European Business Congress Study - 2012

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.

UKRAINE
(October 2011)

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

- Number of NGVs: 200.000
- NGVs are 21% of total vehicle population
- CNG fuelling stations: 285
- 701 vehicles per fuelling station
- Price differential CNG-Petrol/diesel:
  - CNG equivalent per liter gasoline: 0,65 €/liter
  - Regular Gasoline: 0,81 €/liter

  Natural gas costs 35% less then gasoline

Source: Gas Vehicle Report

MOTIVATION

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- Economics (based on the low price of CNG), but today this situation is changing

ENERGY PROFILE

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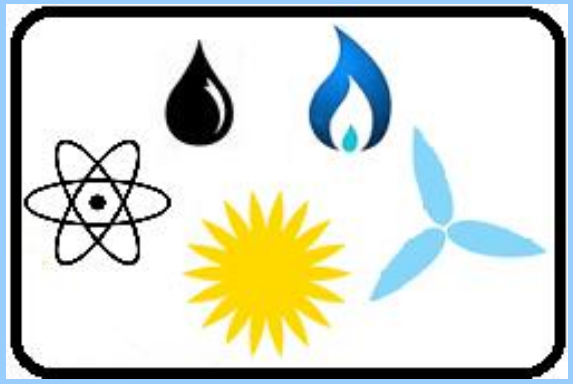


Natural gas is by far the most important primary energy source, followed by coal, nuclear and oil

- While energy consumption has dropped since the country's independence, reliance on imports, particularly on gas from Russia, has not declined
- Due to its geographic position, the country also plays a major role in securing Europe's energy needs: 84% of Russian gas supplies to Europe transits through Ukraine via pipelines

Source: IEA, Ukraine: Energy Policy Review 2006

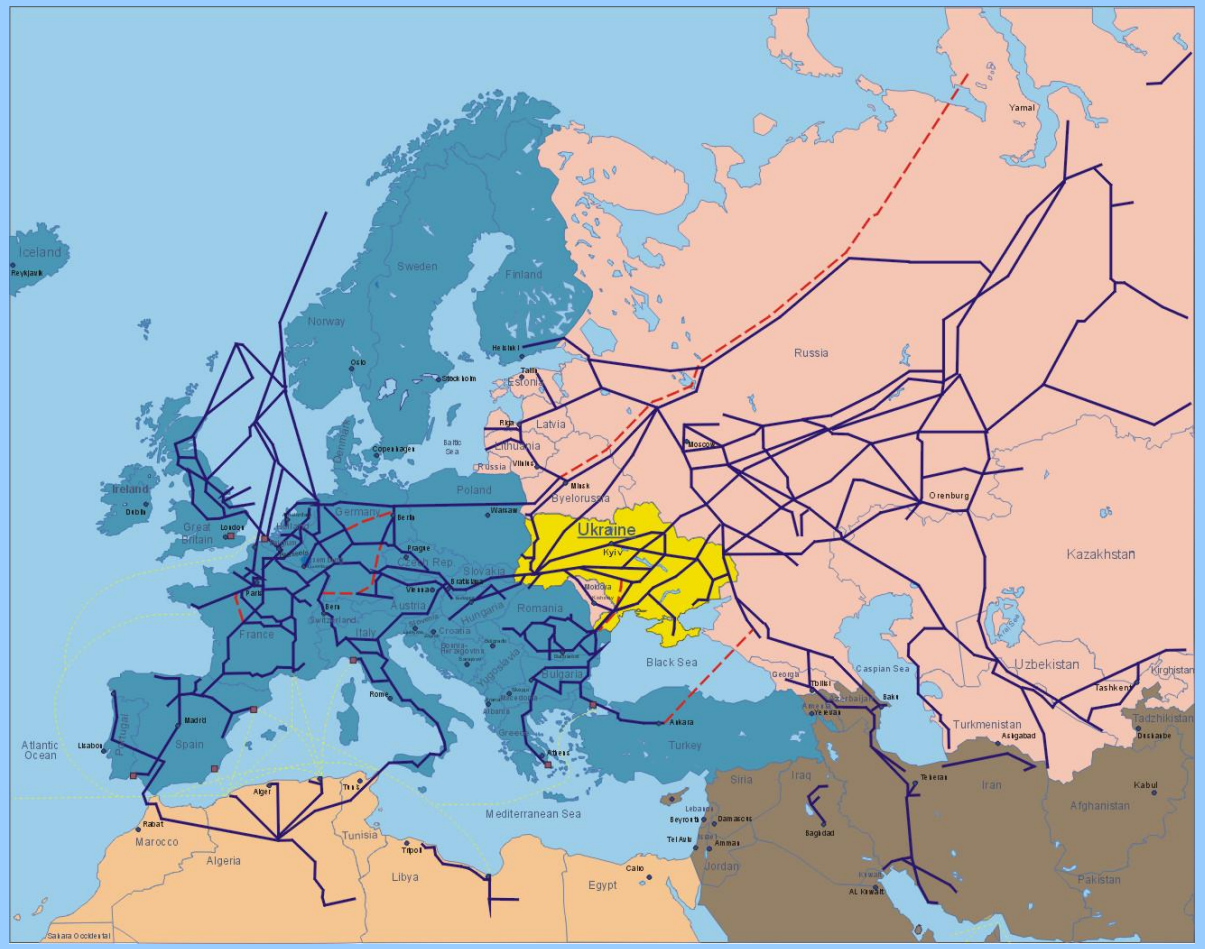
ENERGY PROFILE

- **Oil**
  - production: 99.930 bbl/day
  - consumption: 348.000 bbl/day
  - imports: 147.600 bbl/day
  - exports: 154.400 bbl/day
  - reserves: 395 million bbl
- **Natural gas**
  - production: 21,2 billion m^3
  - consumption: 52 billion m^3
  - imports: 26,83 billion m^3
  - exports: 5 billion m^3
  - reserves: 1,104 trillion m^3

