

Biogas-powered engine coaches - initial experiences in Sweden

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Sie finden uns auf der InnoTrans am SWERIG-
Gemeinschaftsstand Nr.229 in Halle 4.2



Agenda:

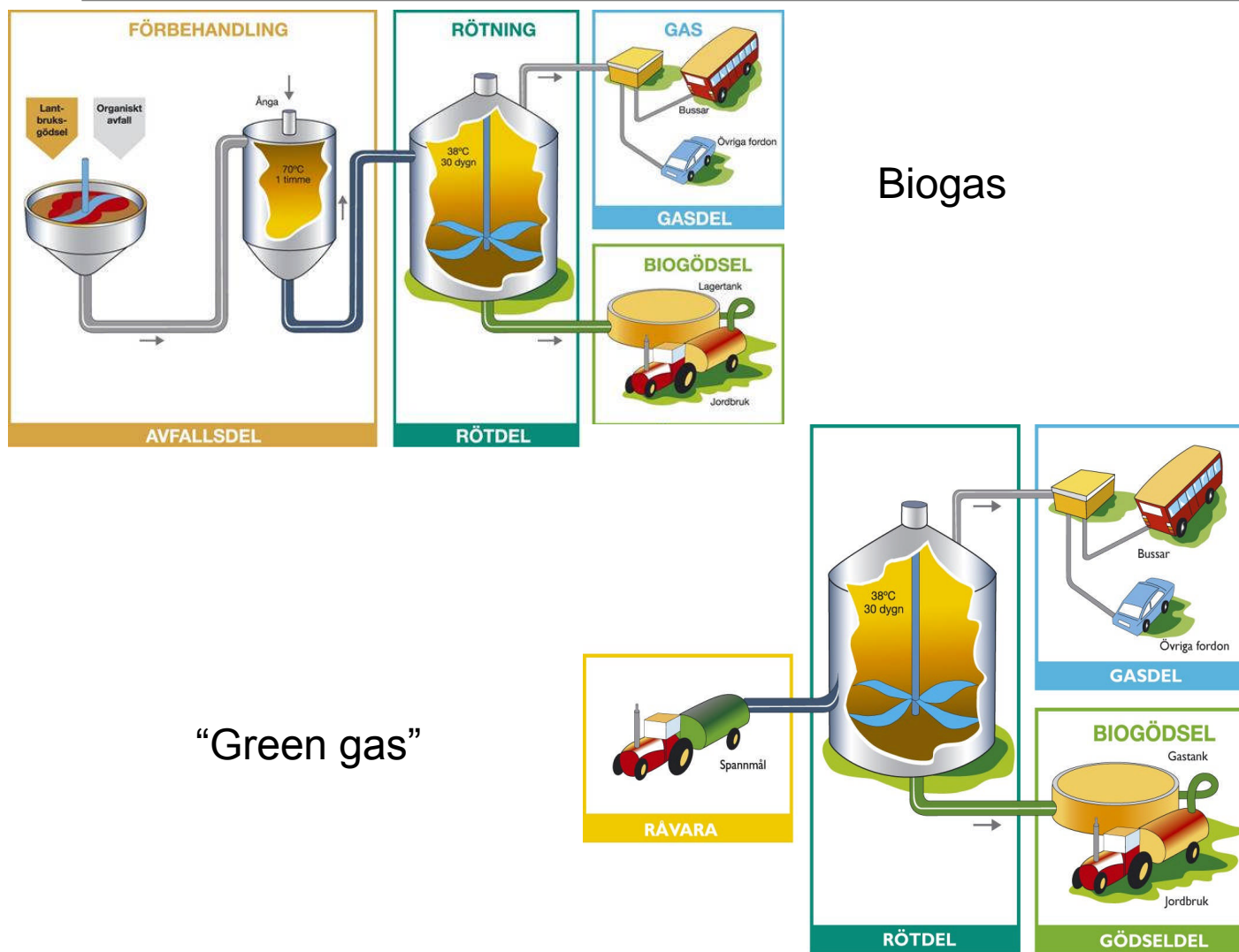
- Background and idea behind the biogas train project
- Technical and commercial concept, problems and solutions
- Exhaust and noise emissions
- Initial experiences from the test run
- Perspectives for using biogas in the railway sector

