

Supply and utilisation of biogas and natural gas in the Black Sea Region, Bulgaria

- *An overview of the present situation, norms & legislation and available vehicles*

Del 2.2.9



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Introduction

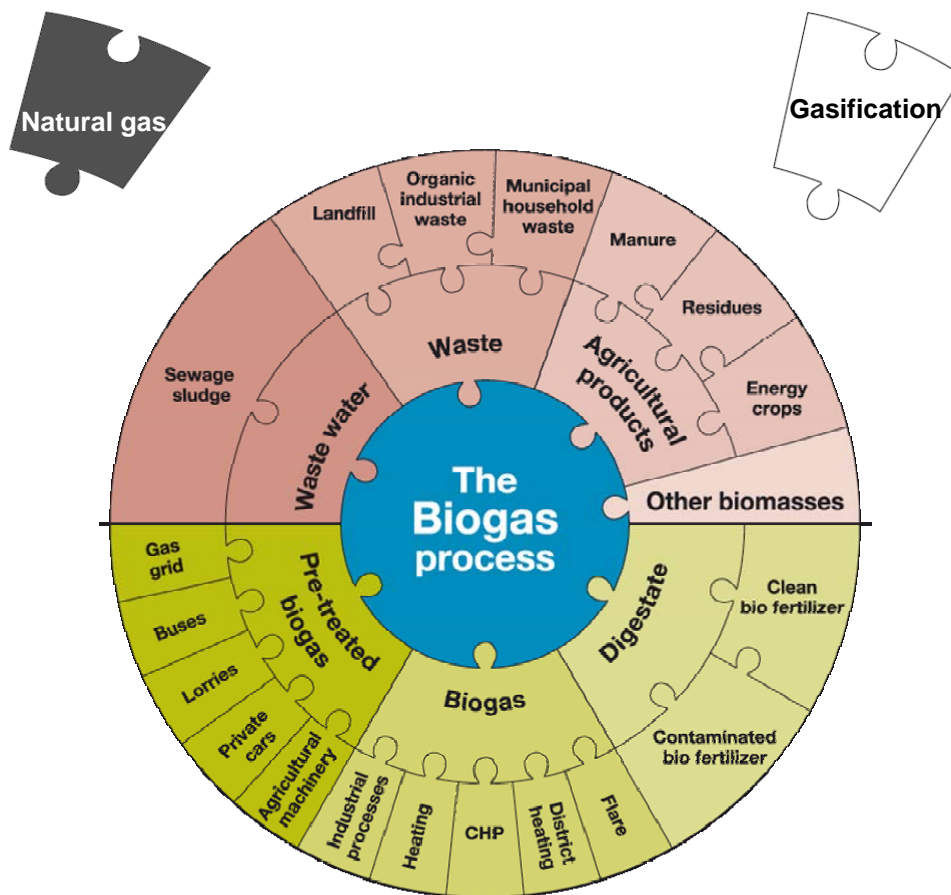
Biogas and natural gas are very clean energy sources, when combusted the amount of particles, NO_x, CO etc are lower than most other fuels. Biogas is also a renewable fuel. If petrol or diesel is replaced with biogas produced from manure, the CO₂ emissions can be reduced with up to 180 % . The MADEGASCAR project aims at improving the conditions for a growing market for gas driven cars and light transport vehicles (NGVs) and also increase the supply of biogas and natural gas for these vehicles.

To expand the market for supply and use of gas as a fuel for vehicles it is of high importance to understand the present situation of use and supply of gas. This text sums the present situation of supply, treatment & distribution and the final use of biogas and natural gas in the region.

One chapter deals with norms and legislation. This chapter concern laws around biogas production plants, distribution of biogas and natural gas, and the use of methane gas in vehicles. The current management control measures that are used in the region to support gas vehicles are also summed in this chapter.