Source: CIA World Factbook 2011

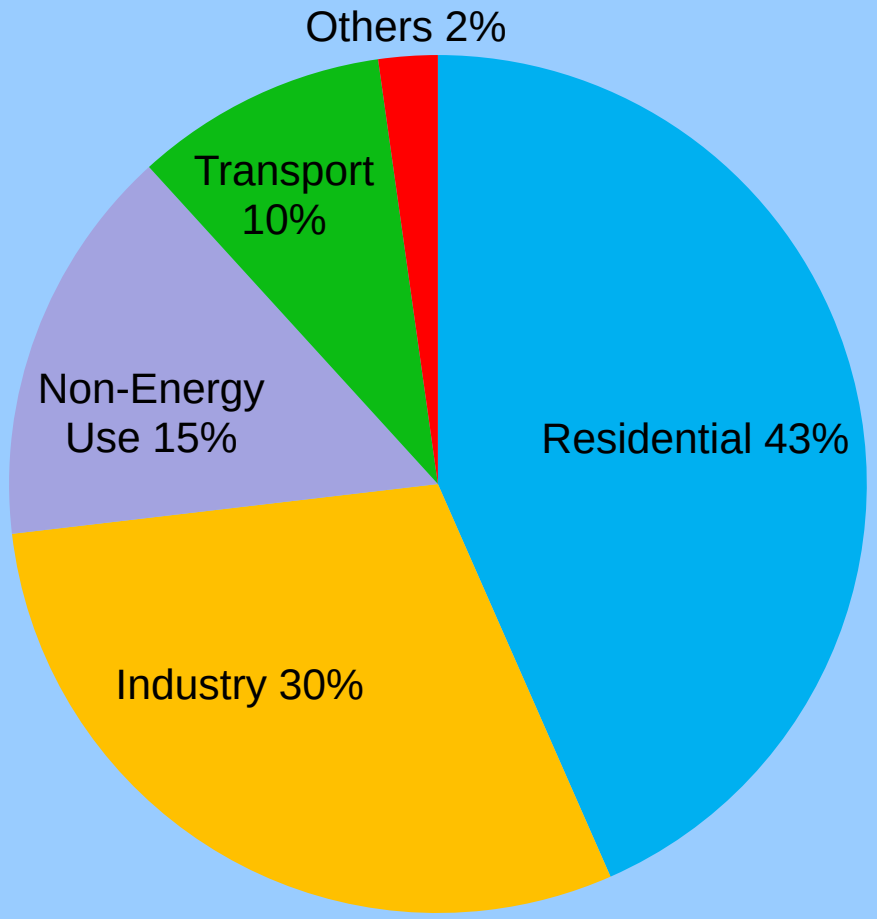
NATURAL GAS PIPELINE MAP

Ukraine is the most important country for the gas connection between EU and Russia



Source: Ukrtransgaz

10% of Natural Gas is used in the transport sector



Source: IEA statistics

Ukraine aims to cut gas imports from 40 bcm to 12.5 bcm by 2015

- Increasing its own gas production from 20 billion cubic meters (bcm) to 25 bcm
- Replacing gas with coal and energy efficiency
- Construction of a liquefied natural gas terminal and agreements on supplies of 5 bcm of gas from Azerbaijan

Source: Kyivpost, 7 September 2011

Ukraine to Launch a New LNG Terminal in 2 Years

- Construction of the LNG terminal with a general volume of 10 billion cubic meters on the Black Sea
- Planned to be completed by 2014In April 2011, the Presidents of Ukraine and Azerbaijan agreed that the latter would supply five billion cubic meters of natural gas to Ukraine annually for the new LNG-terminal

Source: Worldwide News ukraine, 16 May 2011

Biogas should have a great potential in Ukraine starting from 2011

- Ukrainian biogas market has the potential of € 25-30 billion
- Due to a number of biogas plants built by Ukrainian experts in course of 2009, the dynamic growth of alternative energy production in Ukraine is currently higher in comparison to any country, member of European Union

Source: Estonian Free Press, *EU and Ukraine enhance cooperation in alternative energy production*

Solution to the problem of energy dependence via development of bioenergy

- State program for development of production and use of biofuels in 2010-2014
- According to the Cabinet of Ministers Order N 25626 the consumption of the natural gas in 2010 should be cut by 8127.6 mln m3 compared to the year 2008 mostly by thermal power plants for energy and heat production

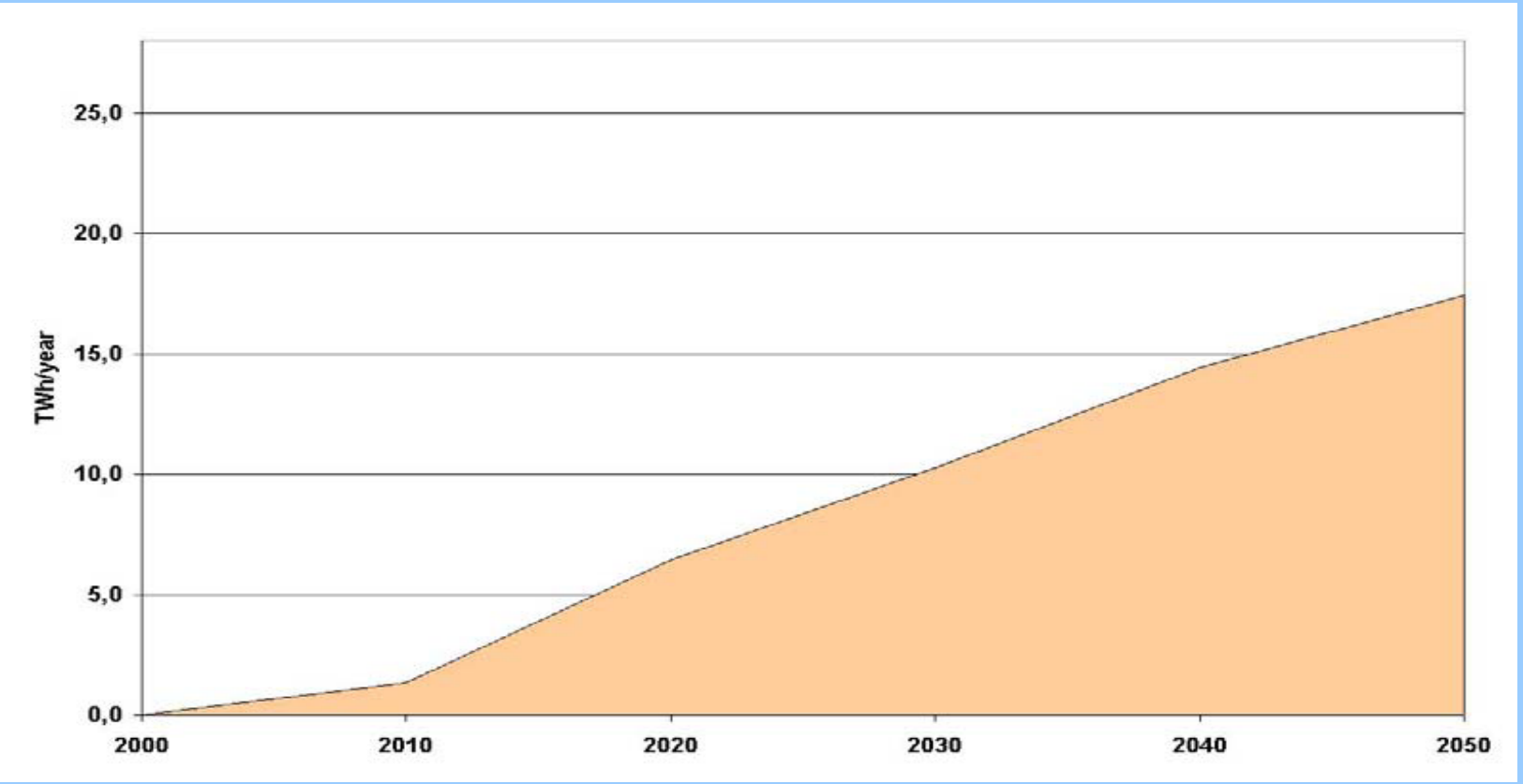
Source: German-Ukrainian Policy Dialogue in Agriculture, Biogas and green tariffs in Ukraine-a profitable investment?, January 2010

