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

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 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.

NETHERLANDS
(January 2012)

COUNTRY PROFILE TEMPLATE

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

NGV PROFILE

- Number of NGVs: 4,300
- NGVs are 0,05% of total vehicle population
- 0,25 NGVs per 1000 population
- CNG fuelling stations: 85
- 50 vehicles per fuelling station
- Price differential CNG-Petrol/diesel:
  - CNG equivalent per liter gasoline: 0,62 €/liter
  - Regular Gasoline: 1,55 €/liter

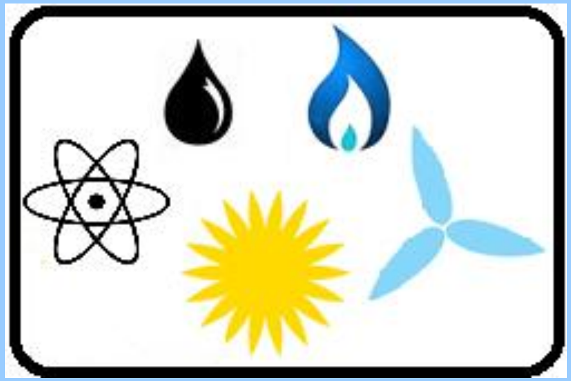
  Natural gas costs 40% less then gasoline

Source vehicles GFV (June 2011 [December 2011 edition])
www.metanoauto.it
http://www.drive-alive.co.uk/fuel_prices_europe.html