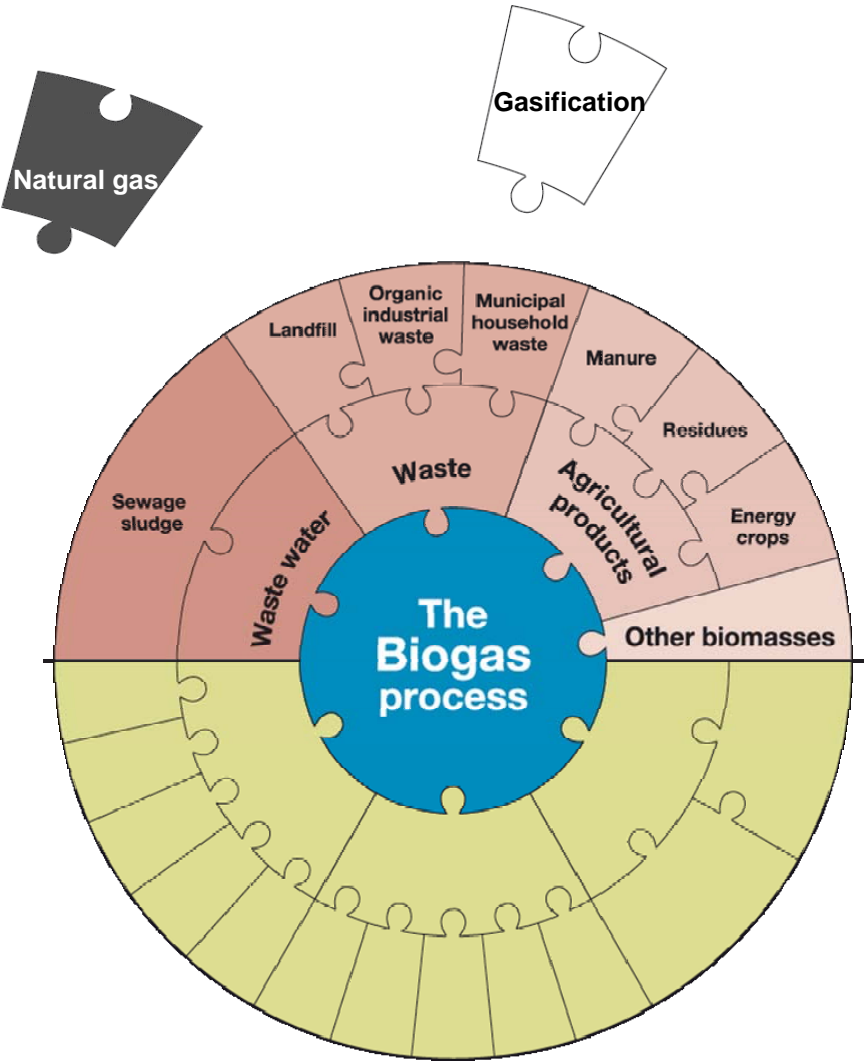
The use of LPG as vehicle fuel is also of interest for the MADEGASCAR project because of the possibility to convert these vehicles to propulsion with methane.

This text also contains an overview of the range of available NGVs in the region.



Supply

This section handles the present supply situation of biogas, natural gas and bio methane (gasification) in the region.



Biogas production plants

Background

At present there are no biogas production facilities in the Black Sea, North East, South East and regions of Bulgaria. Research and viability studies have been carried out in Bourgas and Alfatar (out of region) by the Technical University of Sofia and the Bourgas University mainly focusing on waste management and the potential of renewable energies and Biogas utilisation however the take up and implementation of biogas utilisation to date has been very low. The main barrier has been access to finance and where there has been take up it has been concentrated in the area of bio-diesel. At best the research carried out, only managed to reiterate the potential but little else.

