Study "Legal and Regulatory Environment for the Construction and Operation of CNG Filling Stations in European Countries"

BACKGROUND TO THIS PROJECT (2011-2012)

- Sponsor: European Business Congress
- Primary Contractor: National Gas Vehicle Association Russia, assisted by Clean Fuels Consulting
- Project Scope
  - 21 European NGV Country Profiles (West & East Europe) – PowerPoint file
  - Legal & regulatory environment to build fuelling station network – Excel File
  - Strategic approaches to create NGV fuel infrastructure – PowerPoint file
  - NGV Infrastructure Calculation Tool (NICA) – Excel File

PURPOSE OF THE PROJECT

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The European market for natural gas vehicles has been expanding steadily since 1994 when there were 524,000 natural gas vehicles (NGVs) and 1,693 CNG fuelling stations. Today the European market has expanded to 1.5 million NGVs and 4,000 fuelling stations; growth of 286% and 236% respectively.

While NGVs and the fuelling infrastructure are a practical potential business opportunity they compete with the 'politically attractive' technologies such as hydrogen fuel cells and electric battery vehicles.

Thus, the time is right for the wider European business community to be made aware of the 'NGV potential.' This is best done by highlighting the excellent opportunities to invest in a sustainable fuel and technology that addresses today's important concerns about energy and the environment through the wider use of NGVs, whether they run on fossil natural gas, liquefied natural gas or renewable biomethane.

The European Business Congress has recognized this need and now is seeking a way to inspire new investments in the CNG fuelling infrastructure across Europe. Once in place, this can lead to a much more widespread development of the European NGV market in individual countries that are linked across Europe along the normal transportation corridors.

ACKNOWLEDGMENTS

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- EBC Project Coordinator: Detlef Wessling, E.On Ruhrgas
- NGVRUS Project Manager: Eugene Pronin, Gazprom
- Clean Fuels Consulting
- Principal Investigator: Dr. Jeffrey M. Seisler
- Research Assistant: Marco Dal Pont
- Project engineer for the Natural Gas Infrastructure Calculation Tool (NICA): Gijs van Schoonhoven (Ingenieurbüro van Schoonhoven)

NGV COUNTRY PROFILES

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NGV Country profiles provide, in a PowerPoint format, a template of information that represents in-depth analyses on a country-by-country basis. The profiles focus on the specific elements that are important to understand the investment environment to develop a CNG fuelling infrastructure. Taken together, these country profiles provide a unique window into individual markets that may be attractive to different commercial interests investing in the NGV infrastructure.

BULGARIA
(January 2012)

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COUNTRY PROFILE TEMPLATE

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- NGV Profile
- Motivation
- Energy Profile (oil & gas/imports & exports)
- Vehicles
- Fuelling Infrastructure
- Government Support
- Gas Industry Support
- Conclusions

NGV PROFILE

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- Number of NGVs: 61,623
- NGVs are 3% of total vehicle population
- 8 NGVs per 1000 population
- CNG fuelling stations: 102
- 604 vehicles per fuelling station
- Price differential CNG-Petrol/diesel:
  - CNG equivalent per liter gasoline: €0.51/liter
  - Regular Gasoline: €1.249/liter

  Natural gas costs 60% less then gasoline

Source (December 2011), www.metanoauto.it
http://www.drive-alive.co.uk/fuel_prices_europe.html

MOTIVATION

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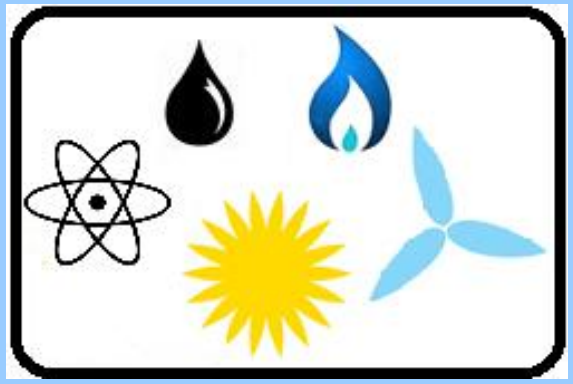
- Cost reduction/Economics

