-Fuel



Also the choice of HDV is increasing



IVECO



VOLVO



Mercedes-Benz



KENWORTH



GROWTH RATES 2006-2007

January 2008

	2006	2007	%
WORLD	4.6 Million	7.55 Million	64%
CHINA	97,200	200,873	107%
BRAZIL	1 Million	1.48 Million	48%
EUROPE	556,000	748,749	35%
UKRAINE	67,000	100,000	49%
ITALY	382,000	432,900	13%

Low noise – low emission

Reduction with biogas as compared to

	<u>petrol</u>	<u>diesel</u>
CO2	100%	100%
NOx	53%	95%
Soot	35%	99%
NMHC	75%	36%

Advantage of fuel price



- Biomethane is often freed of mineral oil tax
- Lowest cost vehicle fuel
- Often promoted by financial support of gas companies or government
- Incitation by a 20% reduction of liability insurance

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6 cities initiated a European project

- Lille (FR), Coordinator
- Region of Göteborg (Swe)
- Stockholm (Swe), incl. Västerås
- Berne (Swi)
- Rome (IT)
- Zielona Gora and Torun (Poland)

In total 28 partners are involved



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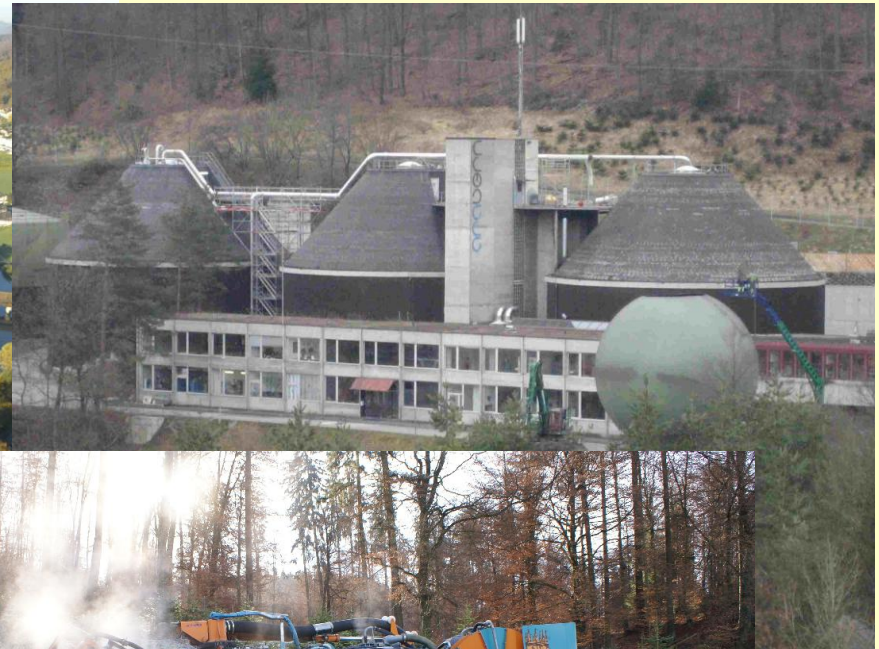


The two major objectives of the project are:

- **Demonstration of large scale digestion and biogas upgrading units with waste material available in urban and close by rural areas**
- **Demonstrate and expand biogas fleets in public transport**

The Bern project includes 3 partners:

BERNMOBIL



NOVA Energie



y

Production targets of arabern

Goal: 2.6 Mio Nm3 Biomethane by 2011

Trend:

	Biogas mio Nm3/a	Increase since 2006 [%]	Biomethane mio Nm3/a
2006	4'702'728		
2007	5'239'398	11.4	
2008	5'700'510	21.2	ca. 1.8

BERN MOBIL



Energie Wasser Bern



	Personal cars	Busses
Target Biogasmax	Plus 100	70
Status end of 2006	334	32
Status end of 2007	647	45
Status end of 2008	950	45

NOVA E n e r g i e



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**Biogasmax in Berne:
It's a great success!**