Present situation

Waste Water

- Zero Waste water plants digests the sludge in biogas reactors

Waste

- No known Co-digestion plants
- Zero plants upgrades the biogas to natural gas quality

Agricultural products

- Zero biogas plant

Future perspectives

There is considerable interest in Biogas production however little action to date. There is more interest in other forms of alternative and sustainable fuel production facilities such as Bio diesel with several feasibility studies and project proposals having been submitted for funding through private financing sources. As part of the National Strategic Plan the Bulgaria Government has included sustainable energy sources as a priority. There is potential for developing Biogas plants in the agricultural sector and waste water treatment plants however the main constraint is funding.

Bio methane (gasification)

Background

This is a very underdeveloped area to date. There are no known actual plants or statistics for potential as this has not been studied in the region.

Present situation

- Research has been carried out but to date no projects have been implemented.
- There are no known pilot plants in the region.

Future perspectives

There is a general expressed interest but little action to date. Part of the reason being that a lack of financial resources have prevented action and there is a general lack of awareness of the technology, benefits and potential of biogas as a fuel of the future. The MADEGASCAR project should be able to increase knowledge and awareness and prompt action. The German firm **Fikon** intends to build a factory for production of bio-fuels and bio-fuel derivatives (gas, **methane**, electricity) in the northeastern Bulgarian city of Targovishte. This site borders the MADEGASCAR project region. The proposed investment is worth EUR 81 M, and the necessary raw material for the functioning of the factory would be about 300 000 tons per year.



Natural gas

Background

Over 95% of industrial enterprises in Bulgaria which have access to the gas distribution network already use natural gas. Only about 150 Bulgarian factories have no access to the gas distribution network. Bulgaria's total consumption of natural gas in 2007 was 3,402 billion cubic meters, with 3,2 billion cubic meters of these consumed by the Bulgarian industry. Where gas distribution is present it is concentrated in major cities. Licences have been granted to a gas distributor provider (Overgas) and companies such as 'Citygas' and 'Varnagas' have distribution licences but are mainly owned by Overgas. Distribution networks are slowly being implemented. At present only 1% of households have access to natural gas. The natural gas supply is only available in 35-40 municipalities, which is about 15% of the territory of the whole of Bulgaria. Bulgargaz EAD is the only gas transmission operator on the territory of Bulgaria carrying out the activity of natural gas transmission at prices regulated by the State Energy and Water Regulatory Commission /SEWRC/. The Company owns and operates annularly built gas transmission network with high pressure branches for transmission of natural gas to consumers and gas distribution companies in Bulgaria.

Main gas pipeline with high pressure branches – 1700 km;

Four compressor stations with total capacity of 57 MW;

Gas pressure-reduction stations – 68;

Eight gas measuring stations.

2. Gas transmission network for natural gas transit.

Transit main gas pipeline with a total length of 945 km;

