

Supply and utilisation of biogas and natural gas in the Czech Republic

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

Summary of the present situation – facts & figures

Supply

No other type of gas is being supplied via publicly-accessible network so far.

Biogas plants

- There are more than 150 biogas production facilities around the country (primarily located on landfills, WWTPs, in food-processing industry and in agricultural facilities)
- Produced biogas is utilized on-site for combined heat & power production by firing in co-generation units

Gasification

- Gasification of solid fuels like coal and biomass played a dominant role in the past (before introduction of natural gas); today, there may be found one large 400 MWe gasification CCPP plant for lignite operated by Sokolovska helna; product gas from solid biomass is then produced in several small-scale installations recently built.
- However, gas (propane-butane) is on a large-scale produced from refining of oil.

Natural gas

- Natural gas finds quite extensive use in the CR – its present consumption represents about 20 % of TPES (which is 90-100 TWh/a).
- Since own resources are very limited, gas is largely imported - from Russia (80 %) and Norway (20 %).
- Three major natural gas importers are presently on the market: RWE Transgas, Vemex, and Ceska plynarenska.

Treatment and distribution

Upgrading plants

- So far, no any installation realized.

Local (biogas) grid

- In the CR, there is presently only the distribution grid for natural gas (introduced gradually from the 1970s).

Regional gas grid

- (Natural) gas grid is being operated by regional distribution companies presently divided into three major holding groups: RWE Transgas, E.ON and Prazska plynarenska.
- The availability of (natural) gas is very high, any communities with population above 2 thous. inhabitants have the access to the NG grid.

Non Grid Transportation

- Due to a high density of natural gas grid, there is not available non grid transportation in the Czech Republic of natural gas.
- However, very popular is transport of propane-butane to the filling stations.

Gas filling stations

- There are presently about 20 CNG filling stations in the CR; each year a couple of new are added (expected dynamic growth in the coming years).
- Availability of LPG is much higher – this gaseous motor fuel is today available at about 700 places around country.
- Besides the limited number, also location of CNG filling points worsen market position of (C)NG as the motor fuel.
- All the existing CNG stations are established in order to be supplied with (natural) gas from the distribution network and/or close to dedicated gas-driven car fleets – that often leads to their remote localization off the main traffic routes.

Utilisation

Biogas & Natural gas in vehicles

- About 1 thousand CNG-driven vehicles presently in operation in the CR.

- Only (methane from) natural gas is used as a fuel so far

Biogas for non transport applications

- All the existing as well as planned biogas plants in the country use biogas for CHP.
- Their primary economy efficiency depends largely on revenues from sale of electricity into the grid for a feed-in tariff; the marketability of heat produced outside the biogas installation is often problematic due to the non-existence of demand for heat around the plant.
- A total of 160 GWh of electricity was produced from biogas firing in 2005 (MIT, 2007) with prospects that this figure may double within 5 years due to new installations .

Natural gas for non transport applications

- The considerable part of the natural gas is used as a fuel for heating (esp. in the housing sector).
- Many district heating systems in the Czech Republic are equipped with combined heat and power production.
- In 2005, there were generated 2 549,5 GWh of electricity in gas-steam cycle power plant.
- Many district heating systems in the Czech Republic are equipped with boilers on burning the natural gas.

LPG

Utilisation in vehicles

- LPG is widely used as a fuel in passenger cars (primarily of individuals). This fact documents following figures.
- About 685 filling stations for LPG were in operation in the Czech Republic in 2007.
- About 250 thous. vehicles were running on LPG in the region in 2007.
- About 20 thous. cars are annually transformed on LPG drive.

Available Vehicles

- There is quite a wide selection of CNG models of passenger cars as well as LD vehicles on the market available offered by e.g. Opel, Fiat, Renault, Citroen, Volkswagen and Mercedes-Benz.
- On the HD vehicles market, the demand for gas-driven buses can be even met by manufacturers of domestic origin (Tedom, Ekobus, Iveco/Karosa).

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Introduction

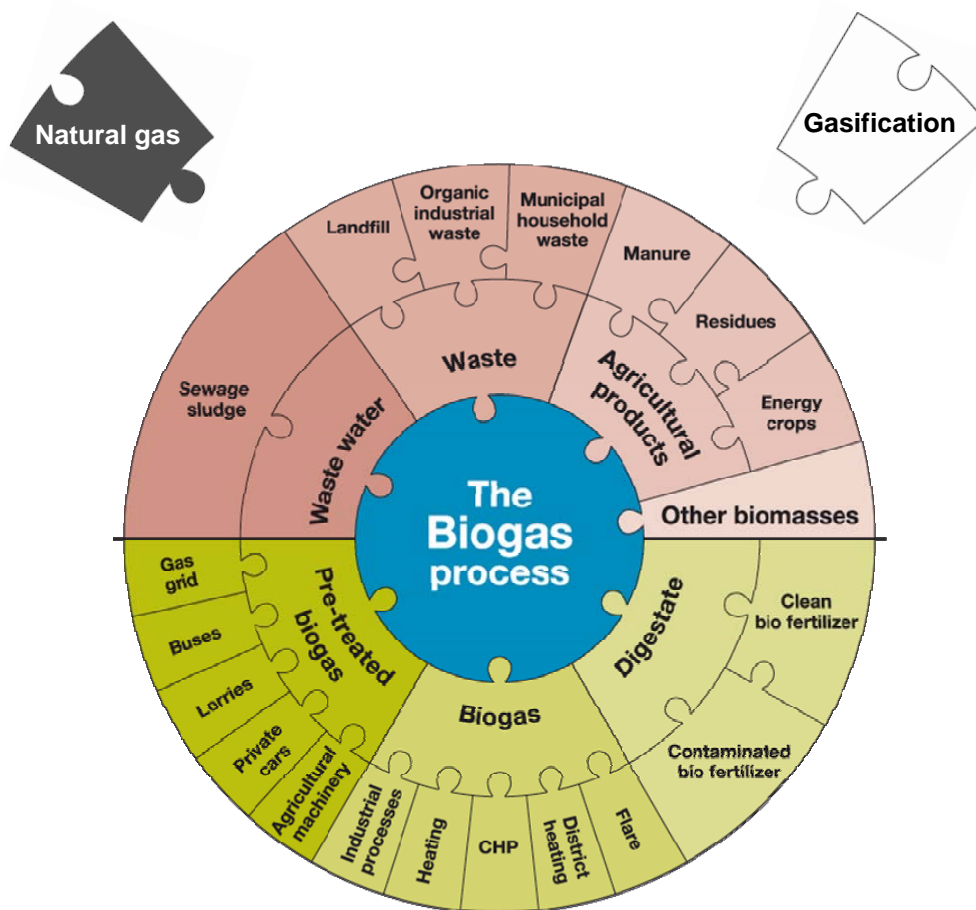
Biogas and natural gas are very clean energy sources, when combusted the amount of particles, NO_x, CO etc are lower than most other fuels. Biogas is also a renewable fuel. If petrol or diesel is replaced with biogas produced from manure, the CO₂ emissions can be reduced with up to 180 %. The MADEGASCAR project aims at improving the conditions for a growing market for gas driven cars and light transport vehicles 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 gas in vehicles. The current management control measures that are used in the region to support gas vehicles are also summed in this chapter.