MOTIVATION

- Economics
- Environmental considerations

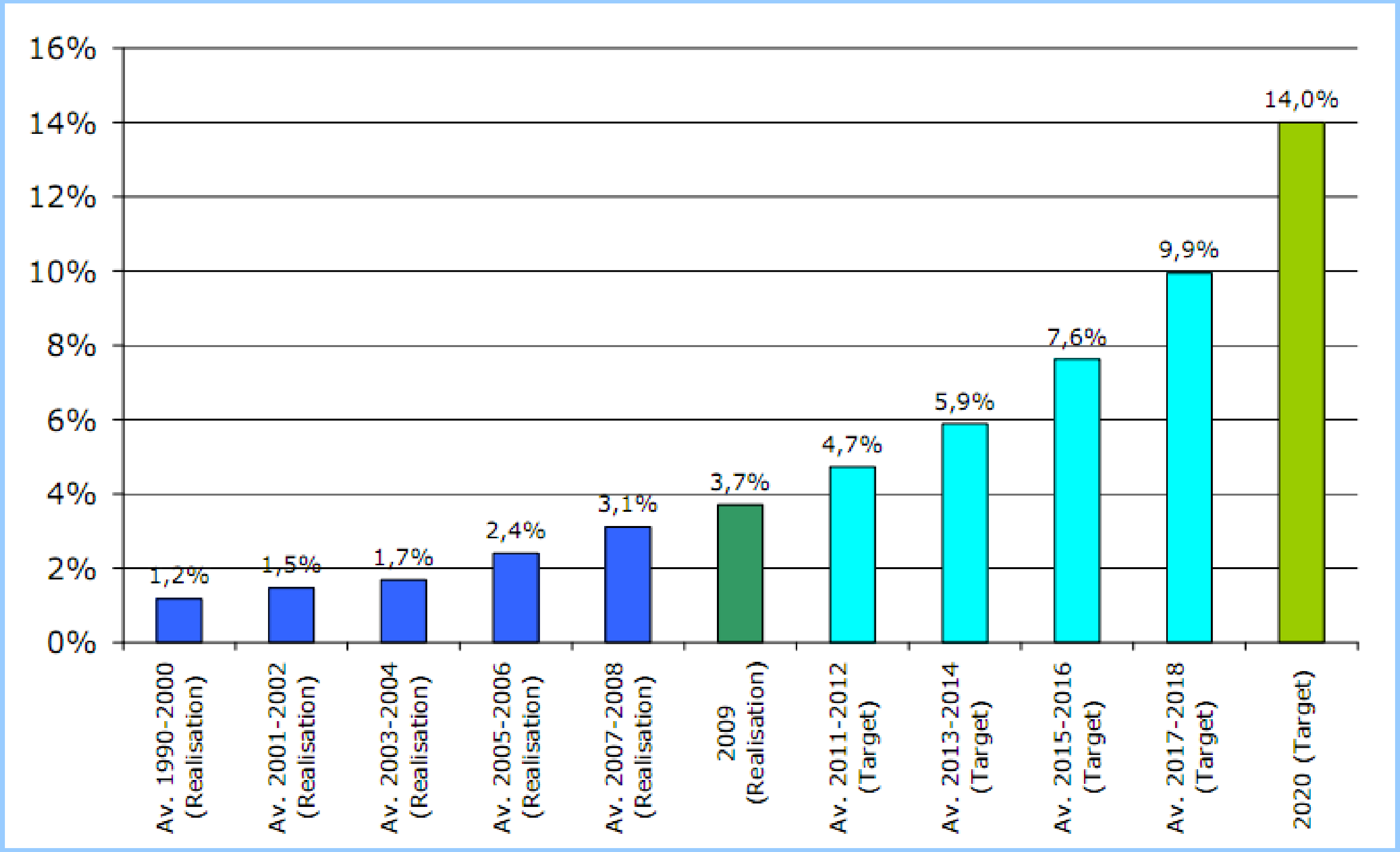
ENERGY PROFILE



ENERGY PROFILE SUMMARY

- The country’s strategic location makes it an important transit and trade hub for natural gas, oil and electricity
- Important natural gas production and a large oil refining industry propels the NL into active energy trade
- Ambitious targets to increase the share of renewables in the energy mix to 20% by 2020
- Netherlands has a small, but long-standing, nuclear program

14% Renewable Energy Share targeted by 2020



Source: NL Agency, Ministry of Economic Affairs Agriculture and Innovation, Country Report Update: Biogas in the Netherlands, April 2011