Biogas potential in Ukraine

Biogas plant electrical capacity, MWel	Number of potential plants on chicken dung	Number of potential plants on pig manure	Number of potential plants on corn silage
0,5	205	745	1.566
1	102	372	783
3	34	124	261

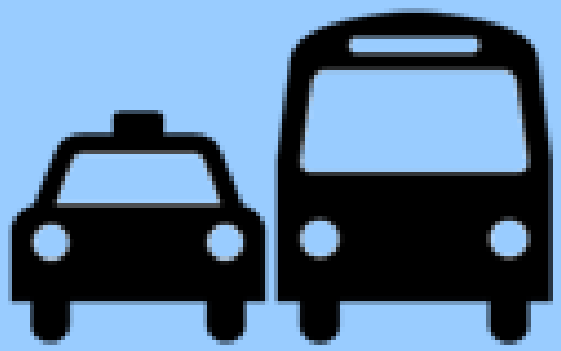
Source: German-Ukrainian Policy Dialogue in Agriculture, Biogas and green tariffs in Ukraine-a profitable investment?, January 2010

Biogas production is not expanded now, but a great potential is expected for the next years

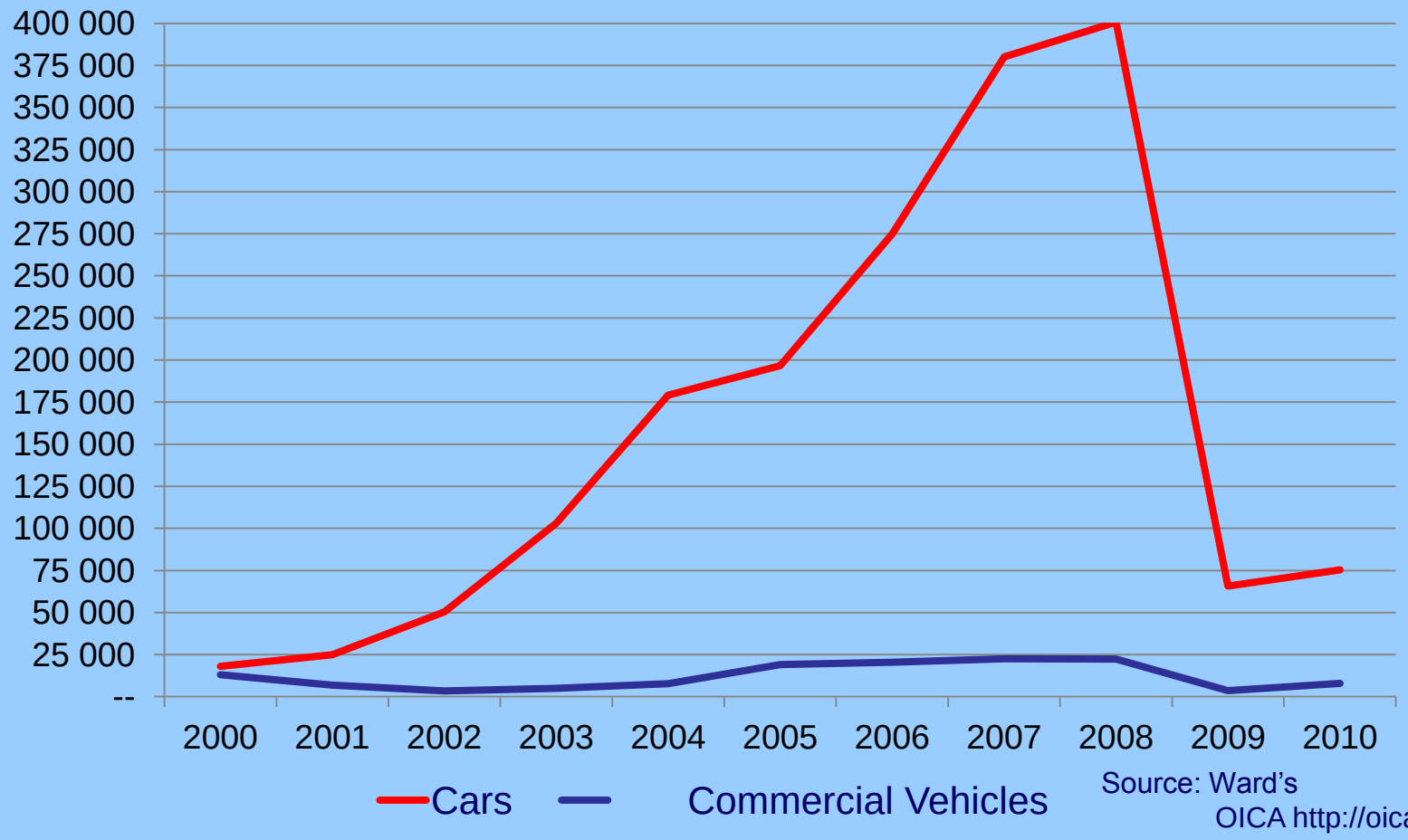


Source: Renewable Energy Agency NGO, Renewable Energy Ukraine vision 2050

VEHICLE PROFILE

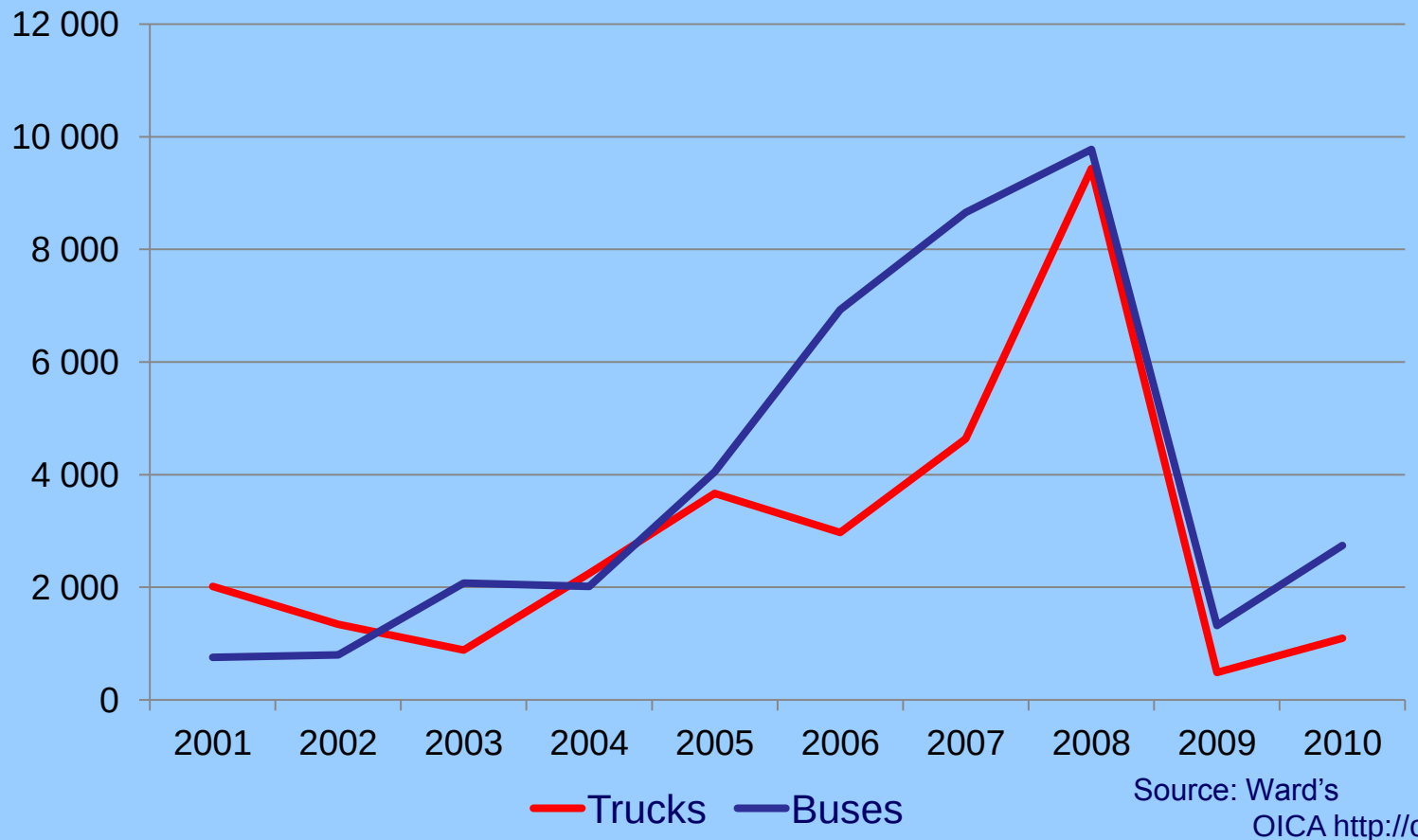


Car production grew faster than commercial vehicle production in the last 10 years



Source: Ward's
OICA http://oica.net/

Bus and truck production had parallel trends in their development



Source: Ward's
OICA http://oica.net/

NGVs

- The first domestic refueling stations were built, and the first vehicles were converted to use liquefied petroleum gas in 1936
- In 1949-1953, compressed natural gas vehicles (NGVs) were designed and launched into production
- Today Ukraine is the second largest market for NGVs in Europe (by number of vehicles)
- There are a wide range of industry interests and stakeholders to support the market development (conversions, fuelling stations, cylinders, etc.)

Source: Use of Compressed Natural Gas (CNG) as Motor Fuel in Ukraine, Prospects and Problems, Igor Orlov & Volodymyr Kozak, World Gas Conference, Amsterdam 2006