ENERGY PROFILE



ENERGY PROFILE SUMMARY

- Bulgaria is a gas transit country that currently provides Russian gas to Turkey, Greece and Macedonia
- The government agreed with the EU to shut down two nuclear facilities at Kozloduy (880 MW) but there are plans to complete the nuclear plant at Belene (1GW) for an estimated cost of €2 billion
- Targeting an 8% reduction of greenhouse gas emissions 2008-2012 under the Kyoto Protocol

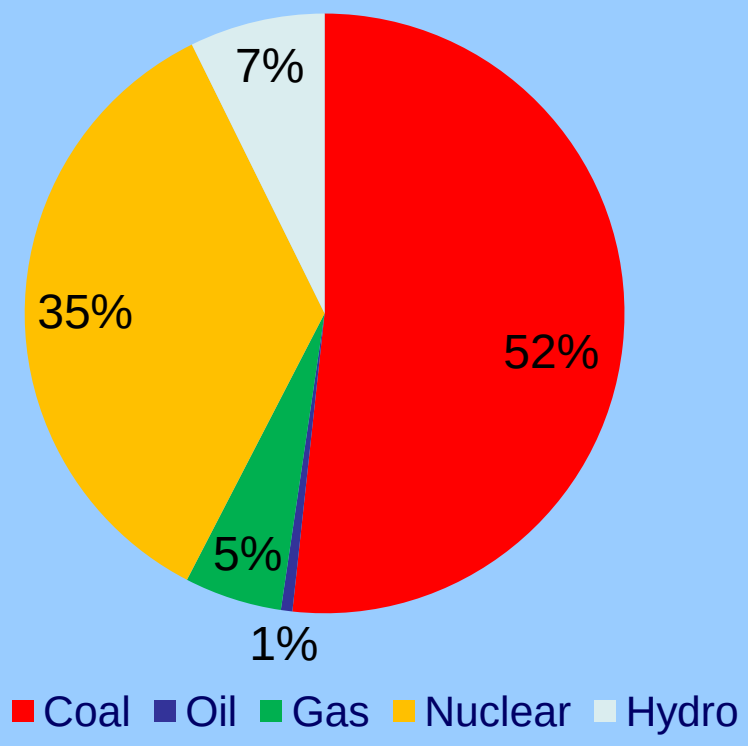
ENERGY PROFILE

- **Oil**
  - production: 2.925 bbl/day
  - consumption: 91.000 bbl/day
  - imports: 201.400 bbl/day
  - exports: 75.840 bbl/day
  - reserves: 15 million bbl
- **Natural gas**
  - production: 54 million m^3
  - consumption: 2,62 billion m^3
  - imports: 2,48 billion m^3
  - exports: 0 m^3
  - reserves: 5,663 billion m^3

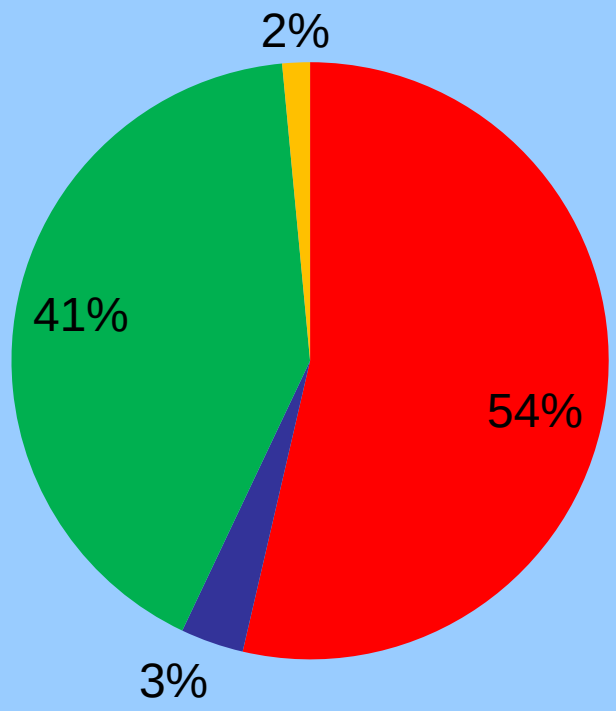
Source: CIA World Factbook 2011

Coal is the main source used for generating electricity and to produce heat, while natural gas has an important role mostly to produce heat