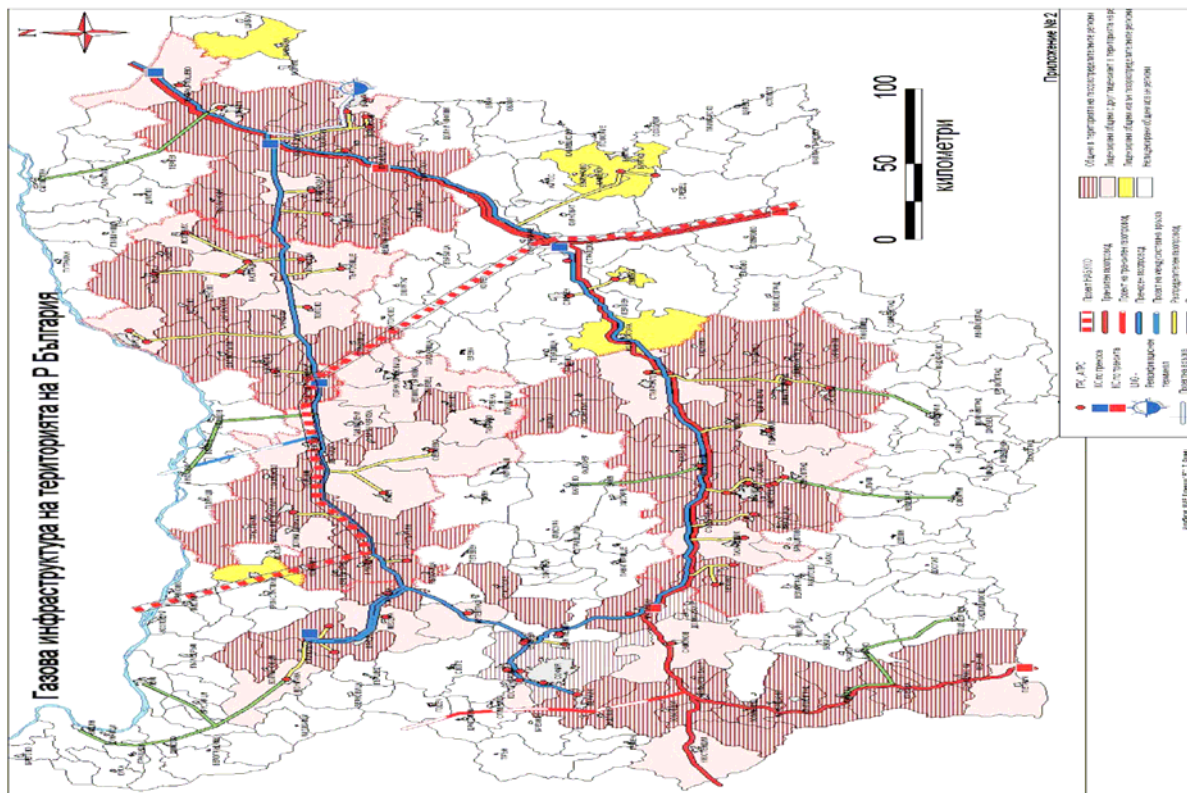
Six compressor stations with a total capacity of 240 MW.

There is a private company that has a license to explore and drill for gas offshore. This company is located in the Kaliakra region and now produces approximately 5% of the natural gas consumed in Bulgaria. The supply joins the national grid managed by Bulgargaz.



Present situation

- One gas company delivers natural gas within the region
- The amount of sold/used gas is 3.327 million cubic meters of natural gas year



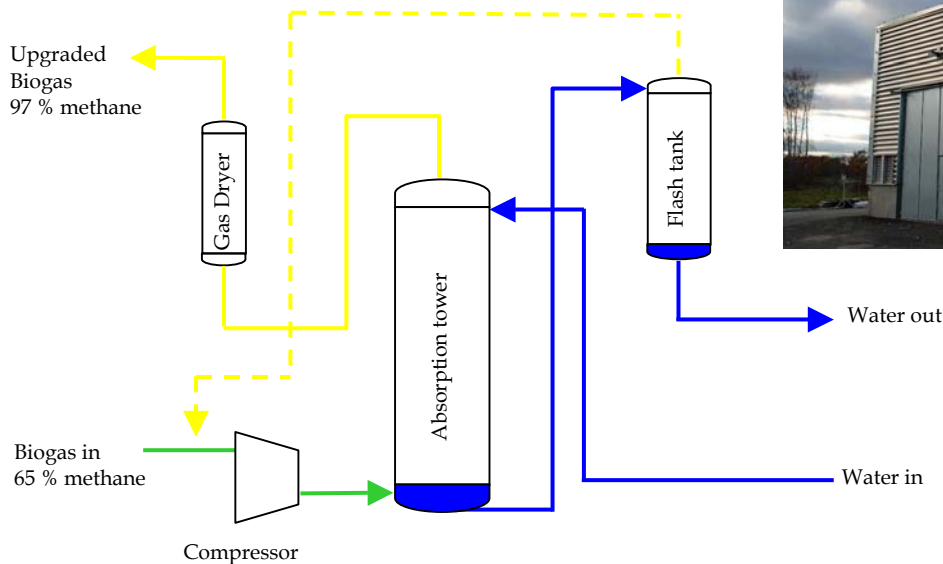
Future perspectives

A major network of gas distribution is planned for the period of 2007 -2013 to be part funded by the European Union structural funds.