Growth of NGVs and fuelling stations has been relatively well balanced

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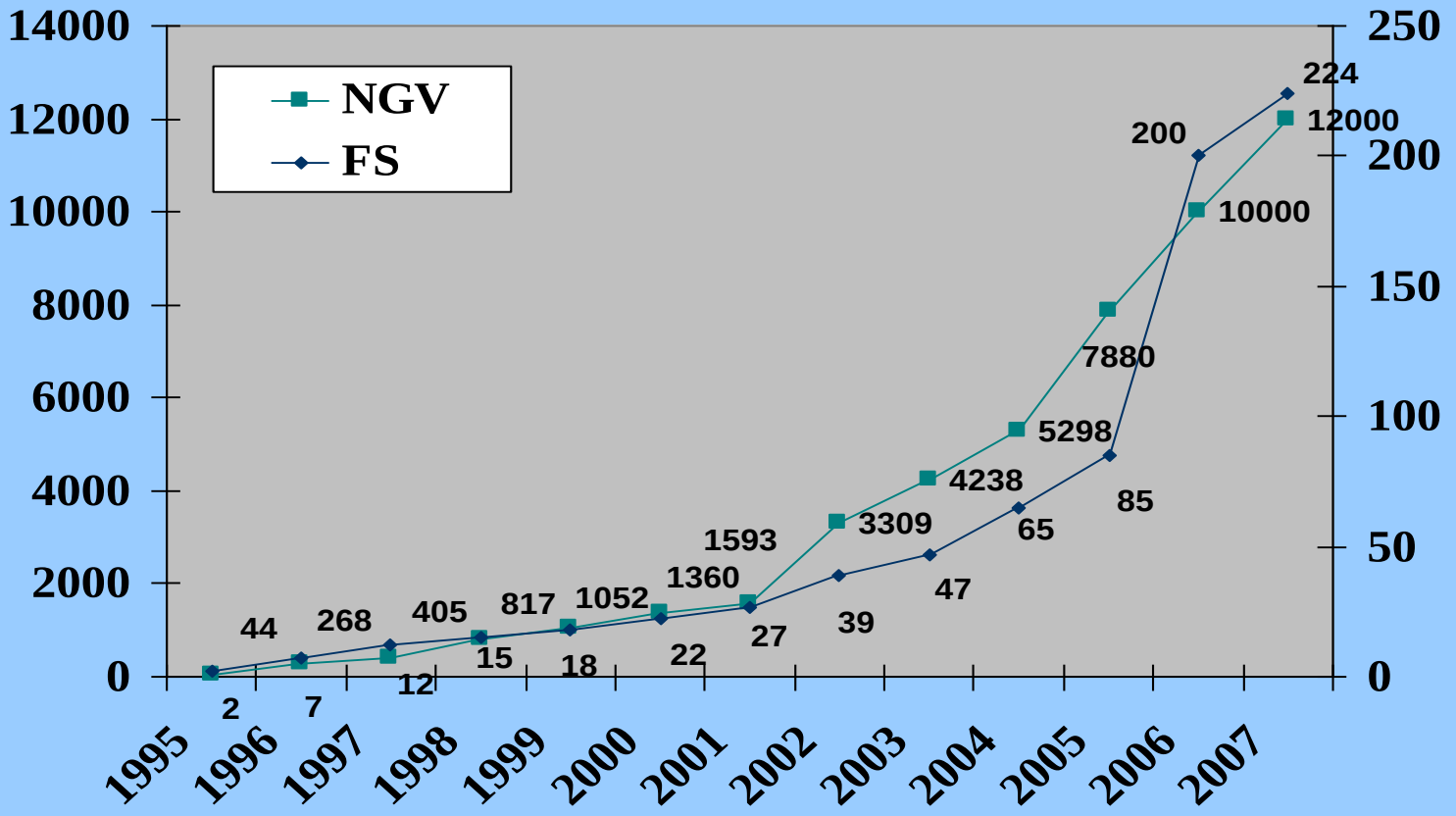
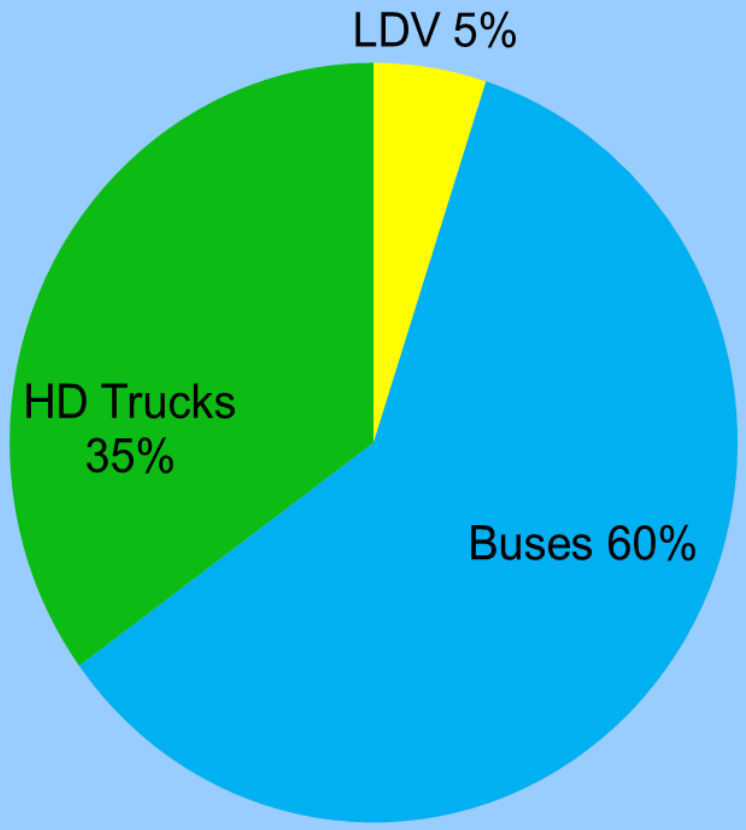


Buses make up the majority of NGVs while private cars are only a small portion



Source: GVR data, November 2009

The political situation between Ukraine and Russian over gas access is creating a difficult situation for the NGV market

- Natural gas prices have increased
- Lower prices of diesel and LPG cut the competitive edge on the price differential for cheaper natural gas
- More of the aging NGVs are being put out of service and new replacements do not seem to be sustaining the NGV population

Source: conversation with CNG Stakeholder

In some cases, old CNG engines on buses and trucks are being replaced with old diesel engines

- Some companies prefer diesel over CNG due to the longer range and wider availability for cheaper fuel
- Some companies are replacing old CNG bus engines with old Mercedes diesel engines

Source: conversation with CNG Stakeholder

Used NGVs drive the market

- Almost 100% of the NGVs are converted vehicles or imported as second hand NGVs from other European countries
- Imported commercial vehicles receive preferential import tax rates. Taxes on imported consumer vehicles are higher
- Some cities are buying used CNG buses from Volvo and other OEMs and customers(10 year old buses)