Electricity production



Heating production

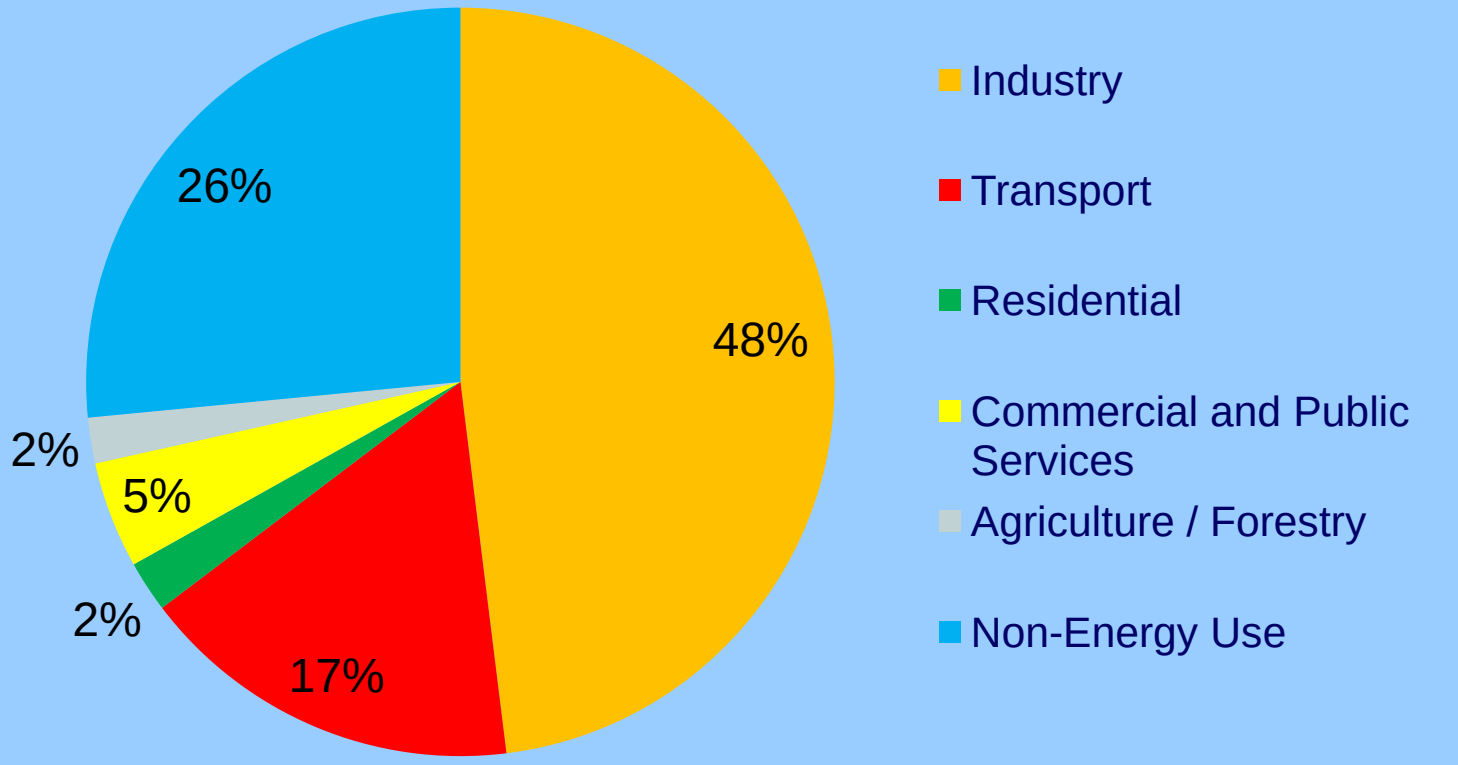


Source: IEA statistics 2011

NATURAL GAS PIPELINE MAP

Bulgaria has a well developed pipeline infrastructure of 2,844 km for natural gas transit and distribution, Natural gas is being transported to Turkey, Greece and Macedonia

Substantial percentage of natural gas is used as fuel in the non-road gas transport sector, while a small fraction goes to vehicles