Treatment and distribution

This section handles the present situation of biogas treatment plants and distribution systems for biogas and natural gas in the region. The number of gas fuelling stations will also be found in this section.



Treatment of biogas (upgrading)

Background

There are no known treatment plants in the region.

Present situation

- 0 upgrading plants

Future perspectives

There is potential for the treatment and upgrading of plants however there are no known proposals in the region as of this date.



Gas grid

Background

Bulgaria imports natural gas from Russia. Natural gas is transited through the territory of the Republic of Bulgaria to countries of the Balkan region – Turkey, Greece and Macedonia. Bulgargaz EAD owns and operates the natural gas transit network. This is in addition to the gas exploitation on the Black Sea shelf just off the Bulgarian shoreline in the Kaliakra region.

Present situation

Regional gas grid

SECTOR: ENERGY

Appendix III.7.5

GAS INFRASTRUCTURE IN BULGARIA AND ENERGY COMMUNITY



Future perspectives

The Nabucco project for constructing a transcontinental gas pipeline connecting the Middle East and the Caspian region has entered into its development stage. The total length of the gas pipeline route will be about 3.300 km of which 400 km on Bulgarian territory. The estimated investment value is about EUR 4.5 – 5 billion. With a planned capacity 25.5 – 31 billion cubic meters per year. The total length of the gas pipeline route will be about 3.300 km of which 400 km on Bulgarian territory.



Non grid transportation

Background

Some areas in Bulgaria do not have access to either natural or biogas and there is no supply chain. The only method of supply is via compressed bottled gas. With four compressor stations with total capacity of 57 MW but none are in the region.

Present situation

As there is limited gas distribution which is due to be developed under the Bulgarian National Strategic Reference Framework supply of gas bottles for domestic use is via lorry and road with gas supplies delivered to either the door or to other fuel suppliers such a petrol stations for sale to end user consumers.

Future perspectives

The future use of road and lorry to transport bottled gas will remain as the gas distribution network will not cover all areas of the region therefore traditional supply and distribution methods will continue especially to the more remote areas.