Background and idea behind the biogas train project

- Biogas trains provide environmentally friendly trains without costly electrification
- The technology exists for converting trains to biogas
- Biogas-powered trains are suitable for local/regional traffic
- The service life of the train is 30 years. Biogas is a possibility for covering the need for environmentally friendly fuel in the future
- Biogas is suitable for local/regional production
-> Biogas crops create jobs in agriculture
- Dramatically lower exhaust emissions
-> a better local environment



Biogas and “green gas” production



“Green gas”

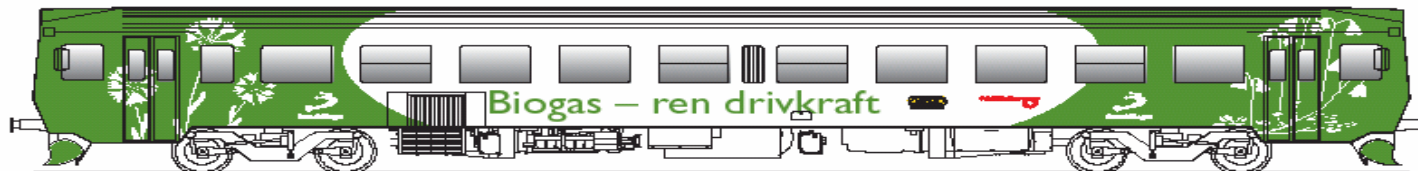
Technical and commercial concept, problems and solutions

- Svensk Biogas AB ordering client and financier
- EuroMaint Rail supplier of conversion
- EuroMaint Rail supplier of vehicle maintenance
- Cost at the pump today EUR 0.6/Nm³ (equivalent to 1 litre diesel)
- By 2010 Svensk Biogas estimate that the prize for biogas will be the same as for diesel