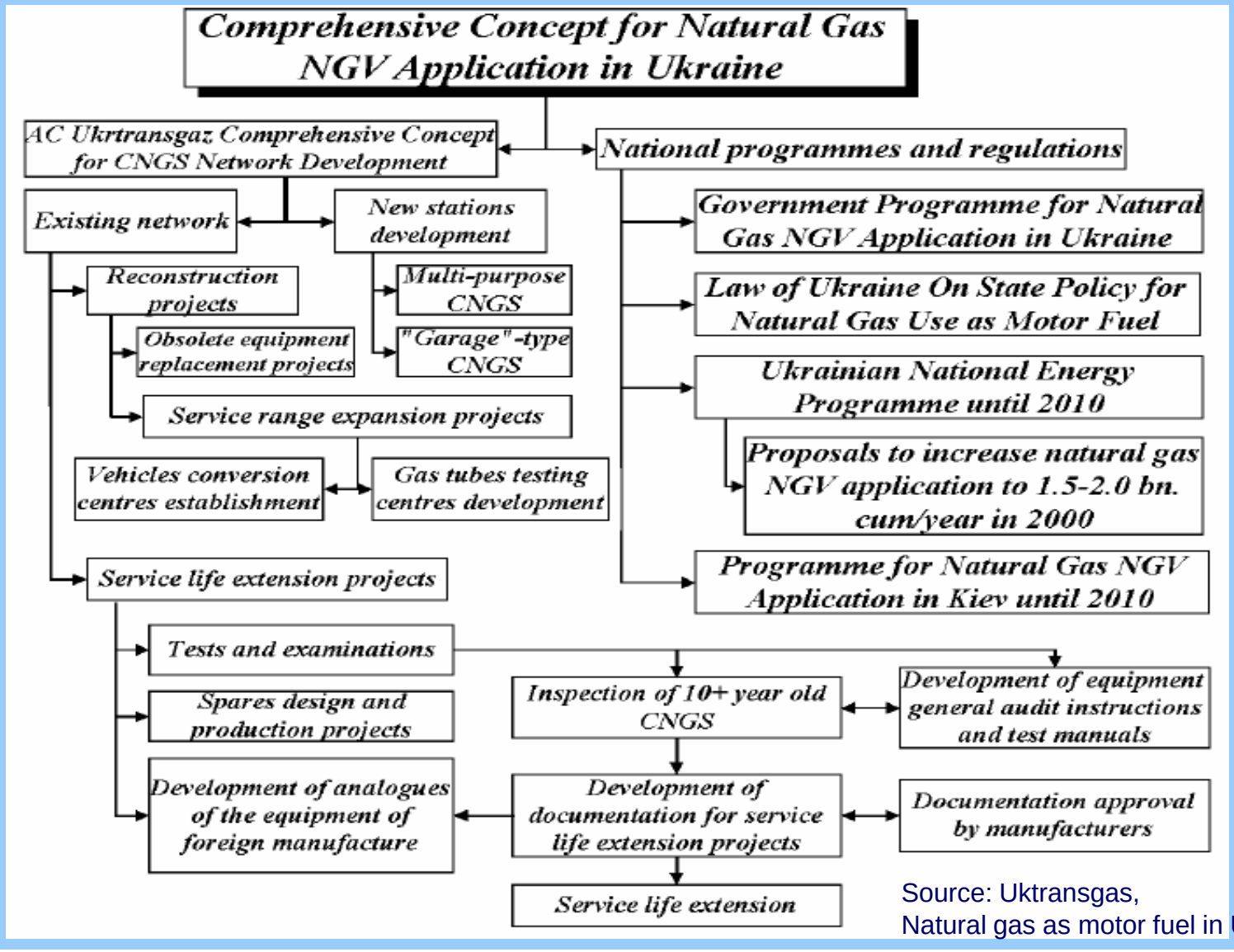
Source: conversation with CNG Stakeholder

Ukrainian LPG and CNG conversion markets are well developed and have strong potential for growth

Autogas Ukraine Group:

- Wholesale company, specialized in trading of autogas conversion kits, LPG tanks and separate parts for gas conversion.
- LPG dealer network is located in more than 30 cities and towns in Ukraine