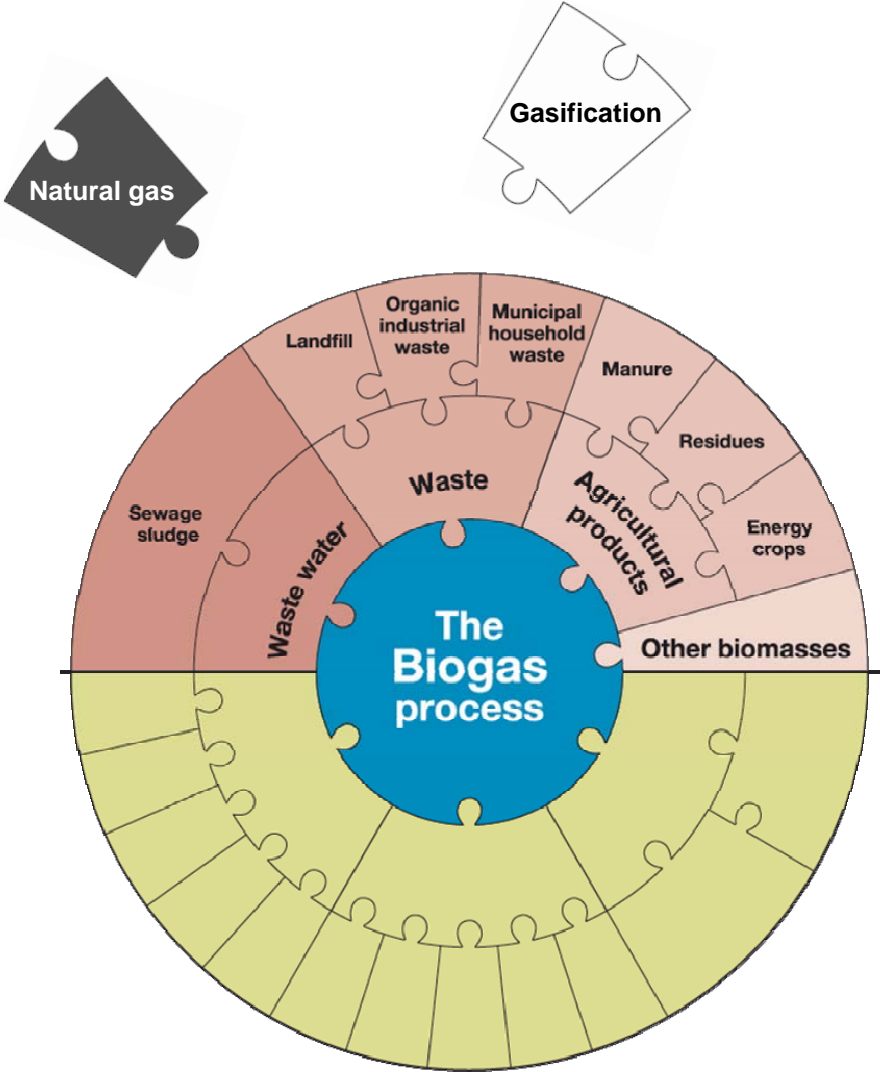
The use of LPG as vehicle fuel is also of interest for the MADEGASCAR project because of the possibility to convert these vehicles to propulsion with methane.

This text also contains an overview of the range of available gas driven personal cars and light transport vehicles 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

The use of anaerobic fermentation for processing specific organic materials has a long tradition in the Czech Republic. The first biogas station in the country was constructed in as early as in the 1970s (a biogas station to stabilize slurry from one of then country's largest pig farms located close to the town of Trebon) and even sooner the process of anaerobic digestion was gradually introduced for processing sewage sludge in waste-water-treatment plants servicing medium and larger metropolitan areas in the country. However, the main (if not the only) purpose of these installations was primary to stabilize the organic matter and avoid its potentially harmful effects onto the environment. The environmental aspects also stood behind the capture and disposal (either with or without energy production) of the methane and other gaseous substances released from the decay of organic compounds in fast growing landfills like those for the capital city of Prague.

The start of biogas use as an energy resource has come up only with the introduction of the state support to production of electricity from renewables for which biogas (basically no matter from which primary source comes from) is considered. The first such support to E-RES, via the instrument of feed-in tariff system, started shortly after 2000 but the long-term guarantee for investors came only with the approval of the Act No. 185/2005 Col.

As a result, since 2006 there is in force a legally-binding public support to power production installations from any renewable energy source which establishes stable long-term favourable economic conditions.

The support is accessible also to all types of projects for biogas production and energy use, both those which include only the installation of a co-generation unit on biogas (e.g. captured from a landfill or from anaerobic digestion of sewage sludge), and also of a full-scale biogas station, including fermentors and other accompanying equipment for processing of organic substances from agriculture, food-processing, and waste management in communities.