ENERGY PROFILE

- **Oil**
  - production: 59.490 bbl/day
  - consumption: 1 million bbl/day
  - imports: 2,577 million bbl/day
  - exports: 1,871 million bbl/day
  - reserves: 310 million bbl
- **Natural gas**
  - production: 85,17 billion m^3
  - consumption: 53,19 billion m^3
  - imports: 25,7 billion m^3
  - exports: 57,75 billion m^3
  - reserves: 1,387 trillion m^3

Source: CIA World Factbook 2011

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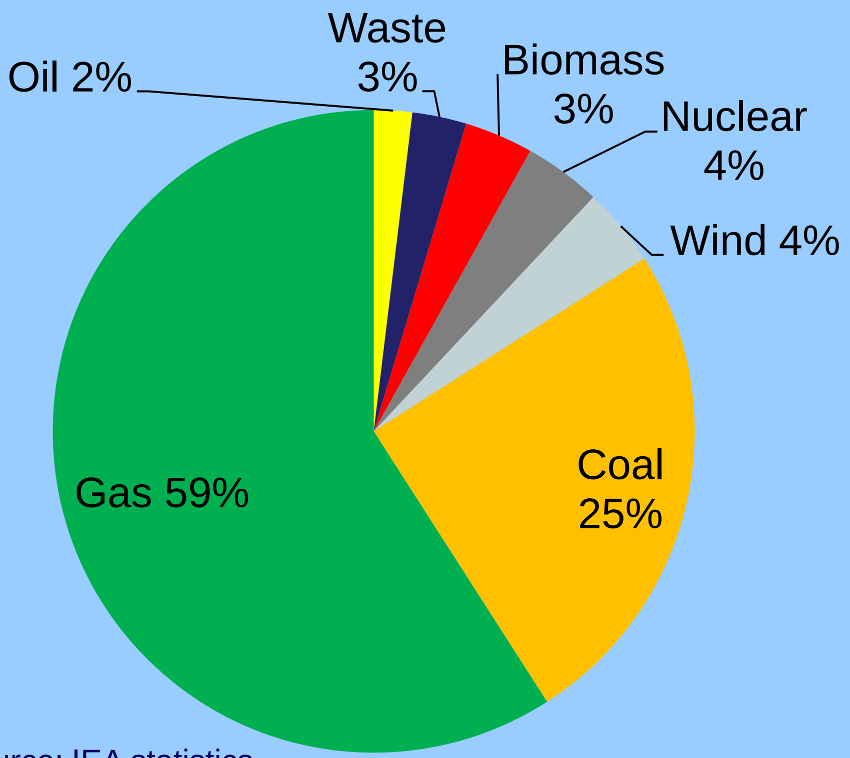
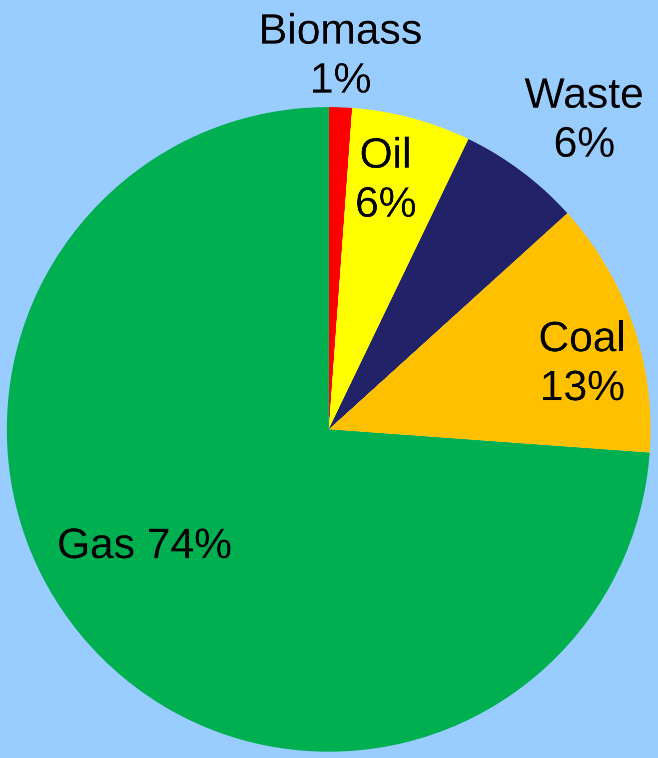
Natural gas is the main source of electricity and heating production