Source: IEA statistics, 2011

Azerbaijan is ready to provide Bulgaria with natural gas supplies as of 2014

- Today 100% of gas imports come from Russia
- According to the Bulgarian Economy Ministry, Azerbaijan can start shipping natural gas to Bulgaria as soon as it completes its gas network interconnections with the networks of its southern neighbors
- About 1 billion cubic meters per year expected via Georgia, Turkey, and Greece

Source: Novinite – Sofia News Agency, 23 June 2011

The government of Qatar is considering Bulgaria as a destination where it can invest in a new LNG terminal

- Over the last couple of years Bulgarian authorities have floated the idea of hosting a terminal for LNG and have initiated negotiations with countries such as Azerbaijan and Egypt regarding this idea

Source: Novinite – Sofia News Agency, 23 March 2010

Interest in biogas projects in the last few years is growing in Bulgaria

- Although biogas market in Bulgaria is just at the beginning of its development, the potential of biomass suitable for biogas production is promising

Source: Big>East, Biogas potential in Bulgaria, Summary Report, March 2009

There are already several biogas projects but that are oriented toward electricity production

Name	Location	Feedstock	Utilization of biogas	Status
Tsarevets farm	Mezdra district	Cattle manure & maize	Electricity	In construction
Dobrich farm	Dobrich district	Animal manure & agricultural waste	Electricity & domestic water	Early planning stage
Montana landfill	Montana	Municipal waste	Purification & burning of biogas	In construction
Sozopol landfill	Sozopol	Municipal waste	Purification & burning of biogas	In construction
Rousse landfill	Rousse	Municipal & industrial waste	-	In construction
Suhodol landfill	Sofia	Municipal waste	CHP	In preparation
Kubratovo WWTP*	Sofia	Sewage sludge	CHP	In preparation

Source: Big>East, Biogas potential in Bulgaria, Summary Report, March 2009

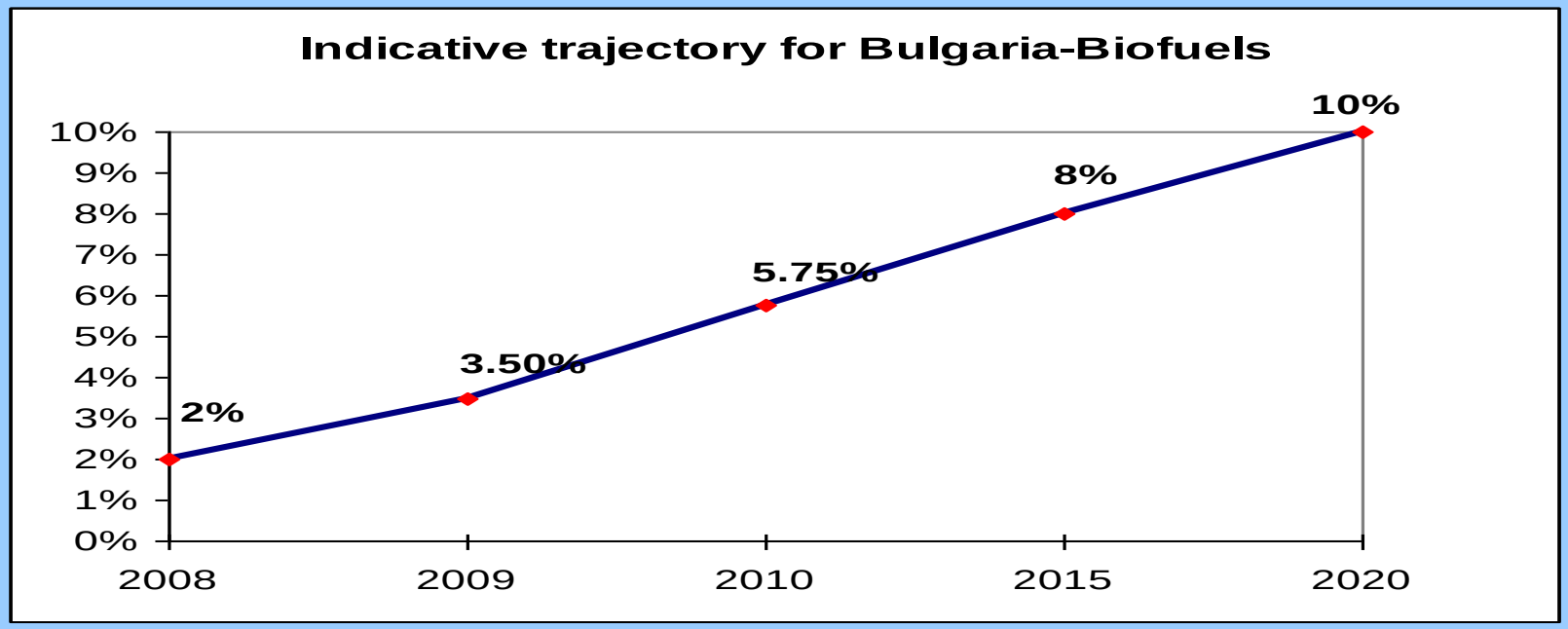
The appropriate reduction of barriers has just started but a lot of work remains in the biogas sector