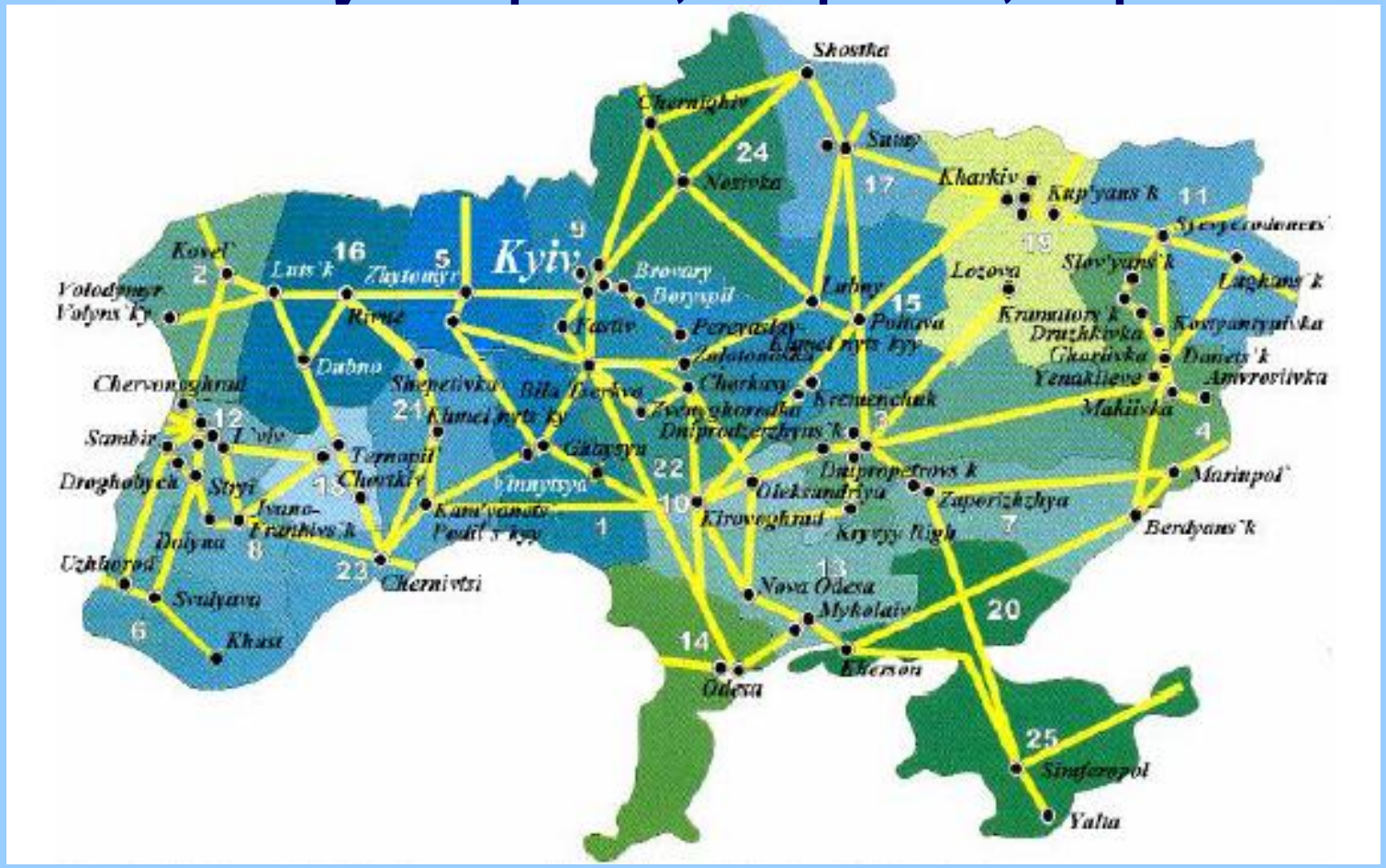
NGV



Source: Uktransgas,
Natural gas as motor fuel in Ukraine

NGV FUELLING INFRASTRUCTURE

Fuelling stations are well distributed in many parts of the country: 102 public; 192 private; 20 planned



Source: Gas Association of Ukraine, UNECE, WP gas, 2008

Only a few companies are planning to build new stations

- They can only connect to low pressure lines
- Stations are supported basically on a profit basis: the amount of the vehicles still supports the economics, but the amounts of vehicles is going down
- Oil companies are pessimistic about CNG and more positive about LPG. CNG involves longer approvals, access to the gas pipelines, and the first cost of fuelling stations is higher

Source: conversation with CNG Stakeholder

New generation of fuelling stations

In August 2004 a new generation fuelling station was opened

-Serves 500 vehicles per day

-2 fuelling hoses per dispenser

-No concrete partitions between the dispensers (leftover from Italian-Russian standards)

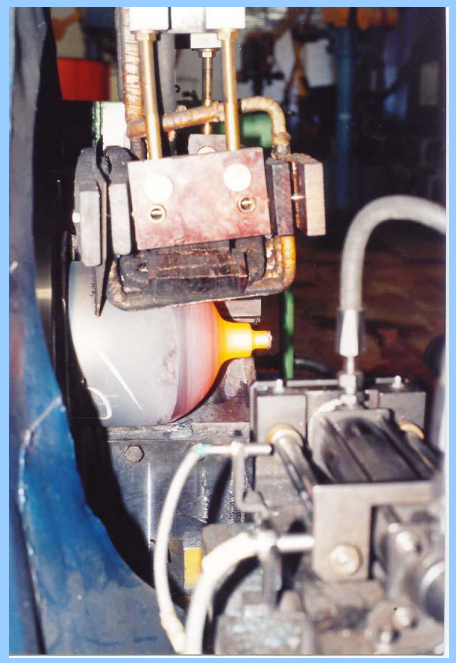
Source: NGV Worldwide, August 2004

CNG station Ecogas will be one of the biggest and most technologically advanced CNG station in Eastern Europe

Source: Gas Association of Ukraine, UNECE, WP gas, 2008

Ukrainian Fuelling Station (older style based on Italian Standards)

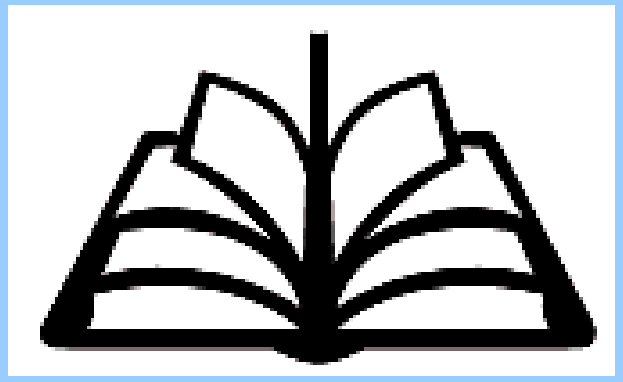
Ukraininan Plant Progress produces the world lightest all-stell CNG cylinders



Cylinders are made under European standard ISO 9002

Source: Gas Association of Ukraine, UNECE, WP gas, 2008

STANDARDS & REGULATIONS



Majority of the stations are strictly CNG stations

- Multi-fuel stations: allowed but less than 5% in total are in multi-fuel stations
- Limits on opening hours: 24h per day
- Self service: allowed
- Payment practices at the pump: Cash, credit card or debit card and private companies have their own gas payment card system

Source: conversation with CNG Stakeholder

Majority of the standards are GOST

- Mostly it is the Russian standards for safety distances
- Standards are becoming a bit more advanced today than in the past. In the old standards required a CNG station to be 60 meters from another building; now it is 30 meters to a private house and 25 meters to a commercial or industrial facility

Source: conversation with CNG Stakeholder

GOVERNMENT SUPPORT

Ukrainian Parliament introduced amendments to the Ukrainian law on natural gas market regulation

28 June 2011

- To allow gas extraction companies to use self extracted natural gas to their own use, to optimize the production cost of gas extraction companies
- Authorization of NAK “Naftogas” and its subsidiaries who are responsible for accumulation of natural gas resources, used for satisfaction of public needs, to export marketable natural gas in amounts set out in Preliminary Annual Balance of Intake and Distribution of Natural Gas