Present situation

Waste Water

- As of the end of 2007, a total of 96 waste-water-treatment plants equipped with anaerobic fermentors for sewage sludge digestion in the country producing altogether more than 60 GWh of electricity annually (in co-generation units of different sizes)

Waste

- 41 Co-digestion plants which includes 9 biogas stations on anaerobic fermentation of industrial organic waste and 32 devices for collecting landfill gas
- 164 GWh in total production per year
- 0 plants upgrades the biogas to natural gas quality

Agricultural products

- 8 biogas plant
- 7,4 GWh of electricity per year
- dominant organic substrate used for anaerobic fermentation is semi-liquid manure (it holds 83 % share of all agricultural substrates

Source: Ministry of Industry and trade (abbrev. "MPO"), Fuels research institute (abbrev. "ÚVP")

Table 1 Biogas plants data table (2003 - 2005)

Year	Number of biogas plants	Installed capacity kW	Gross electricity production MWh	Electricity supply MWh
2003	81	24 985	107856	11868
2004	119	32540	138793	81913
2005	135	36271	160857	93413
Trend 2004 - 2005	26	+ 3731	+ 22064	+ 11500
		+ 11,5%	+ 15,9%	+ 14,0%

Source: Ministry of Industry and trade (abbrev. "MPO")

Table 2 Time series of gross power generation

	Electricity production (brutto)			2006/2005 index
	2004	2005	2006	
	GWh	GWh	GWh	%
Biogas Total	138,79	160,86	175,84	9.31
Municipal water purification plants	63,51	71,44	67,66	-5.29
Industrial water purification plants	2,00	2,87	2,07	-27.87
Agricultural biogas	7,13	8,24	19,21	133.13
Landfill gas	66,07	78,29	86,90	11.00
Share on total gross consumption	4,04%	4,48%	4.91%	0.43%

Source: Ministry of Industry and trade (abbrev. "MPO")

Future perspectives

In the future there can be expected some increase in the number of the biogas plant installations due to the putting emphasis on renewable sources. The biggest development will be seen probably in agricultural, because of favourable conditions of purchasing price for electricity and heretofore poor utilisation of agricultural residues for biogas digestion.

In the present time, the purchasing price for a electricity produced from biogas is sets on 3,90 Kč/kWh resp. 3,30 Kč/kWh, according the type of the substrate. Thanks of the programmes co-financed with the EU structural funds, there can be expected that as much as several hundreds biogas plants will be build in next 5 - 10 years. These programmes (e.g. The Operational Programme Enterprise and Innovation) motivate investors to submit applications on building new biogas plants, ranging from 300 to 700 kWh. The budget of this programme is about 8 billion Kč (ČEA, 2007).

Also favourable support programme has in competence Ministry of Environment. The name of this programme is "The Operational Programme Environment". The budget of this programme is about 1 307 thousands € (ČEA, 2007).

The most of the constructed biogas plants will be dependent on grown energy crops/biomass (e.g. maize). Growing and deliveries of the biomass will decrease, in compare with agricultural residues, the biogas plant economy. Little different is situation with landfill gas. Due to changes of waste management and waste treatment, there will be still smaller and smaller reserves of landfill gas from waste dumps.

Bio methane (gasification)

Background

In 2005 there were already installed 135 biogas plants.

Present situation

- In the Czech Republic, there are established some research institutes, which occupy by biogas. Each research institute has different topic of interest.
- Research Institute of Agricultural Engineering Prague occupies by e.g. tests of biogas yields
- The Institute of Chemical Technology, Prague, occupies by development of sewage sludge methane digestion (with accent on conversion from mesophilic to thermophilic process)
- Fuels research institute, Prague occupies by biogas quality and setting of standards
- In the present time, there are in the Czech Republic some projects on increasing biogas yield and on affecting the process with targeting higher gas production

Natural gas

Background

Gas consumption in the Czech Republic is almost totally dependent on import from the Russian Federation and Norway. To enhance security of gas supply, Czech Republic diversified its gas deliveries between Russian Federation (75 % of annual consumption), and Norway (25 % of annual consumption (RWE Transgas).

The share of natural gas in the total consumption of primary energy sources in the Czech Republic reached its peak in 2001, and since that, it remains stable fluctuating only according to outdoor temperature changes (source: MPO). The considerable part of the natural gas is used as a fuel for heating (esp. in the housing sector).

Table 2 Natural gas consumption (1993 - 2007)

Year	Gas consumption		Year-on-year change	
	Million cm	GWh	Million cm	%
1993	6 983	72 915	+314	+4,7
1994	6 934	72 803	-49	-0,7
1995	8 075	84 782	+1141	+16,4
1996	9 306	97 714	+1231	+15,2
1997	9 441	99 131	+135	+1,5
1998	9 390	98 591	-51	-0,5
1999	9 427	98 982	+37	+0,4
2000	9 148	96 053	-279	-2,9
2001	9 773	102 611	+625	+6,8
2002	9 542	100 193	-231	-2,4
2003	9 739	102 600	+197	+2,1
2004	9 691	102 236	-48	-0,5
2005	9 562	100 829	-129	-1,3
2006	9 269	97 806	-191	-3,1
2007	8 646	91 214	-521	-6,7

Source: Gas Balance Centre

The full liberalization of the gas market was finished on 1. January 2007, when all end customers inclusive 2 700 000 households became eligible customers with freedom of a supplier choice. The amendment of energy act, which deals with the liberalization and business in natural gas sector, was adopted in 2005. This "energy act" is No. 458/2000. Since this day the legal unbundling of Distribution System Operators from Gas Traders has entered into force. Since full liberalisation of the Czech gas market there are companies supplying gas to Czech customers. The main supplier is RWE Transgas, other gas traders are Pražská plynárenská, a. s., Středočeská plynárenská, a. s., E.ON Energie, a. s., Severočeská plynárenská, a. s., Západočeská plynárenská, a. s., Východočeská plynárenská, a. s., Jihomoravská plynárenská, a. s., Severomoravská plynárenská, a. s., VEMEX s. r. o., Petr Lamich – LAMA, VNG Energie Czech, a. s., United Energy Trading, a. s., MND, a. s., Lumen Energy, a. s., Energie Bohemia, a. s., Quantum Vyškov, a. s., Česká energie, a. s. and Wingas GmbH. (source: ERÚ)