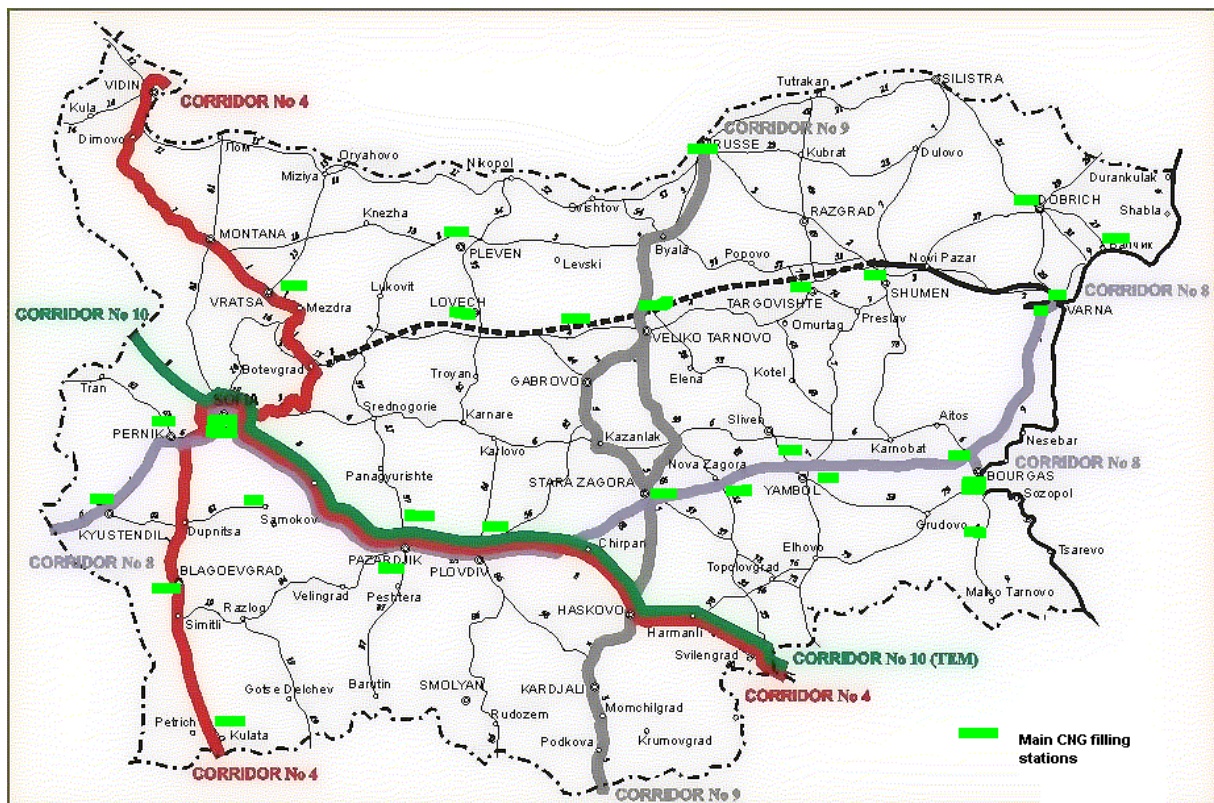
Gas filling stations

Background

There are 59 CNG filling stations constructed and operating in the whole of Bulgaria which are mainly situated in big cities. There are 12 gas filling stations operating in the Bulgarian Black Sea Region at present. The 59 stations are all linked to the main natural gas system and are privately owned and not part of the major vehicle fuel supply companies. The distribution of CNG stations is parallel to the gas network.