Electricity production



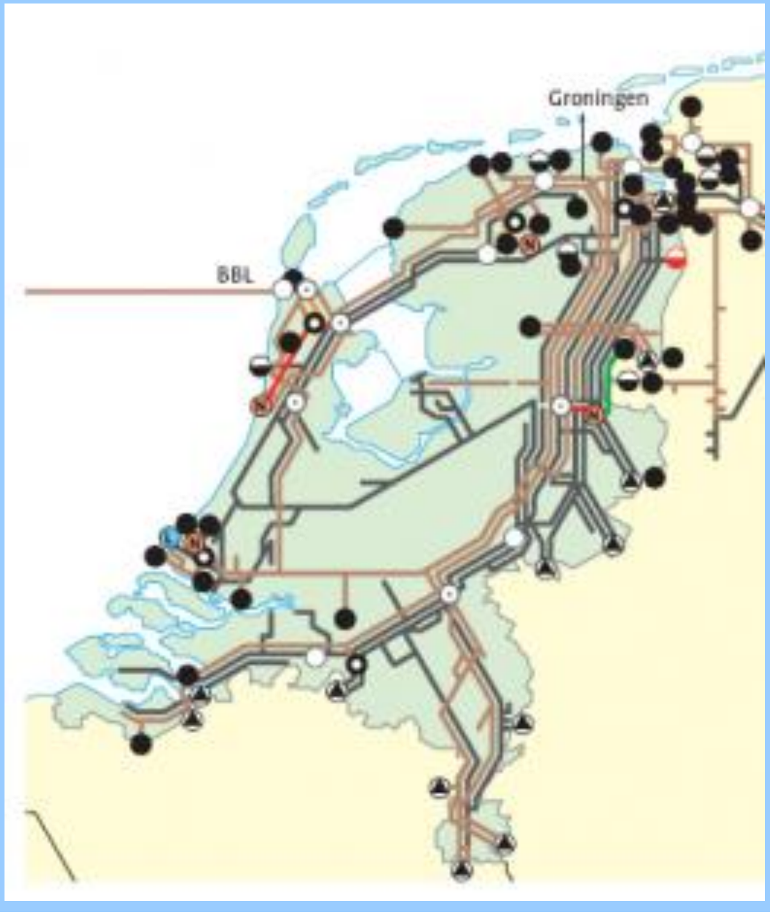
Heating production



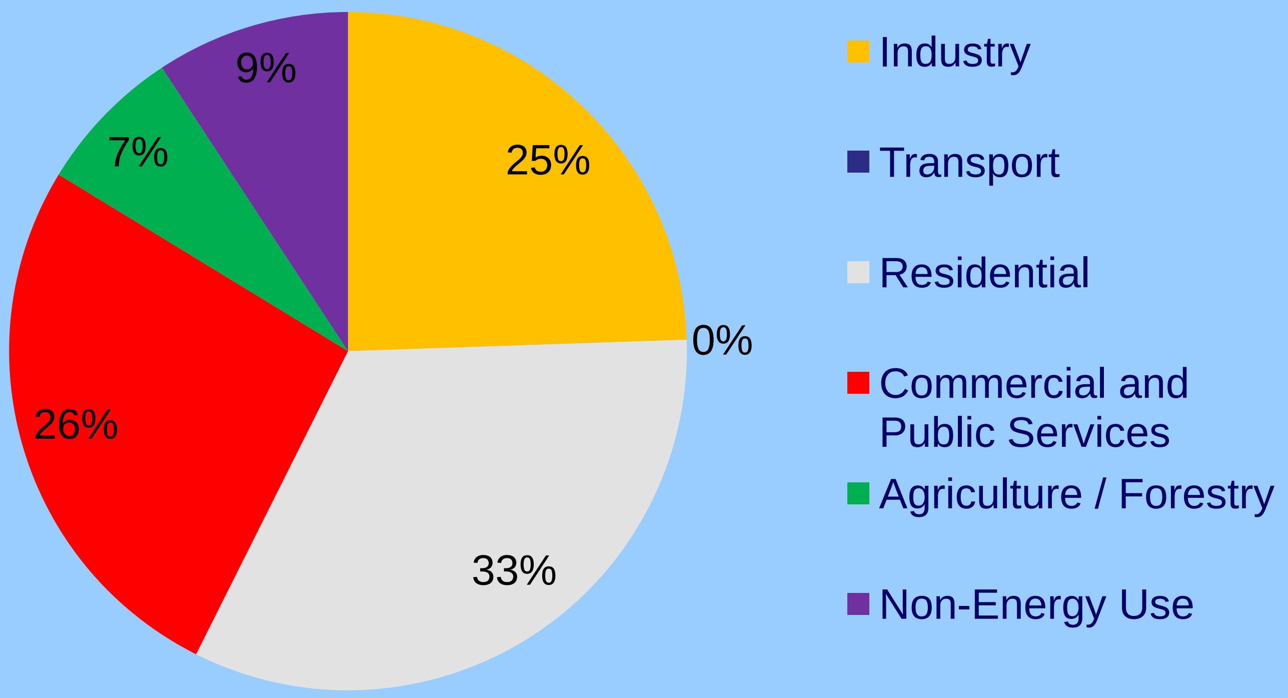
Source: IEA statistics

NATURAL GAS PIPELINE MAP

The Dutch gas network comprises 11,500 km of pipelines, 52 entry points, 23 export stations and 9 compressor stations



Natural gas used in the transport sector is only 0.003%



Source: IEA statistics, 2011

At present, four LNG regasification terminals are planned – three in the port of Rotterdam (two onshore and one offshore) and one in Eemshaven, north of Groningen

Main challenge:

- There is no legal basis for safety and environmental regulations for allowances, both for stations and for trucks
- Lack of knowledge concerning LNG in general
- Replacing diesel oil at large is not a popular message for the oil industry

Source: Rolande LNG, Introduction of LNG as a fuel for vehicles in the Netherlands, 2006

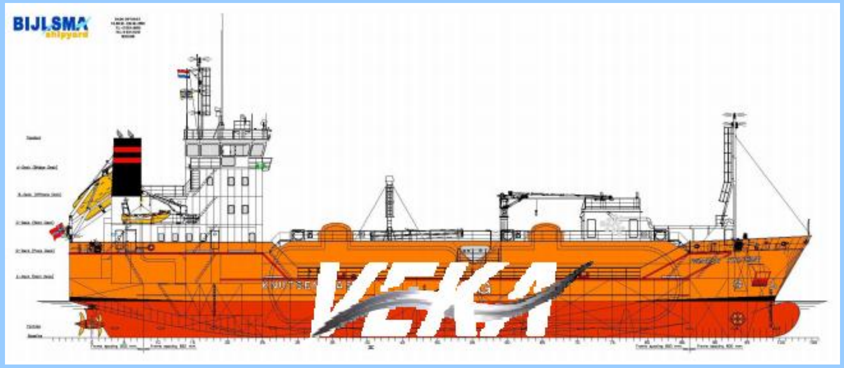
Rotterdam LNG terminal planned for 2013

- Capacity: 9 billion m3, can be increased to 16 bm3 in the future
  Storage: 3 tanks capable of storing 180,000 m3 cubic meters each
- Receiving Capacity: up to 110 ships per year with a capacity of 65,000 m3
- Cost: €800 million
- Operator: 4Gas
- Shareholders: Gasunie, 42.5%, Vopak, 42.5%, DONG Energ 5%, Essent 5%, OMV 5%