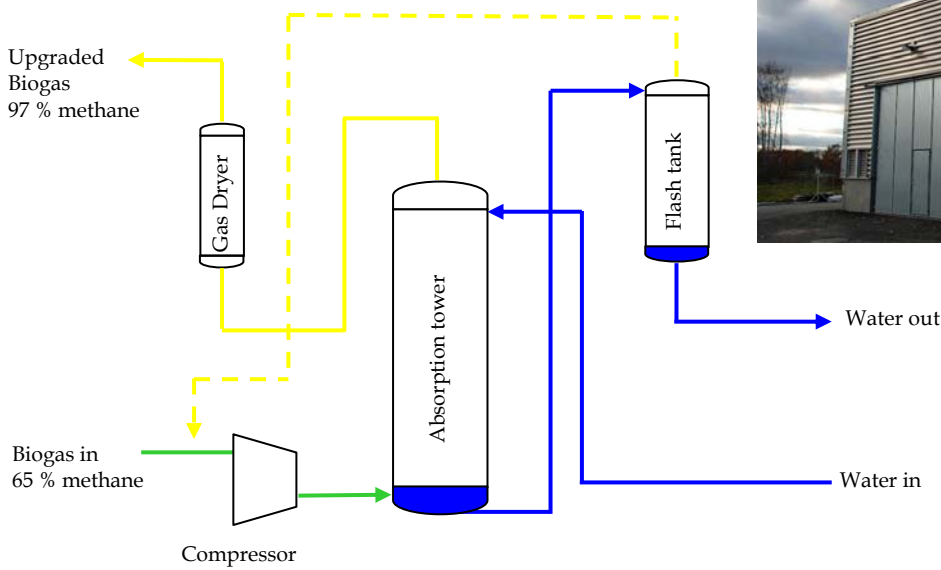
Present situation

- 8 gas companies delivers natural gas within the region
- The Energy value of the gas is 9,50 kWh per Nm³
- The total number of costumers in the region is 2 850 000
- The amount of sold/used gas was 91214 GWh/year in 2007

Source: Gas Balance Centre and Energy regulatory office

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

Unfortunately, there are not any biogas plants in the Czech Republic that can supply the biogas into the natural gas grid. The reason for it is at first an absence of the upgrading and cleaning biogas stations which can upgrade the biogas into the natural gas standards.

The same situation is presently in the transport sector. The reason is also the absence of the upgrading biogas station.

Present situation

- 0 upgrading plants
- Used techniques are 0
- 0 GWh of biogas is treated
- 0 GWh over-capacity in the existing upgrading plants

Future perspectives

In the future, there can be expected increase of the biogas production and its upgrading according the natural gas standards in the Czech Republic.

This development is expected also in the succession with the biogas production development in our neighborhoods (especially Germany and Austria).

Gas grid

Background

There exists only separate gas grid for natural gas. The biogas is not upgraded to the natural gas quality, so it is used separately away the gas grid. Currently, approximately 30 Bcm of natural gas via territory of the Czech Republic is being transported annually by the company RWE Transgas Net Ltd. Other 8 companies are operators of the regional gas grid. These companies are: Pražská plynárenská Distribuce, a. s., STP Net, s. r. o., JČP Distribuce, s. r. o., SČP Net, s. r. o., ZČP Net, s. r. o., VČP Net, s. r. o., JMP Net, s. r. o. a SMP Net, s. r. o. Besides the 8 regional gas grid operators, more than 80 local gas grid operators operate in Czech Republic. As the consumption differs in summer and in winter, a part of the gas must be stored in the underground gas storage facilities. Current total storage capacity 2,9 bcm is equal to 30 per cent of overall annual domestic gas consumption with maximum daily withdrawal capacity 55 mcm and as of 1st October this volume is able to cover 60 days consumption of natural gas. (Sources: ERÚ, RWE)

Present situation

Local biogas grid

Local biogas grid does not exist.

Large (regional) gas grid

Recently, RWE Transgas j.s.c., the gas trader with highest market share has signed both a new contract for delivery of natural gas into CR ensuring hereby an annual import volume of 9 Bcm and contract for transit of natural gas into further EU countries through the territory of the Czech Republic valid until 2035. The rest of gas consumption will be covered by import from Norway, whereby the diversification of sources is ensured. RWE Gas Storage Ltd. has been main Underground Storage Facility Operator since May 2007 as a separate legal entity which has been unbundled from RWE Transgas j.s.c.. (Sources: CGU, RWE)

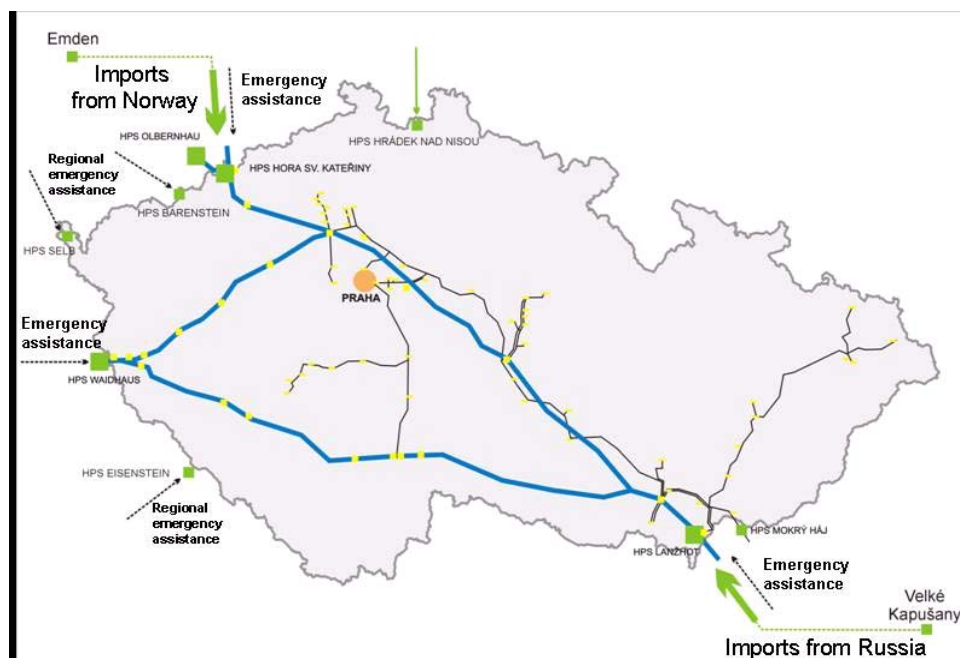


Figure 1 Large gas grid in the Czech Republic

Source: CGU

Future perspectives

Thanks of the long term contracts on the natural gas imports, there is guaranteed a long duration of the transit gas grid existence. Even though the regional gas grid is very dense now, development of the gas grid will still continue. Development of the regional gas grid is expected mainly in the small urban areas and in the countryside.

Non grid transportation

Background

Due to a high density of natural gas grid, there is not available non grid transportation in the Czech Republic. The gas grid in the Czech Republic has expanded in 90. due to a state programme on gasification.