- Lack of legislative framework on biogas and support mechanisms
- Low educational level and inadequate qualification of the stakeholders
- Lack of information campaigns, training programs, consensus conferences, and regional dissemination networks
- Lack of domestic capital and difficult access to credit of Small Medium Enterprises

Source: Big>East, Barriers for Biogas implementation in Bulgaria, November 2009

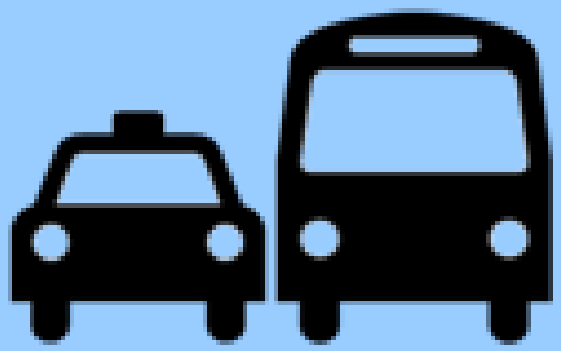
Mandatory EU targets set 16% share of renewable energy consumption by 2020 Renewable Energy Directive

- At least 10% share of biofuels of final consumption of energy in transport in Bulgaria in 2020



Source: InvestBulgaria Agency, Bulgaria – your investment decision, June 2010

VEHICLE PROFILE



VEHICLE PROFILE

- There has been no domestic production of passenger cars in Bulgaria since 1996, when the Rover Group closed its car plant
- Component manufacturers are active in producing for various European customers; local production ranges from electrical & electronic equipment and spare parts to aluminum and steel wheel rims, batteries, tires, windshields, paints, filters etc, totaling exports of €22.3 million