Holland Innovation Team and partners are paving the way for a bio-LNG infrastructure which can improve the small scale LNG chain

- BER BV wants to build a bio-LNG plant in Delfzijl, and a bunkering bio-LNG terminal in Zwijndrecht together with Nobel close to Rotterdam
- The bio-LNG must be transported between these locations and to other terminals and distribution centers, so they are creating a vessel for this task

Source: Holland Innovation Team, Building the small scale LNG market with bio-LNG contributing to get it off the ground, December 2011



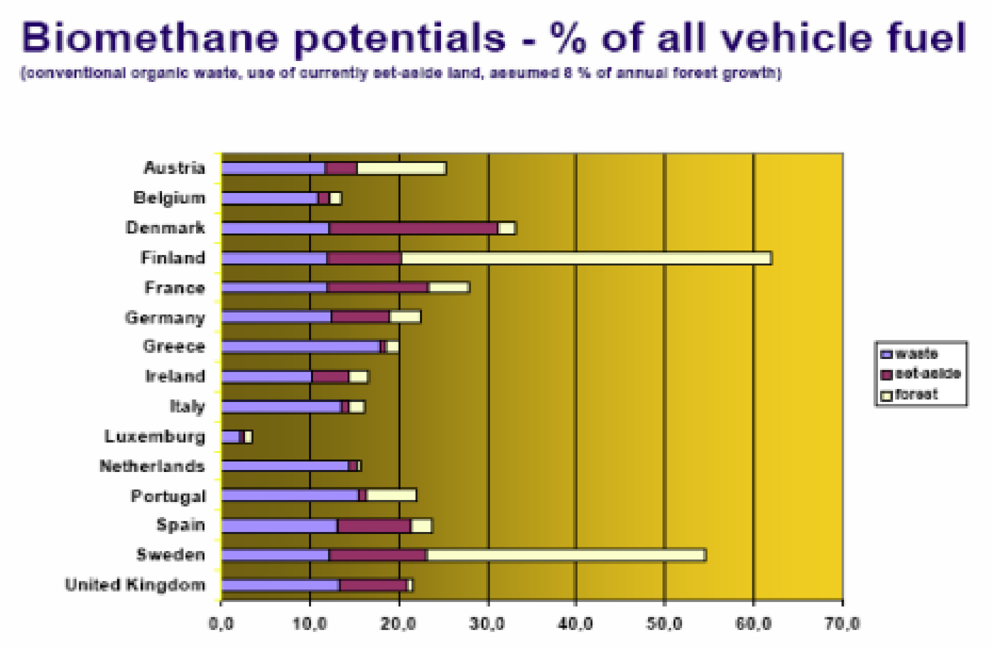
Biogas policies in Netherlands

- Gas quality: prescribed
- Mandatory acceptance of grid injection: No
- Regulatory Style: Somewhat prescriptive
- Government Incentives: Production & tarif subsidies
- Restrictions for feed-in: NO (exception is requirement to meet gas quality standard)
- Tariffs: Market determines prices

Source: Clean Fuels Consulting, Grid Injection of Biomethane, August 2010

ALTERNATE NATURAL GAS SOURCES

Dutch government agency forecasts that 3 billion cubic meters of so-called ‘green gas’ can be produced from anaerobic digestion in the Netherlands, i.e. equivalent of over 2 million tons of bio-LNG

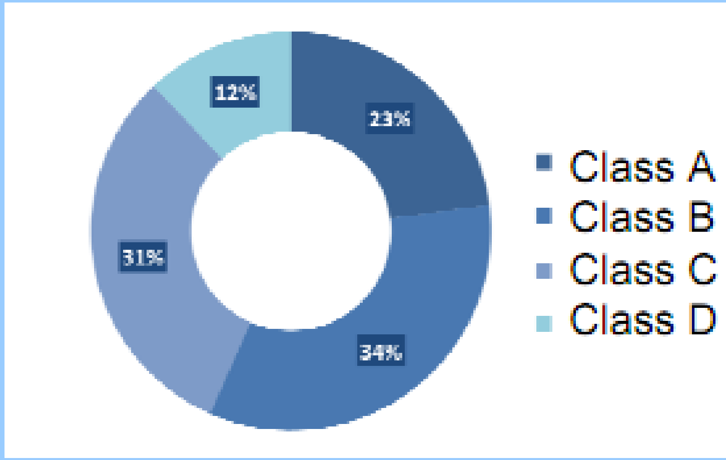


Source: Holland Innovation Team, Building the small scale LNG market with bio-LNG contributing to get it off the ground, December 2011