Present situation

- 12 filling stations in the region



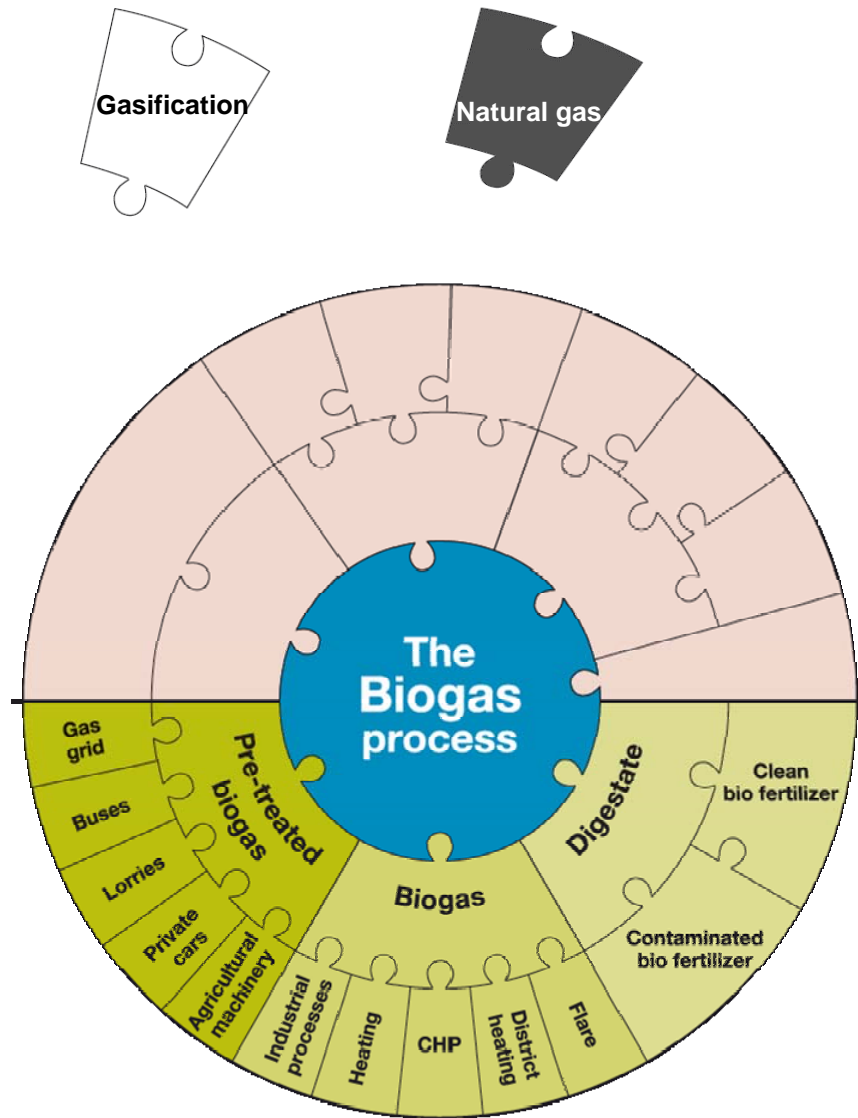
Future perspectives

There are two active companies (Avtometan and Remix) both based in Sofia for the design, construction and supply of equipment for biogas fuelling stations. These companies have the only licences to carry out this work on the territory of Bulgaria. The companies are active and are seeking to open new fuelling stations on a regular basis. There are currently 12 cities with CNG fuelling stations with 15 future stations under construction.



Utilisation of biogas and natural gas

This section sums the use of biogas and natural gas in the region. The focus lays on use of gas for vehicles, but the use in fixed applications as heating and CHP will also be ventilated to get a better overview of the entire gas market.



Utilisation of upgraded biogas and natural gas in vehicles

Background

LPG and diesel have been mainstay fuels with Taxi and private cars until recently. With the increase of private importation of second hand cars from Italy the number of CNG cars is steadily growing therefore fuelling an increase in demand. This is also with Taxis which have converted to CNG from LPG and diesel. A second influence has been the private importation of cars from other European car dealers of new CNG vehicles being used as taxis. The Opel Safira is an example. There is now an estimated utilisation of between 70-75% of taxis using CNG 5% diesel and the remained using LPG. There are no known actual figures for the number of taxis in operation in the region as some operate without the official permits.

Present situation

- 40,000 personal cars as of December 2007
- 200 buses
- 20 heavy duty vehicles and 35 other vehicles
- Average monthly consumption for the whole of the Bulgarian territory is 7,00 MNm³

Future perspectives

There is reported to be a alleged 229% growth in CNG fuelling stations and a 225% growth in CNG vehicle usage between 2006-2007. Therefore the trend is very positive with a bright future for increased distribution and use.

LPG

Background

As a general rule there is a large uptake of LPG usage in Bulgaria and the region. Almost all garages have LPG pumps. There is also sole LPG filling stations which do not supply any other types of fuel for vehicle consumption. Approximately 20-25% of all taxis use LPG. A large number of private cars also use LPG but this is in the main within low income households.

Future perspectives

It is foreseen that the usage of LPG as a fuel for vehicle consumption will continue in the future. This is due to the rising costs of alternative petroleum based fuels and increasing distances and frequency of travel. Conversion to Biogas will depend on factors such as fuel unit costs, ease of access, consumption rates or economies and costs associated with conversion of vehicles as well as payback periods as well as incentives to convert vehicles. Vehicle owners are reluctant to convert to CNG as they question the safety of their vehicles and damage caused when using a heavy fuel tank and the rough pot holed roads.



Norms and Legislation

Under Bulgarian legislation all aspects of gas and biogas production, supply and distribution are covered by the following 2 laws:

The **Law on Energy**: Biogas is mentioned in “Additional Provisions: Renewable Energy Sources” Regulations and laws pertaining to gas fall under Chapter 12 of the Law on Energy. There are no specific laws and regulations in relation to biogas it is bundled into the main law.