Present situation

The present demand on non grid transportation is connected with the development of CNG stations. The deficiency of gas filling stations is the binding of the refueling stations to pipelines. The stations are often off the main traffic routes or highways or are very remote. One of the possible ways how to solve this deficiency, is to install new Liquefied Natural Gas (LNG) and Liquefied compressed natural (LCNG) gas re-fueling stations. (Source: Chrz,V., 2008)



Figure 2 LNG semi-trailer

Source: chart-ferox

Future perspectives

LNG Applications for Vehicle Fueling can solve the existing deficiency of the CNG vehicle system – binding refueling stations to pipelines. LNG and LCNG stations make it possible to build a continuous network of re-fueling stations in regular distances, at accessible places directly on motorways.

Gas filling stations

Background

In the Czech Republic, natural gas has been used in transportation since 1981. By the beginning of 1990s, the Czech Republic was one of the worldwide leaders in the gasification of transport. Unfortunately, the promising development slowed down, and years of stagnation followed. The Czech Republic has fallen behind other European countries where gasification of vehicles began much later (source: www.cng.cz).

Present situation

- 18 filling stations in the region
- 0 filling stations are provided with 100% biogas.
- N/A home filling stations



Figure 3 CNG stations (situation in 2007)

source: www.cng.cz

The present deficiency of gas filling stations is the binding of the refueling stations to natural gas pipelines. The CNG stations are often off the main traffic routes or highways or are very remote. This high distance between stations causes that many drivers are pressured to use petrol drive, which decrease the profitability of CNG drive. Or, if a rare re-fueling opportunity comes sooner, the driver fills the tank at higher level and frequency of re-fueling is increased. The practical run on one re-fueling is shortened, which causes a loss of driver's time per unit of fuel is increased (Chrz,V., 2008). One of the possible ways how to solve this deficiency, is to install new Liquefied Natural Gas (LNG) and Liquefied compressed natural (LCNG) gas re-fueling stations.

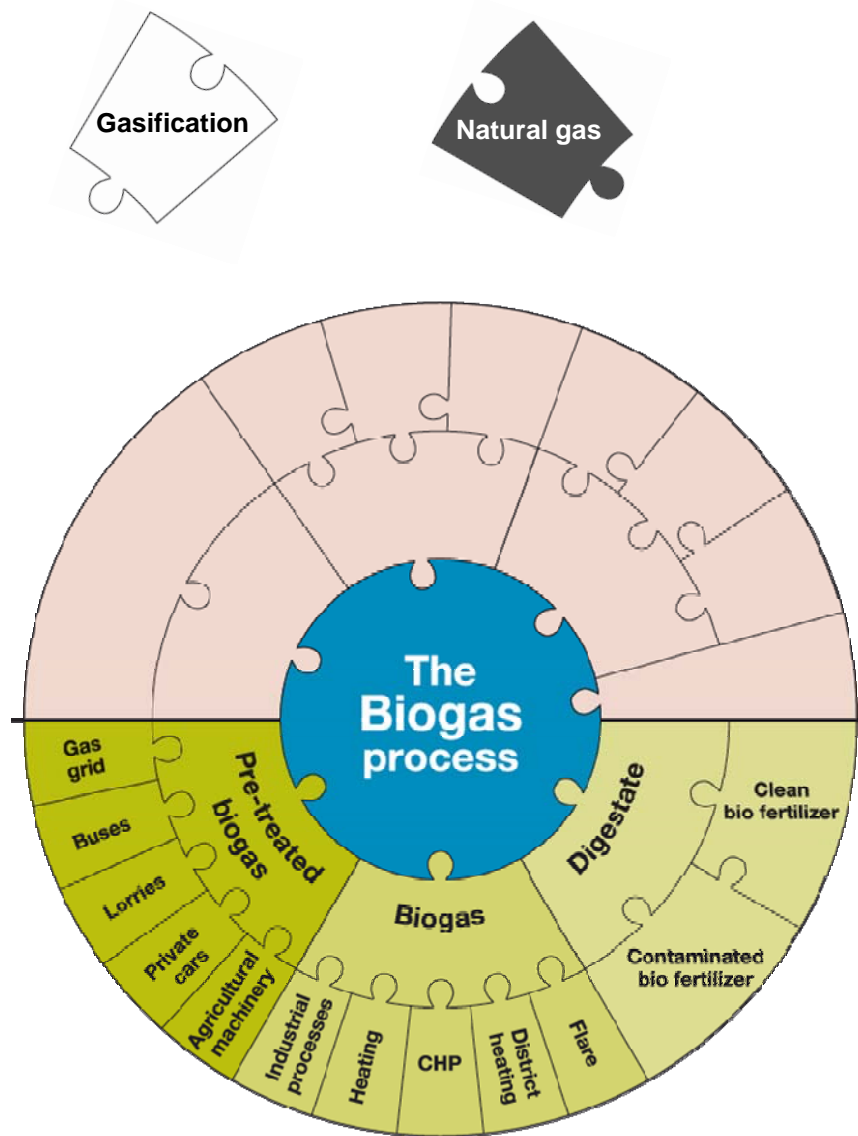
Future perspectives

According the voluntary agreement between the state and gas delivery companies there is a plan on building new gas filling stations in the Czech Republic. There is a project for at least 6 new gas filling stations in 2008 in the Czech republic. Others project will follow them. There is expected to build at least 41 gas filling station till 2013 and possible to build 100 gas filling stations till 2020. The Czech or EU goal for CNG driven cars is to substitute 10 % of the liquid fuels in the transportation. To reach this goal is expected to sale 600-800 mil. m3 of natural gas. The total amount of the CNG driven cars should be about 350-450 000 CNG. This number of CNG cars will need broad CNG filling stations infrastructure. There will be necessary to build 350-450 new gas filling stations (according to Czech Gas Union).

LNG Applications for Vehicle Fueling solves the existing deficiency of the CNG vehicle system - binding refueling stations to pipelines. LNG and LCNG stations make it possible to build a continuous network of re-fueling stations in regular distances, at accessible places directly on motorways. This would stimulate wide use of natural gas for the transport sector and it would help to achieve the EU target to substitute 10% of vehicle consumption by natural gas till the year 2020. (Source: Chrz,V., 2008)

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

In the vehicles is used only natural gas, because there are not any upgrading biogas stations now. Nowadays the effort of the Czech gas industry is devoted to a construction of CNG filling stations in order to reduce oil import dependency. According to the EU transport policy the share of natural gas as an alternative fuel should amount to 10% in 2020. Most of the CNG filling stations are situated in big cities and the local public transport corporations are increasingly operating more and more CNG powered busses thereby reducing emissions from public transport and improving living conditions for their citizens.