Technical and commercial concept, problems and solutions

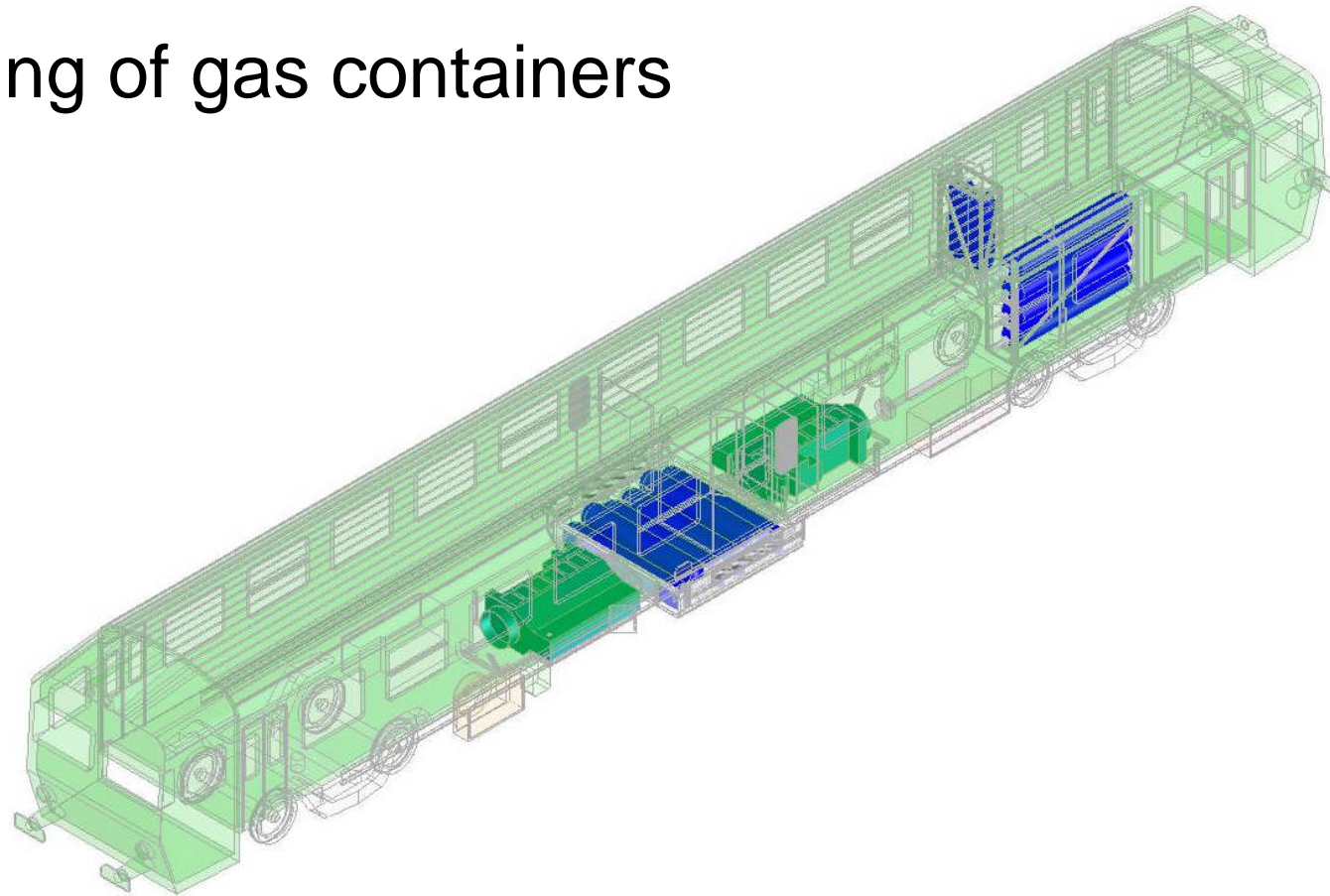


- Pilot project “Biogas train on the Tjust Line”
- Y1 purchased 1 February 2005
 - Conversion by EuroMaint Rail (Åmål)
 - Filling facility in Västervik
 - Project budget MEUR 0.95
 - Grand Opening 20 June 2005



Technical and commercial concept, problems and solutions

Positioning of gas containers



Technical and commercial concept, problems and solutions

Performance:

- 2 x GH10B Volvo engines
 - 214 kW (290 hp)
 - 1,200 Nm
 - Acceleration equivalent to diesel-powered Y1s
- Range
 - approx. 600 km
 - 2 return journeys (Linköping-Västervik) with approx. 25% margin
 - Linköping-Västervik 116 km
 - Linköping-Kalmar 236 km
 - 54 seats

Technical and commercial concept, problems and solutions

Risk management

Fire/other
overheating

Thermistors on the containers

Pipe breakage

Automatic valve shut-off

Gas leak

Volatile gas with a strong smell

Unhealthy

No risk of poisoning

Technical and commercial concept, problems and solutions

Maintenance



- Workshop adaptation
 - Gas detectors in the ceiling
 - Controlled hatches in the ceiling
- Known components
- Supplementary training

Exhaust and noise emissions

Exhaust emissions

[g/kWh]	Diesel engine THD103KB	Biogas engine GH10B
Carbon monoxide CO	0.60	0.01
Nitrogen oxides NOx	6.15	2.0
Hydrocarbons NMHC	0.35	0.1
Particles	0.16	0.01
Fulfils requirement	Euro 1	Euro 5

Noise emissions

- Not an issue generally discussed in the Nordic region – too sparsely populated
- Measurements within one year, however, both inside and outside of the train
- Experience suggests, however, that this vehicle is considerably quieter both in the compartment and outside

Initial experiences from the test run

- The train is in regular service
- Has not experienced any operational disruptions so far
- Gas engines are slightly more expensive than diesel engines to maintain – the only additional cost we can see at present

Perspectives for using biogas in the railway sector

- Biogas/Green gas is a viable environmentally friendly alternative to diesel
 - Can be produced locally
 - Creates local jobs in agriculture
- Biogas engines are quieter than diesel engines
- New engines combining diesel and gas are starting to appear on the market – can provide more flexible traffic solutions with a better environmental choice

Biogas a possibility in the future