The “**Renewable and Alternative Energy Sources and Biofuels Act**” mentions biogas in section C Complimentary Provisions. *“Biogas”: gas derived from biomass and/or biodegradable fractions of waste, which can be refined to the quality of the natural gas and be used as biofuel ;*

An additional related law; the “Law on Energy Efficiency” does not mention biogas only that the state has a policy to promote the use of alternative energy sources which in the main is directed to electricity production.

The price of gas is regulated by the State Energy and Water Regulatory Commission who publishes the price of gas and the transit costs.

Control measures

There are no control measures that are used to enhance any of the parts of the gas market or the use of CNG as vehicle fuel?

Utilisation of biogas and natural gas

There are no control measures that are used to enhance the utilisation of biogas and natural gas for vehicles, except for a local initiative on the sale of a new Volkswagen Caddy where the dealer will give 500 Kg of Methane on purchasing a new vehicle.

The only other initiative in place is as follows under the Energy Efficiency law: Art. 31. The users of electric power, heating power and natural gas in condominiums, having founded legal entities - housing associations under the provisions of art. 152 of the Law on Energy, may apply for financing of projects for energy efficiency raising to the Energy Efficiency Fund.



Available vehicles

Personal cars



Make: Volkswagen
 Model: Caddy
 Car Body:
 Rated Output:
 Fuel capacity:
 Action range:
 CO₂ emissions:
 Passengers: 5-7 passengers
 Kerb Weight



Make: Citroen
 Model: C3
 Car Body:
 Rated Output:
 Fuel capacity:
 Action range:
 CO₂ emissions:
 Passengers:
 Kerb Weight



Make: Citroen
 Model: Berlingo
 Car Body:
 Rated Output:
 Fuel capacity:
 Action range:
 CO₂ emissions:
 Passengers:
 Kerb Weight



Make: Opel
 Model: Combo
 Car Body:
 Rated Output:
 Fuel capacity:
 Action range:
 CO₂ emissions:
 Passengers:
 Kerb Weight



Make: Fiat
 Model: Panda
 Car Body:
 Rated Output:
 Fuel capacity:
 Action range:
 CO₂ emissions:
 Passengers:
 Kerb Weight



MADEGASCAR

MADEGASCAR - market development of gas driven cars, is a project which aims at developing the market for gas driven vehicles – natural gas and biogas fuelled vehicles. Strengthening the supply and distribution infrastructure of biogas and natural gas to fuel vehicles is also a goal for the project.

Intelligent Energy - Europe

Intelligent Energy - Europe is the EU's tool for funding action to improve the conditions for energy saving and the use of renewable energy sources in Europe

BoRAEM

The Bourgas Regional Agency for Energy Management was been established and supported by Energy Intelligent – Europe Programme of the European Commission, managed by the Executive Agency for Competitiveness and Innovations. The activities of BoRAEM cover the territories of municipalities in Bourgas administrative district.

The Agency was created as a voluntary organization for the accomplishment of non-profit activities. The Agency operates to private benefit and is registered as a juridical person in accordance with the Law on Juridical Non-for-Profit Persons.

Strategic goals

- To represent and defend its members' interests for establishment of the energy efficiency as a major element of sustainable development policy in the Bulgarian Black Sea region
- To unite the Bulgarian Black Sea municipalities' efforts in increasing the energy efficiency, energy and environmental policy as a prerequisite for finding solutions to tasks of national importance
- Environmental protection and recreation in the Bulgarian Black Sea region
- To create conditions for burden the energy costs on municipal budgets
- To contribute to reduction of energy costs of individual end users.
- To assist the process of capacity building of the municipal servants for effective energy management
- To enhance the public awareness for the role and importance of effective energy management and active citizenship
- To contribute to the national and the international know how transfer for energy efficiency management.

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