In 1994 were passed a governmental decision no. 472/1994 about the state support of development of public transport. In 2003, government has kept in the previous decision with the governmental decision No. 550/2003. This decision deals with the public transport renewal from 2004.. The subsidy for investing to new gas driven bus has been set up to 900 thousand Kč. This subsidy has been utilized for purchasing 129 gas driven buses till 2007 (MoT).

Present situation

- about 750 personal cars and vans in 2007
- 220 buses
- about 20 heavy duty vehicles
- 4000 kNm³ Natural gas in 2007
- 0 kNm³ Biogas, in 2007

Nowadays, the limiting factor for the increasing use of NGT cars is an insufficient net of gas filling stations in Czech Republic. Probably, the quickest development in the use of CNG or LNG will be in the public transport sector. The main reason for the development in public transport is to mitigate the emissions and better economy, both in compare with diesel driven vehicles.

For the time period 2008 – 2013 has been adopted a Programme for public transport renewal. The administrator of this programme is the Ministry of transport. According to this programme conditions, there is possible to purchase at least 200 new gas driven buses. See the budget of the programme in the table below.

Table 3 Programme budget [million Kč]

Subprogram/Year	2008	2009	2010	2011	2012	2013	2008-2013
Public transport - coach	250	250	250	250	250	250	1500
Public transport - city	250	250	250	250	250	250	1500
Total	500	500	500	500	500	500	3000

Source: Czech Gas Union

Future perspectives

Currently there are 18 CNG filling stations in operation in all regions. Construction of further CNG filling stations is planned, so that there will be approximately 100 CNG filling stations in 2020 providing for alternative fuel to gasoline and diesel (CGU).

Biogas for non transport applications

Background

In the Czech Republic is the biogas used only for non transport applications, and is not also delivered into the gas grid. The most of biogas plants were primary built for waste processing. At the present time, the biogas plants are built for electricity and heat production. In the present time, the purchasing price for electricity produced from biogas is 3,90 Kč/kWh or 3,30 Kč/kWh, according to the type of biogas substrate.

The most of the biogas plants are out of reach the customers. So, if there is some production of the heat in the biogas plant, this heat is often consumed by the producer.

Present situation

Heating

Because the biogas plants are out of reach the customers, the heat is consumed mainly by producers.

CHP

Many of biogas plants produce together heat and power. In compare with power, the heat is mostly consumed by producers.

Power generation

Power is generated in many biogas plants. The reason for the electricity generation is the purchasing price for electricity produced from biogas. Gross electricity production in biogas plants was 160 857 MWh in 2005 (MIT, 2007).

District heating

Because the biogas plants are out of reach the customers, the heat is consumed mainly by producers. Even in the Czech Republic exists some projects on district heating (heat from biogas plants), but these projects are very rare. One of the deficiency of district heating supply are the losses by pipeline transportation, because of the long distance between biogas plant and costumers.

Future perspectives

Thanks of the programmes co-financed with the EU structural funds, there can be expected that as much as several hundreds biogas plants will be build in next 5 – 10 years. These programmes (e.g. The Operational Programme Enterprise and Innovation) motivate investors to submit applications on building new biogas plants, ranging from 300 to 700 kWh. The budget of this programme is about 8 billion Kč (CEA, 2007).

Natural gas for non transport applications

Background

The share of natural gas in the total consumption of primary energy sources in the Czech Republic reached its peak in 2001, and since that, it remains stable fluctuating only according to outdoor temperature changes (MIT, 2007).

In the Czech Republic, the use of natural gas for non transport applications plays a dominant role in the use of natural gas. The use of natural gas for transport applications is still minority.

Present situation

Heating

The considerable part of the natural gas is used as a fuel for heating (esp. in the housing sector).

CHP

Many district heating systems in the Czech Republic are equipped with combined heat and power production.

Power generation

In 2005, there were generated 2 549,5 GWh of electricity in gas-steam cycle power plant.

District heating

Many district heating systems in the Czech Republic are equipped with boilers on burning the natural gas. But, according the stats, the production of heat has decreasing trend.

Future perspectives

There are some perspectives on the increasing consumption of natural gas for power generation. State energy company ČEZ plans some investments to build new natural gas power plants. One of these gas-steam cycle power plant will be build near city Ústí nad Labem, in northern Bohemia.

But, according to stats, the production of heat has decreasing trend. (Mostly thanks of the rising gas prices)

LPG

Background

Higher utilisation of LPG in the housing sector is limited thanks of the high density of natural gas grid. Higher utilisation can be found in the transport. Especially, LPG is widely used as a fuel in private cars. In compare with CNG stations, LPG stations are spread out of whole state.

LPG as a fuel for housing sector (heating, hot water preparing and cooking) is rarely use in the rural areas and in the areas with poor energy infrastructure (missing natural gas grid, electricity etc.).

The Czech market of LPG is stabilized, because of its long tradition. LPG is delivered to customers in 2, 5, 10 or 33 kg steel cylinders. For frequent use of LPG for heating and cooking, there are available storage tanks.

Supply of LPG

- about 685 filling stations for LPG in the region in 2007.

Utilisation of LPG

- about 250 000 vehicles running on LPG in the region in 2007.
- about 20 000 cars annually transformed on LPG drive.

Leading LPG companies in the Czech Republic:

- Flaga plyn , spol. s r.o.
- Agip Gas
- Primagas s r.o.
- VITOGAZ ČR, s.r.o.

Probably the biggest producer of the LPG in the Czech Republic is Unipetrol company. LPG, in Unipetrol, is produced in 2 refineries in Litvínov and Kralupy nad Vlatvou.

Future perspectives

There is an expectable trend in the increasing number of LPG cars in Czech Republic, due to the increasing petrol and diesel prices.

There is not official public support for LPG cars in Czech Republic. In Czech, only LPG club provides a grant for drive transformation (conventional drive to LPG drive). This grant is set on 10% of the drive transformation price.

Even thought LPG is also “environment friendly fuel”, in compare with CNG fuel tax (0 Kč/l), the tax for LPG is higher (2,20 Kč/l).

Norms and Legislation

Gas norms

TDG 982 01

This norm treats with the equipment of the services, garages etc. which works with CNG cars.