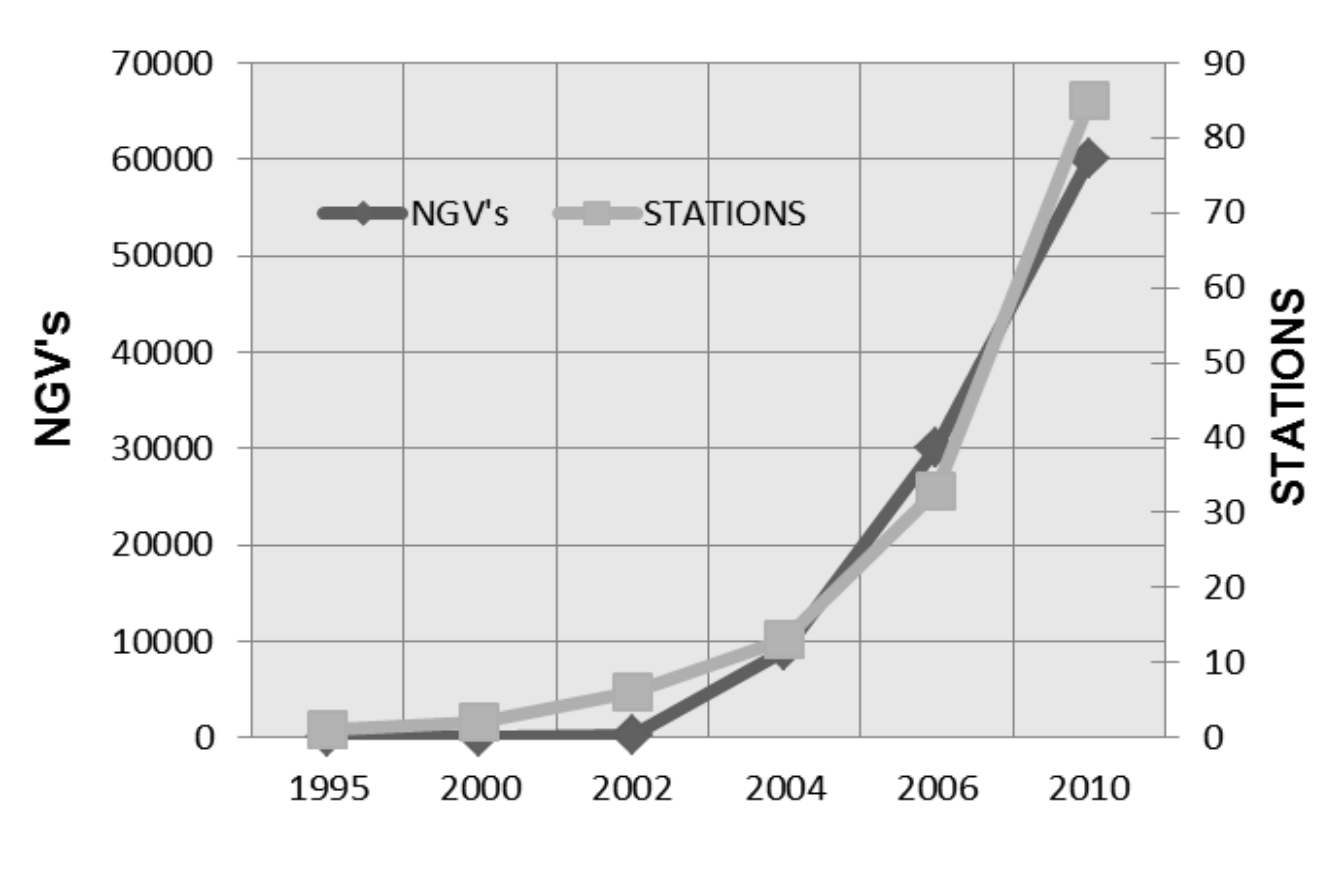
NGVs

More than 99% of NGVs are passenger cars

- Passengers cars: 61.500 (of which 59.000 are retrofitted)
- Buses: 105 (50 OEM, 55 retrofitted)
- Trucks: 11 (all retrofitted)
- Other vehicles: 7

Source: IGU NGV Report, Bulgaria Country Profile, December 2010

Since 2002 there was strong and constant growth of NGVs and fuelling stations



Source: InvestBulgaria Agency, Bulgaria – your investment decision, June 2010

NGV OEM AVAILABILTY

List of vehicle models available from the factory with CNG is still very limited. Light duty vehicles almost always are usually multi fuel

FIAT
- Punto
- Doblò
- Multipla

Mercedes-Benz
- E200

Volvo
- V70
- S60

Citroen
- Berlingo

Source: BNGVA

Majority of CNG installation come from foreign countries, especially from Italy

- Up to July 2011, about 80% of the converted NGV are equipped with CNG systems of the Italian BRC brand
- **REMIX BULGARIA LTD**: exclusive representative for Bulgaria of the Italian companies SICOM and BRC
- **Balkan Trade Group Ltd**: official representative of the brand A.E.B. srl (Italy), electronics for cars running on LPG and CNG and AG Centrum (Poland), Gas Injection Systems
- **Lease Consult**: sells italian CNG compressors

Source: Remixbg; BTG Gas

Several cities have started to introduce alternative fuels in public transport buses mostly funded within EU projects

- Sofia: 55 buses on diesel-methane and 13 buses on methane are in operation
- Gorna Oryahovitsa: has converted 5 public transport diesel vehicles to natural gas
- Plotiv: 30 new buses running on natural gas to replace the old diesel buses
- Bourgas: since October 2008 has operated the first 10 LNG buses in its public transport network

Source: Cleanvehicle.eu

The major drive behind the development of the CNG market in Bulgaria is the taxi sector

- More than 73% of the yellow cars run on CNG
- This tends to keep taxi prices comparatively low, making them more popular and affordable for the commuting public