Source: www.dlapiper.com

Two main laws, which set the framework for biogas development

- Law of Ukraine "On the alternative types of liquid and gas fuels" (2000): basic definitions and characteristics of the alternative fuels, sets the main principles of the state policy in the area, which includes support of the entrepreneurship
- Law of Ukraine "On alternative sources of energy" (2003): regulates the state administration and regulation in the field of alternative energy resources, organizational support, standardization and some general peculiarities of the use of the alternative energy resources

Source: German-Ukrainian Policy Dialogue in Agriculture, Biogas and green tariffs in Ukraine-a profitable investment?, January 2010

Higher tariff for electricity generated from renewables sources of energy

The “green tariff” is a feed-in tariff valid until 1 Jan 2030 and differentiated for:

- each company that produces electricity from renewables sources of energy
- each type of renewable energy
- each single facility

The green tariff for electric energy from biomass is 1.6135 UAH/kWt (0,1464€) including VAT

Source: German-Ukrainian Policy Dialogue in Agriculture, Biogas and green tariffs in Ukraine-a profitable investment?, January 2010

Green Tariff Scheme

Origin of electric energy	Tariff coefficient 2009	Tariff level 2009 without VAT (UAH Kop/kWh)	Euro binded minimal tariff level 2009 without VAT (EUR cent/kWh)	Tariff coefficient 2015 (-10%)	Tariff coefficient 2020 (-20%)	Tariff coefficient 2025 (-30%)
Wind (plant capacity under 600 kWel)	1.2	70.15	6.46	1.08	0.96	0.84
Wind (600 kWel – 2000 kWelel)	1.4	81.84	7.54	1.26	1.12	0.98
Wind (over 2000 kW)	2.1	122.77	11.31	1.89	1.68	1.47
Biomass	2.3	134.46	12.39	2.07	1.84	1.61
Solar energy (onland facilities)	4.8	505.09	46.53	4.32	3.84	3.36
Solar energy (facilities installed on roofs, capacity over 100 kWel)	4.6	484.05	44.59	4.14	3.68	3.22
Solar energy (facilities installed on roofs, capacity under 100 kWel)	4.4	463.00	42.65	3.96	3.52	3.08
Small hydropower stations	0.8	84.18	7.75	0.72	0.64	0.56

Source: NCER Regulation from July 23, 2009 No 857, Law of Ukraine N 1220-VI from April 1, 2009

GOVERNMENT SUPPORT

"The public emphasis on biogas is not realistic. It's mostly political talk."

- Implementation of green tariffs but it's restricted
- Only the company connected with government officials can get the green tariffs. It's not possible for every company because of a very long license process to be part of the energy market and, generally, it's not worth it

Source: conversation with CNG Stakeholder

GAS INDUSTRY SUPPORT

Ukrtransgas Affiliated Company of National Joint-Stock Company «Naftogaz of Ukraine»

- Founded to the Resolution of the Cabinet of Ministers of Ukraine «On Distribution of Production, Transmission, Storage and Sales of Natural Gas» dated June 24, 1998
- The Company annually supplies Ukrainian consumers with 75 Bcm of natural gas and transports Russian gas to 19 European countries in the amount of 120 Bcm, which equals almost 85% of Russia's total gas export

Source: Ukrtransgaz

NGVs are on Ukrtransgaz's list but are lower than other large-investment priorities

The Company's main activities are:

- natural gas transmission via trunk gas pipelines
- storage of natural gas in underground storage facilities
- supplying natural gas to consumers
- operation, reconstruction and servicing of gas mains and associated facilities
- capital construction of gas pipelines and other facilities
- production of compressed natural gas and filling vehicles with it at gas-filling compressor stations

NATIONAL LAWS & REGULATIONS

Political instability and structural constraints limit the business freedom

- Despite progress in regulatory reform, lingering complexity often creates uncertainty in commercial transactions
- The inefficient regulatory framework imposes a significant burden on private enterprise

Source: The Heritage Foundation, 2011 Index of economic freedom

Investment freedom is limited by barriers, taxes and fees, complex standards and certification regulations

- Ukraine's bureaucratic legal and regulatory requirements discourage foreign investment
- The law provides equal treatment for foreign and domestic investors in most sectors of the economy
- Resident and non-resident foreign exchange accounts may be subject to restrictions and government approval
- Payments and transfers are subject to various requirements and quantitative limits
- Some capital transactions are subject to controls and licenses

Source: The Heritage Foundation, 2011 Index of economic freedom

COMMENTS BY STAKEHOLDERS

COMMENTS BY STAKEHOLDERS

- Situation of CNG in Ukraine for the last couple of years has changed dramatically
- There is no support for the CNG industry from the government and no official statistics to track NGVs. In my opinion the number of NGVs went down
- Number of CNG stations is about 250, and only a few are under construction. CNG sales (per station) is going down by 5% per year

Source: conversation with CNG Stakeholder. Data is unsubstantiated.

CONCLUSIONS

- Energy environment
- Gas industry support
- Government support
- NGV market development
- Investment environment

Energy Environment

- Natural gas in the most important energy source but as the price increases the impact on NGVs is negative
- New energy policy could limit the use of CNG, promoting renewable sources
- While the potential for biogas seems to be favorable, government policies and practices are not yet developed, putting the current energy situation in a degree of limbo

Gas Industry Support

- Monopolistic market by Ukrtransgaz is not favorable to competitive NGV market
- Investments on infrastructure depend only on Ukrtransgaz policy
- Gas supply companies, with the new government and new rules about distribution, are not taking a long term perspective on NGVs

Government Support

- The lack of support from national and municipal governments slows NGV market growth
- Laws on Energy are very general and don't introduce any clear and specific measures in the sector
- Government has to make things easier for CNG but each year it is harder to get permits, land, etc. The time spent (a year or more) to begin construction of a new fuelling station is a disincentive for the growth of NGVs

NGV Market Development

- Well developed natural gas infrastructure (good territorial coverage and good technology level) but few new stations are under construction
- The aging NGVs coupled with a lack of new conversions or OEM sales will stagnate the NGV market and allow diesel and LPG to be more competitive

Investment Environment

- Problematic country in which to invest
- A lot of bureaucracy, barriers, complex regulations that can discourage foreign investment
- Political instability doesn't help the private sector development

UKRAINE
(October 2011)