TDG 982 02

This norm treats with the conditions of operations, maintenance and inspection of CNG driven cars.

TDG 982 03

This norm treats with the Vehicle Refuelling Appliance (VRA).

Supply

I 80/2005

This law deals with RES and support for its production. Even though the biogas is used also for heating and can be used as a vehicle fuel, the support is aimed only for electricity production.

Treatment and distribution

Utilisation of biogas and natural gas

- governmental decision No. 563/2005 includes:
 - consolidation of excise duty on CNG till 2020 – (2007 – 2011) 0 Kč/t
(2012 – 2014) 500 Kč/t
(2015 – 2017) 1000 Kč/t
(2018 – 2019) 2000 Kč/t
from 2020 3355 Kč/t or minimal excise duty set by EU
 - support of the alternative fuels, especially CNG
 - voluntary agreement between state and gas delivery companies for the support of CNG like an alternative fuel
- state and gas company support for bus drive transformation (diesel to CNG)
 - 800 000 Kč/bus (state support) and 200 000 Kč/bus (gas company support)
 - this support is able completely to cover costs for bus drive transformation
- in 1/2008 government adopted an amendment on Vehicle Excise Duty (No. 16/1993Sb.), which introduced exemption from VED for LPG, CNG, hybrid, electric and ethanol driven cars
- possibility of the EU grants for each regions which are fit for a public transport vehicles renewal or for build new CNG filling stations

Control measures

In the 90., there took place a national programme on gasification in the Czech Republic. This programme has been promoted by Ministry of Environment. The funding has been secured by State Environment Fund.

Utilisation of biogas and natural gas

Ministry of Environment has promoted (within the Operational Programme Environment) switches of old boilers on solid fuels to natural gas. The switches has been aimed especially on public sector.

Available vehicles

Personal cars



Make: Opel
 Model: Zafira
 Car Body: MPV
 Rated Output: 69 kW / 94 bhp
 Fuel capacity: 19 kg / 14 litre
 Cruising range: 350 / 150 km (gas/petrol)
 Kerb Weight: 1503-1765 kg
 Gross vehicle weight: 2075-2250 kg
 Passengers: 7 passengers



Make: Opel
 Model: Combo
 Car Body: combi
 Rated Output: 69 kW / 94 bhp
 Fuel capacity: 19 kg / 14 litre
 Cruising range: 370 / 180 km (gas/petrol)
 Kerb Weight: 1235-1395 kg
 Gross vehicle weight: 1725-1900 kg
 Passengers: 5 passengers



Make: Fiat
 Model: Multipla
 Car Body: MPV
 Rated Output: 68 kW / 92 bhp (76/103 for petrol only)
 Fuel capacity: 26,5 kg / 38 litre
 Cruising range: 420 / 420 km (gas/petrol)
 Kerb Weight: 1545 kg
 Gross vehicle weight: 2050 kg
 Passengers: 6 passengers



Make: Fiat
 Model: Panda
 Car Body: Hatchback
 Rated Output: 38 kW / 51 bhp (44/60)
 Fuel tank capacity: 13 kg / 30 litre
 Cruising range: 280 / 480 km (gas/petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 4 passengers



Make: Volkswagen
 Model: Touran
 Car Body: MPV
 Rated Output: 80 kW / 109 bhp (75/102)
 Fuel capacity: 5,8 kg / 13 litre
 Cruising range: 310 / 130 km (gas/petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 5 - 7 passengers



Make: Citroen
 Model: C3
 Car Body: Hatchback
 Rated Output: 49 kW / 68 bhp (54/75)
 Fuel capacity: 8 kg / 47 litre
 Cruising range: 170 / 720 km (gas/petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 5 passengers



Make: Citroen
 Model: Berlingo
 Car Body: combi
 Rated Output: 48 kW / 65 bhp (55/75)
 Fuel capacity: 11,4 kg / 55 litre
 Cruising range: 140 / 700 km (gas/petrol)
 Kerb Weight: 1240 kg
 Gross vehicle weight: 1880 kg
 Passengers: 5 passengers



Make: Renault
 Model: Kangoo
 Car Body: Combi
 Rated Output: 60 kW / 80 bhp
 Fuel capacity: 13 kg / 50 litre
 Cruising range: 220 / 640 km (gas/petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 5 passengers



Make: Mercedes-Benz
 Model: E 200 NGT
 Car Body: sedan
 Rated Output: 120 kW / 163 bhp
 Fuel capacity: 18 kg / 65 litre
 Cruising range: 300 / 700 km (gas/petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 5 passengers



Make: Volkswagen
 Model: Caddy
 Car Body: van
 Rated Output: 80 kW / 109 bhp (75/102)
 Fuel capacity: 26 kg / 13 litre
 Cruising range: 440 / 150 km (gas / petrol)
 Kerb Weight: ___ kg
 Gross vehicle weight: ___ kg
 Passengers: 5 passengers



Make:	Fiat
Model:	Doblo
Car Body:	van
Rated Output:	68 kW / 92 bhp (76/103)
Fuel capacity:	19 kg/ 30 litre
Cruising range:	300 / 326 km (gas / petrol)
Kerb Weight:	___ kg
Gross vehicle weight:	___ kg
Passengers:	5 passengers

Light transport vehicles



Make:	Fiat
Model:	Doblo Cargo Van
Load volume:	3200 – 4000 litres
Load weight:	___ kg
Rated engine output:	68 kW / 92 bhp (76/103)
Fuel capacity:	26,4 / 30 litre
Cruising range:	300 / 326 km (gas / petrol)
Gross vehicle weight:	___ kg
Passengers	2 passengers



Make:	Fiat
Model:	Punto Van
Load volume:	820 litres
Load weight:	___ kg
Rated engine output:	38 kW / 51 bhp (44/60)
Fuel capacity:	26 kg / 47 litre
Cruising range:	395 / 745 km (gas / petrol)
Gross vehicle weight:	___ kg
Passengers	2 passengers



Make:	Volkswagen
Model:	Caddy
Load volume:	___ litres
Load weight:	___ kg
Rated engine output:	80 kW / 109 bhp (75/102)
Fuel capacity:	26 kg / 13 litre
Cruising range:	___ / ___ km (gas / petrol)
Gross vehicle weight:	___ kg
Passengers	2 passengers



