

Biogas distribution, bus depots and fuelling systems

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Local partner

A project to stimulate the use of biogas as fuel for city buses, aiming to reduce environmental impact.



Outline

- Different distribution techniques:
 - pipeline network
 - compressed gas in bottles
 - liquefied gas distribution
- Distribution planning in Stockholm region (Stockholm Public Transport)
- Alternative fuelling systems
 - Fast fuelling
 - Slow fuelling



www.balticbiogasbus.eu

General distribution techniques for biogas

- Distribution of compressed biogas (CBG) in bottles by truck
- Distribution of compressed biogas (CBG) in pipelines
- Distribution of liquefied biogas (LGB) by truck

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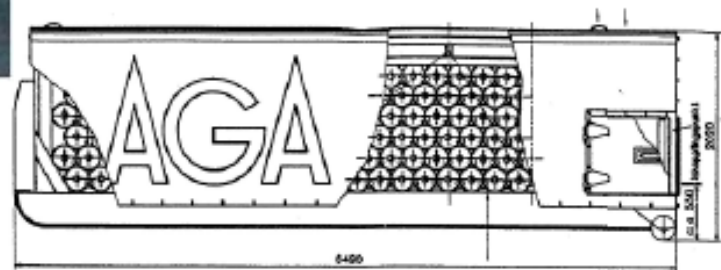
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Compressed gas in bottles

Steel gas cylinder

Composite gas cylinder



Pipeline network

- Low operational maintenance costs
- High dependability for delivery
- Low environmental impact during operation

Pipeline under water



Pipeline underground



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Planning regional distribution infrastructure

- Securing the biogas supply
- *Evaluate and decide on functional distribution infrastructure*
- Public transport traffic planning requirements
- Suitable locations of biogas bus depots, existing and new ones
- Ocular inspection of the suitability of installing biogas fuelling at the depots

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THE EUROPEAN UNION
(European Regional
Development Fund)

Gas grid distribution of biogas in Stockholm



Planning regional distribution infrastructure

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Biogas Bus Depot requirements

Basic requirements:

Size

Appropriate surroundings

Road access in and out

Access to water and sanitation

Access to heating and electricity

Additional area needed for:

Biogas storage

Compressors

Fuelling ramps and/or fast fuelling dispenser

Back up storage



Gubbängen - taken in to service August 2011

Fuelling systems for biogas

Fast fuelling dispenser



- Fuelling time: ca 6 min
- Logistics/Planning Day- and nighttime, demands more planning, service staff
- Layout: Dispenser outdoors, Indoor depot; parking indoors

Gubbängen Fast fuelling dispenser

Fuelling systems for biogas

Slow fuelling by ramp

- Fuelling time: 8-10h
- Logistics/Planning : At nighttime, driver connects hose
- Layout: On ramp, outdoors



Gubbängen Slow fuelling on ramp

Comparing slow- and fast fuelling systems

- Security
Human error affects at a higher extent at fast fuelling
- Work environment
Slow filling: Better work environment according to staff
- Redundancy
Slow filling: Complement with FF-dispenser, alt. fast fuelling lots on ramp
- Economy/investments
Slow filling: Higher investment cost
Fast filling: Claims more staff



SL's planned bus depots

Gubbängen, 2011 - August 2011

92 buses

Slow fuelling on ramp (CBG and LNG)

One fast fuelling dispenser



- Björknäs, 2011
 - 34 buses
 - Slow fuelling system
 - Mobile modular fuelling station
 - One fast fuelling dispenser
- Fredriksdal, 2015
 - 130 buses
 - Fast fuelling system
 - Indoor depot
- Charlottendal, 2016
 - 100 buses
 - Slow fuelling on ramp (CBG)
 - One fast fuelling dispenser
 - Liquid biogas (LBG)

Gubbängen Bus Depot - August 2011

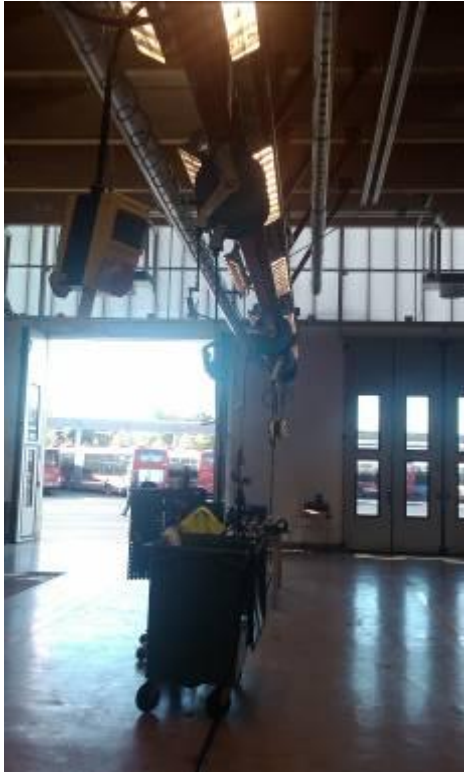


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Gubbängen Bus Depot - August 2011



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Baltic Biogas Bus Project 2009-2012

Thank you for your attention

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