Source: madagascar.eu

NGV FUELLING INFRASTRUCTURE

31 cities covered by the CNG refuelling stations network (average 3 per city)

Lack of biogas in the Bulgarian fuelling network

- There are no operating biogas plants yet and no refuelling stations with biomethane or biomethane mixture with other fuel
- Biogas is not yet present in the legislative policy

Source: Big>East, Biogas potential in Bulgaria, Summary Report, March 2009

The biggest CNG station in Europe (at that time) was opened in Samokov in October 2007

- The companies behind the station are Samel 90 and Gas Systems Holland
- Divided in two separate parts: one for the lighter vehicles and one for the heavy duty vehicles
  - 2x 800 Nm³/h compressors
  - 2 double hose dispensers for cars
  - 4 double hose dispensers for buses and trucks
  - Vehicle conversion workshop

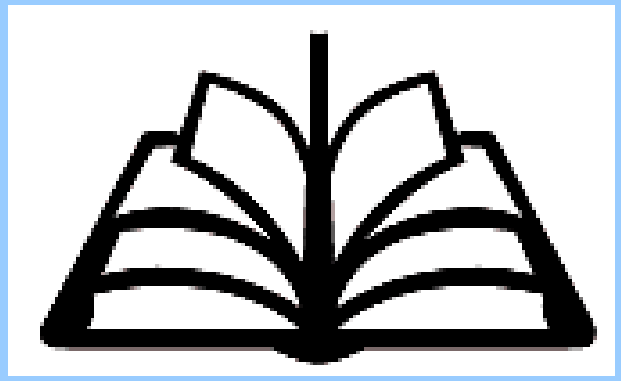
Source: Teesingsystem.nl

Mobile compressor station makes deliveries to fleet parks and end customers

- Cylinders: 16 composite CNG cylinders, type 4 with 450 l volume and 250 bar service pressure
- General mobile compressor station volume: 1800 m3

Source: Overgas CNG, New approaches for CNG distribution to customers in Bulgaria, February 2012

STANDARDS & REGULATIONS



- Multi-fuel stations: allowed (only 15 stations have CNG and other fuels)
- No limits on opening hours
- Self service: allowed but only 3 stations practice it
- Payment practices at the pump: cash. Only one station in Sofia accepts credit cards

Bulgaria uses international standards ISO for CNG and NGVs

Fuelling Stations

- Pr EN 13638 NGV filling stations
- IGEUP5 Part 1 Natural gas vehicle design and installation of filling stations
- Pr EN 13945 Vehicle refuelling appliances

Source: BDS, Bulgarian Standards Institute

Bulgaria uses international standards ISO for CNG and NGVs (continued)

NGV Systems

- EN 13 423 Compressed natural gas vehicle operations.
- EN ISO 11439 Gas cylinders – High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
- ISO 15 500-1 Road vehicles- Compressed natural gas (CNG) fuel system components –part 1: general requirements and definitions

Gas Quality

- ISO 15 403 Natural gas- Designation of the quality of natural gas for use as a compressed fuel for vehicles

Source: BDS, Bulgarian Standards Institute

Technical requirements to the natural gas grid and equipment are provided in the following regulations:

- Regulation about technical rules and standards for design, construction and usage of objects and equipment for transmission, storage, distribution and supply of natural gas (ordinance No 6 of 25 November 2004)
- Regulation for structure and operation of transmission and distribution gas pipelines and of natural gas equipment, installations and appliances (ordinance No 171, 16 July 2004)
- Specific requirements for biomethane injection into the grid are not given

Source: Big>East, Biogas potential in Bulgaria, Summary Report, March 2009

GOVERNMENT SUPPORT

Circulation tax based on the vehicle weight. The only environmental tax exemption is on the excise duty

- Leaded Gasoline: 0.424 €/liter
- Unleaded Gasoline: 0.363 €/liter
- Kerosene: 0.314 €/liter
- LPG: 0.174 €/liter
- Natural Gas: €0
- Biodiesel: €0

Source: Deloitte, Bulgarian taxes 2011

A draft law to raise the excise duty on fuels including natural gas, is under discussion