Make:	Citroen
Model:	Berlingo
Load volume:	2800 litres
Load weight:	800 kg
Rated engine output:	49 kW / 68 bhp (55/75)
Fuel capacity:	11,4kg / 55 litre
Cruising range:	180 / 700 km (gas / petrol)
Gross vehicle weight:	1865 kg

Passengers

2 passengers



Make:	Opel
Model:	Combo
Load volume:	3200 litres
Load weight:	520-735 kg
Rated engine output:	69 kW / 94 bhp
Fuel capacity:	19 kg / 14 litre
Cruising range:	370 / 180 km (<i>gas / petrol</i>)
Gross vehicle weight:	1710-2055 kg
Passengers	2 passengers



Make:	Renault
Model:	Kangoo
Load volume:	___ litres
Load weight:	___ kg
Rated engine output:	60 kW / 80 bhp)
Fuel capacity:	13 kg / 50 litre
Cruising range:	220 / 640 km (<i>gas / petrol</i>)
Gross vehicle weight:	___ kg
Passengers	2 passengers
Passengers	2 passengers

Buses



Make:	TEDOM
Model:	TEDOM C 12 G (EURO IV)
Load volume:	-
Load weight:	5 900 kg
Rated engine output:	210 kW / 280 PS
Fuel capacity:	960 / 1280 litres (only gas)
Cruising range:	450 / 650 km (<i>gas</i>)
Gross vehicle weight:	12 100 kg
Passengers	86 passengers (of which 33 seats)



Make:	TEDOM
Model:	TEDOM L 12G (EURO IV)
Load volume:	-
Load weight:	6 150 kg
Rated engine output:	210 kW / 280 PS
Fuel capacity:	960 / 1280 litres (only gas)
Cruising range:	450 / 650 km (<i>gas</i>)
Gross vehicle weight:	11 850 kg
Passengers	43 passengers (only seats)



Make:	IVECO
Model:	Citelis 12M CNG
Load volume:	-
Load weight:	NA
Rated engine output:	200 kW
Fuel capacity:	1240 litres (only gas)
Cruising range:	NA
Gross vehicle weight:	NA
Passengers	82 passengers (of which 28-32 seats)



Make: IVECO
 Model: Citelis 18M CNG
 Load volume: -
 Load weight: NA
 Rated engine output: 228 kW
 Fuel capacity: NA
 Cruising range: NA
 Gross vehicle weight: NA
 Passengers: 140 passengers (of which 40-44 seats)



Make: EKOBUS
 Model: EKOBUS INTERCITY
 Load volume: -
 Load weight: 5 975 kg
 Rated engine output: 172 kW
 Fuel capacity: NA
 Cruising range: NA
 Gross vehicle weight: 7 725 kg
 Passengers: 75 - 81 passengers (of which 45 seats)




Make: EKOBUS
 Model: EKOBUS CITY
 Load volume: -
 Load weight: 6 125 kg
 Rated engine output: 172 kW
 Fuel capacity: NA
 Cruising range: NA
 Gross vehicle weight: 7 785 kg
 Passengers: 90 passengers (of which 28 seats)

List of major vehicle fleet owners in Prague

Fleet owner name	Number of vehicles	Contact info	Brief description of fleet owner ¹
Dopravní podnik hl. m. Prahy	1259	http://www.dpp.cz/	Buses. Diesel only. (Monopolist) Provider of public transport in the city of Prague and suburban areas (up to ~ 30 km outside city borders). Short as well as long range transport.
Pražské služby	150	www.psas.cz	Refuse collection vehicles (90), sweeper-flushers (50). Diesel + CNG (2 sweeper-flushers, 3 dustbin lorries). Operator of municipal system of waste collection & disposal and street cleaning services.
Česká pošta	~ 500 (4100 nation-wide)	www.cpost.cz	Light transport vehicles (Renault Kangoo mainly), personal cars. Diesel and Petrol. Short as well as long range transport.
AAA radiotaxi	1200	http://www.aaataxi.cz/	Personal cars. Diesel, Petrol. Taxi service
SEDOP	250	http://www.sedop.cz/	Personal cars. Diesel, Petrol. Taxi service
DHL	~ 100	http://www.dhl.cz	Personal cars and light transport vehicles. Diesel, Petrol. Provider of express overland transport.
Lease Plan Česká republika s.r.o.	3500 (20000 nation-wide)	http://www.leaseplan.cz/	Personal cars and light transport vehicles. Diesel, Petrol. Leading fleet and vehicle management company (manages vehicle fleets for more than 900 clients presently in the CR).

¹Type of vehicles used; personal car and light transport vehicles. Used fuels; diesel, petrol, gas, ethanol etc. Range of action; short or long range transports etc.

List of major vehicle fleet owners running on CNG (nation-wide, status as for 6/2008)

Fleet owner name	Number of vehicles	Contact info	Brief description of fleet owner ¹
Pražská plynárenská, a.s.	~ 100	www.ppas.cz (Mr. Rataj)	personal cars, short range transport
RWE Transgas, a.s.	~ 350	www.rwe.cz	personal cars, short range transport
Cheap Taxi	5	www.1taxieco.cz	personal cars, taxi
Pražské služby, a.s.	5 (next 6 till end 2008)	www.psas.cz	3 refuse collection vehicles, 2 sweeper-flushers 
Dopravní podnik Ústeckého kraje a.s.	68	www.dpuk.cz	buses, long/short range transport
ČSAD Česká Lípa a.s.	21	www.csadcl.cz	buses, long range transport
ČSAD Havířov	42	www.csad-havirov.cz	buses, long/short range transport
FTL Prostějov	30	www.ftl.cz	buses, long/short range transport
ČSAD Semily, a.s.,	6	www.csadsm.cz	buses, long/short range transport
ČSAD Liberec, a.s.,	10	www.csadlb.cz	buses, long/short range transport
ČSAD Tábor	15	www.mhdtab.wbs.cz	buses, long/short range transport
DP Karlovy Vary	8	www.dpkv.cz	buses, long/short range transport
Veolia Transport	31	http://www.veolia-transport.cz	buses, long/short range transport
Others...			
Total	~ 1000		750 cars and light transport vehicles, 220 buses, 10 refuse collection vehicles and/or sweeper-flushers, 20 other (forklift stacker etc.)

¹Type of vehicles used; personal car and light transport vehicles. Used fuels; diesel, petrol, gas, ethanol etc. Range of action; short or long range transports etc.

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