

EU-Project "Baltic Biogas Bus" Renewable fuel for a climate-neutral transport



ATI erc GmbH
Alter Holzhafen 19
23966 Wismar



Leadpartner Sweden:
SL Stockholm transport
Lennart Hallgren
phone: +46 8 686 14 01
fax: +46 8 6861606
Lennart.Hallgren@sl.se

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www.balticbiogasbus.eu

EU-Project "Baltic Biogas Bus", frame data

- European funding: Interreg IVB
- Programme area: Baltic Sea Region
- Duration: 2009 – 2012
- Total volume: 4,2 Mio €
- Part financed by the European Regional Development Fund
- 12 partners from 8 countries + 1 associated partner

12 partners from 8 countries:

Schweden: - SL, Stockholm transport
- Biogas East

Norwegen: - Ruter, Transport Services for Oslo and Akershus
- HOG Energy, energy consulting,
- Skys, Hordaland regional administration

Finnland: - VTT, technical research centre in Finland

Estland: - Tartu, city council

Lettland: - Riga, city council, traffic department

Litauen: - Kaunas city bus company

Polen: - Motor Transport Institute Warschau

Deutschland: - ATI erc gGmbH, Agency for Technology Transfer and Innovation, Schwerin
- ITC Innovation and Trendcentre, HRO

Russland: - University of St. Petersburg, associated partner

Project processing Germany by:

ATI erc gGmbH
Alter Holzhafen 19
23966 Wismar
Phone: +49 3841-7582180
Fax: +49 3841-7582186
Internet: www.ati-erc.de

Contact EU-Project „Baltic Biogas Bus“:

M.-Eng. Petra Seidenberg
Email: petra.seidenberg@ati-erc.de

Aims of the project:

- spread of the use of biogas¹ in public transportation as a fuel in cities and regions of the Baltic region
- strengthening of public transport by using environmentally friendly fuels
- reduction of polluting emissions and CO₂ emissions
- improving the quality of life in the cities of the Baltic Sea
- demonstrate cost-effective solutions for biogas production, biogas purification, biogas distribution and use of biogas buses

Advantages of biogas as a fuel:

- compared to petrol and diesel: reduction of polluting emissions and CO₂ emissions
- 100% production from renewable energies
- production from energy crops, food waste from households and industry, waste from sewage treatment plants and landfills is possible
- strengthening of local energy and economic cycles
- independence of fossil resources
- costs biomethane: 0,93² – 1,50 €/kg³
- costs natural gas: 0,86 €/kg⁴ - 0,95€/kg⁵
- costs diesel: 1,285 €/lt⁶ - 1,45 €/lt
- 1 kg of natural gas / biogas corresponds to approximately 1 lt. of Diesel⁷

¹ For the use as a fuel biogas is upgraded to natural gas quality

² Biogas station Jameln, costs in August 2010

³ Information by Mitgas, December 2010

⁴ Information by EVB, transport services Wismar, 14.12.2010

⁵ www.erdgas-mobil.de/flottenkunden/vielseitig/evobus-mb-citaro-cng-gelenkbus/

⁶ Information by EVB, transport services Wismar, 11.01.2011

⁷ Information by EVB, transport services Wismar, 14.12.2010

Tasks of the ATI erc gGmbH:

- publication of biogas as a fuel
- support for transport companies and municipalities in Mecklenburg-Western Pomerania for the introduction of biogas as fuel in public transport
- feasibility study to determine potential of food waste for the biogas production in the Rostock area
- study on the on-board power supply from the SOFC in the Bio / Gas Bus
- organisation of 2 seminars in St. Petersburg, Russia to raise awareness of biogas as fuel in public transport

Steps on the way to biogas in the public transport and the conditions for the use of biogas as a fuel in Germany:

- upgrading of biogas to natural gas (biomethane)
- sufficient number of decentralized biogas treatment plants
- connectivity to the natural gas network to feed the biogas
- use of natural gas buses because gas and biogas buses require the same Vehicle Technology
- purchase of biogas in the amount of the used natural gas, to obtain and to refuel natural gas mixture in the network (e.g. Hamburg Airport)
- production of a network of natural gas or biogas filling stations

Technical requirements for the use of biogas / natural gas buses:

- gas buses can be operated with biogas and natural gas. There are no technical modifications required for the conversion of natural gas to biogas.
- vehicle models for public transport, which can be operated with natural gas / biogas:
e.g. Mercedes Citaro CNG, CNG Solaris Urbino, Volvo 7700, MAN Lions City, Neoplan
- example: Mercedes Citaro CNG (approximately 20.000 vehicles in Europe), meets the EEV standard, 5-8 gas tanks each with a capacity of 190 l., range of a tank of gas is about 400 to 600 km

Development in Germany:

- 1993: first use of natural gas in public transport (LPT) in Germany
- 1995: first gas station built in Germany, For the first time city buses in the fleet transportation operations were powered by natural gas. These buses were first used in the municipal transport authority in Frankfurt (Oder) (SVF).
- 2009: 60 744 vehicles powered by natural gas in Germany and 770 CNG filling stations
- 2006: the first biogas filling station in Jameln in Wendland
- 2009: all over Germany 28 biogas treatment plants, at two locations biomethane for the direct use as a vehicle fuel is prepared (Jameln, Bottrop), for all other installations a use of biogas for combined heat and power held by EEG takes place, one part is fed into the natural gas grid as fuel for natural gas filling stations provided
- Airport Hamburg: from 2010 in the airport's CNG filling station 100% biomethane is fed for the fleet of passenger transportation at the airport
- currently in planning: within the project "Bioenergieregion Rügen" public transport buses or public buses should run on biomethane

Biogas-Bus-projects across Europe:

- Sweden, Switzerland and the Netherlands have the most experience with the use of biogas as fuel in public transport
- since 1995: use of biogas buses in public transport for the city of Lille, France
- since 2004: use of biogas for buses in public transport in Stockholm, across Europe currently largest fleet (approximtely 160 buses), which is operated with biogas, more biogas buses e.g. in Malmo, Kalmar Communities
- Since 2008: use of biogas for fleet of Bernmobil, Switzerland

Studies on experiences with natural gas buses / biogas buses in public transport:

Economics of natural gas buses in public transport, Results of a business monitoring, Informationsdrehlscheibe Erdgasbusse e.V., Berlin, 2007

The introduction of (bio) gas buses at Bernmobil, a field report, Federal Office of Energy, Federal Department of Environment, Energy and Communications, Bern, 2008

Comparison of variants of natural gas buses for the fuel supply of Rügen Passenger transport from waste biomass, Bachelorarbeit HAWK Göttingen, Julian Schütte, 2009

Natural gas and biomethane in the future fuel mix, need for action and solution approaches for an accelerated establishment of the transport, German Energy Agency GmbH (dena), Berlin, 2010

Previous results of the EU project partners:

- www.balticbiogasbus.eu
- international conferences in Tartu, Oslo, Kaunas, Riga, St.Petersburg
- Stockholm transport used about 160 biogas buses in 2010
 - **annual savings of 60,000 tonnes of CO²**
- transport companies of Oslo use 14 biogas buses since 2010
- City of Bergen, Norway has made the decision to use 70 biogas buses, start in 2012
- Tartu, Estonia has made the decision to use biogas buses, start in 2011
- Kaunas, Lithuania wants to use biogas buses, start in 2011
- since June 2011 10% blend of biomethane into the natural gas network at all gas stations in Mecklenburg-Vorpommern, Germany
- Study on comparison of costs and emissions from diesel buses / CNG buses / biogas buses by finnish project partners
- study on biogas potential in the countries of the Baltic Sea region by MTI Warsaw
- Study on the mixing ratio of hydrogen and biogas in Biogas buses by ATI erc gGmbH
- study on the use of SOFC fuel cells for on-board power supply in Biogas buses by ATI erc gGmbH

Financing of investment projects for the introduction of natural gas infrastructure / biogas in public transport:

- low-interest loans for 100% of investment costs by the KfW bank for purchase of natural gas vehicles and natural gas / biogas-tank systems for companies as part of the "ERP Environmental and Energy Efficiency Program - A" of the KfW bank
- low-interest loans for max. 50% of investment costs by the European Investment Bank
- Funding under the "Climate Action Plan" of the country MV, Ministry of Labour, Economy and Tourism, Subsidy for max. 30% of total investments for investment measures for the use of alternative fuels and engines and hydrogen infrastructure is possible

Competitions / Events:

- " Climate action wanted " Ministry of Labour, Economy and Tourism M-V, to get more information: www.klimaschutzaktionen-m-v.de
- **5. Bioenergy forum University of Rostock, 02./03.11.2011**