- Excise duty on diesel and kerosene will increase to €0.630/liter
- Excise on Natural gas of €1.7/Gigajoule
- Prime Minister Borisov opposed taxing methane because it was inappropriate during an economic crisis

Source: energetika.net, Bulgaria to keep rise in excise duty on fuels from January 2012, 28 October 2011

Bulgarian regulations do not provide specific biogas support instruments

- Feed-in tariff, quota regulation/certificate mechanisms, tax incentives/investments grants and/or other financial resources are not present in any regulation
- Future development of biogas sector is highly dependent on the willingness of politicians and policy makers who formulate policies and introduce legislation

Source: Big>East, Biogas potential in Bulgaria, Summary Report, March 2009

GAS INDUSTRY SUPPORT

Overgas CNG AD is one of the biggest companies delivering CNG in Bulgaria

- For over five years Overgas CNG AD has been delivering CNG to some 300 enterprises, public-administrative entities, transport firms and households in Bulgaria
- CNG delivery by mobile compressor stations
- CNG delivery by local compressor stations

Source: Overgas CNG, New approaches for CNG distribution to customers in Bulgaria, February 2012

Bulgarian Natural Gas Vehicle Association is the main advocate lobbying for NGVs

- Founded in 2004
- BNGVA creates favorable legal conditions for the use of natural gas by vehicles and adopts European standards in the area of natural gas vehicles
- Large scale educational activities were conducted

БААПГ

Българска Асоциация
Автомобили на Природен Газ

Source: BNGVA

NATIONAL LAWS & REGULATIONS

Bulgaria's transition to a more open and flexible economic system has been facilitated by substantial restructuring measures over the past decade

- Launching a business has become less time-consuming and licensing requirements have been eased
- Foreign and domestic investors are treated equally, but arbitrary bureaucracy is an impediment to more dynamic investment

Source: The Heritage Foundation, 2011 Index of economic freedom

COMMENTS BY STAKEHOLDERS

COMMENTS BY STAKEHOLDERS

"Among alternative fuels natural gas plays major role to achieve target 2020. Meanwhile the time for achievement of this target is short, which places on the agenda the need for the following steps:

- Road map of compressor stations, which will facilitate transnational journeys
- Better cooperation between firms offering equipment for CNG and business to improve technologies for CNG
- Expertise transfer between European countries is extremely important, especially in the sphere of viable policies of the government and local authorities to promote CNG use in transport by tax relief and other instruments
- Joint and determined efforts to expand CNG uses would help achieve the major goals of the Lisbon strategy – to turn Europe in a better working and living place."

Source: Overgas CNG, New approaches for CNG distribution to customers in Bulgaria, February 2012

CONCLUSIONS

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- Energy environment
- Gas industry support
- Government support
- NGV market development
- Legal and regulatory framework for CNG station development
- Investment environment

Energy Environment

- Expanding natural gas network could mean good possibilities to improve the fuelling station network
- Lack of repair to the infrastructure, on the other hand, could slow this process
- Lack of support mechanisms has slowed the development of renewable energy sources in Bulgaria
- Development of biogas in Bulgaria will largely depend on legislation and policies on the one hand and, on the other hand, on the success of the demonstration projects and building internal capacity

Gas Industry Support

- The lack of strong support from the gas industry for NGVs is a barrier to the development of the market
- Major actions by Russian Gazprom to develop the pipeline network using Bulgaria as a corridor for South Europe could enhance the focus on NGVs

Government Support

- Tax exemption for CNG and biofuels is not sufficient to stimulate the market of new NGVs
- Incentives for NGVs and fuelling stations could spur the market to additional growth
- Main opportunities to develop the NGV market are coming from municipalities and their public transport fleets

NGV Market Development

- High price of NGVs compared to petrol cars is a deterrent to the purchase of new OEM NGVs. This continues to stimulate the use of retrofit vehicles
- Fuelling station network is in expansion with an average of 10 stations per year but without any help from the Government it is a difficult investment to justify

Legal and regulatory framework for CNG station development

- Clear regulations based on international standards (ISO) could enhance greater development of the CNG fuelling stations network

Investment Environment

- Thanks its entrance to the EU, Bulgaria has achieved an improved level of business and investment freedom
- The main barrier to development is the slow and arbitrary bureaucracy that still remains

BULGARIA
(March 2012)

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