Biogas projects in full operation in 2010 (No. = 113, not including sewage sludge digestion)

Classification:

- Class A: co-digestion < 500 kWe
- Class B: co-digestion 500 kWe < 1MWe
- Class C: co-digestion > 1 MWe
- Class D: other



Source: NL Agency, Ministry of Economic Affairs Agriculture and Innovation, Country Report Update: Biogas in the Netherlands, September 2011

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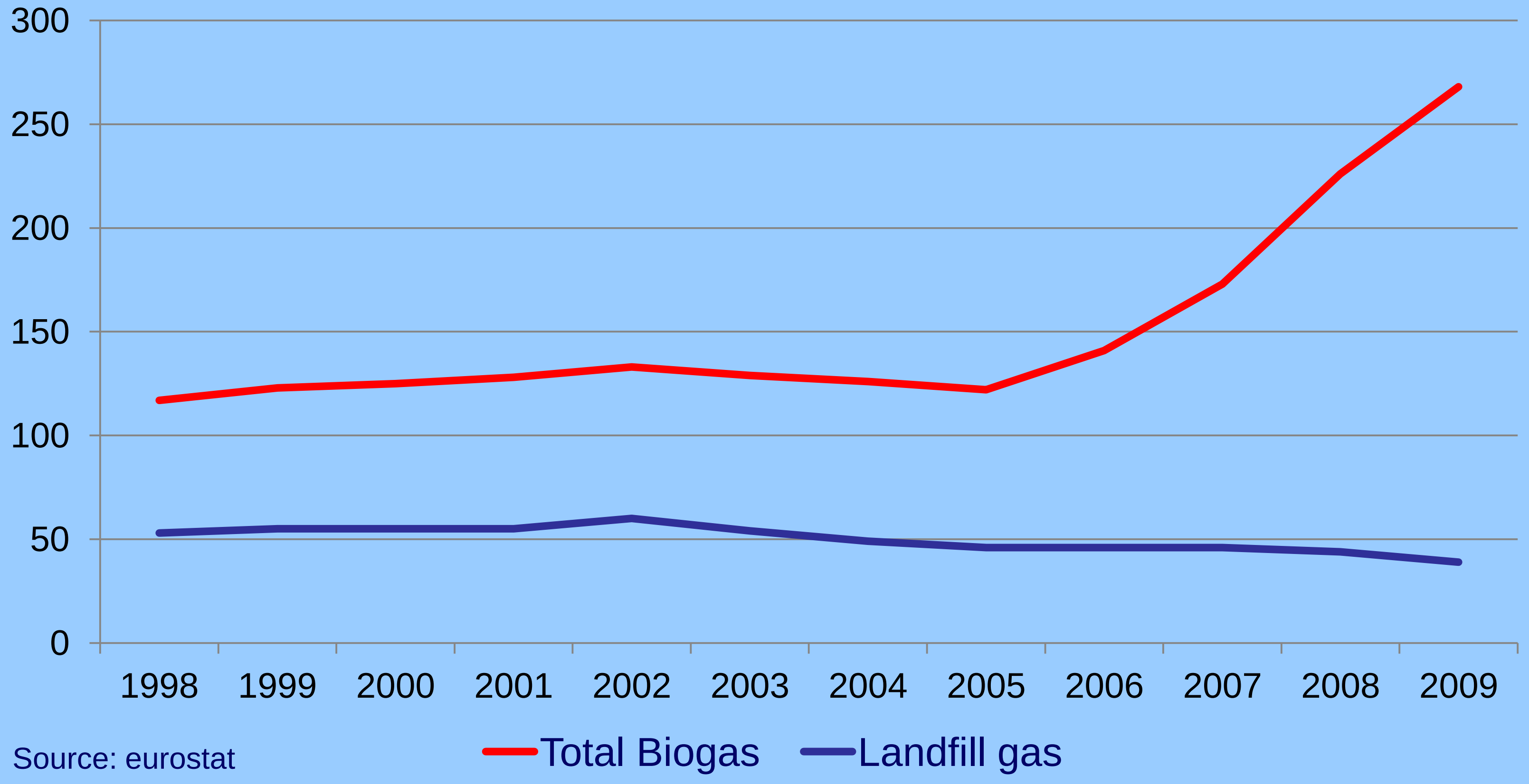
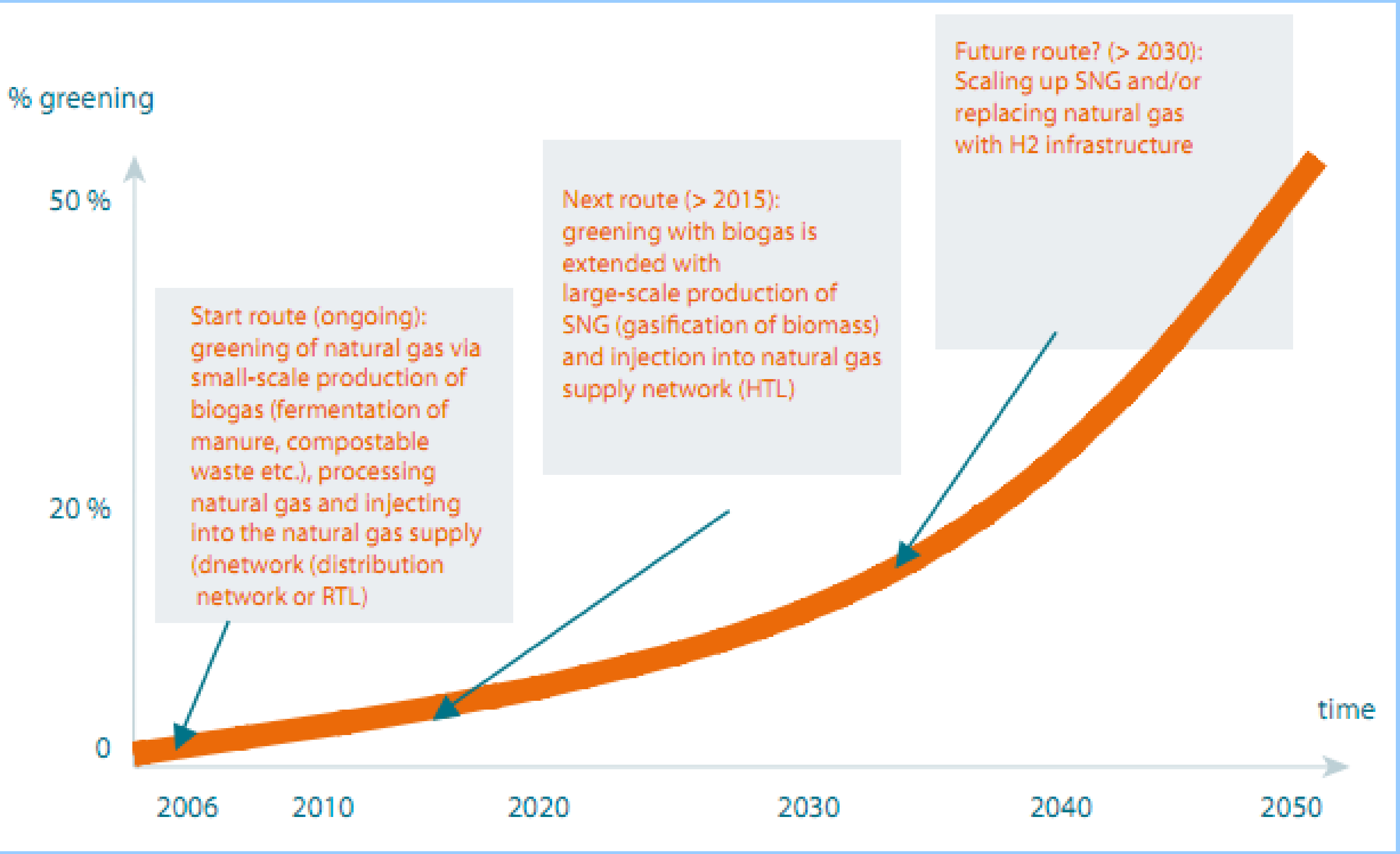
Only 14% of biogas comes from landfill. Other forms of biogas have increased significantly since 2005



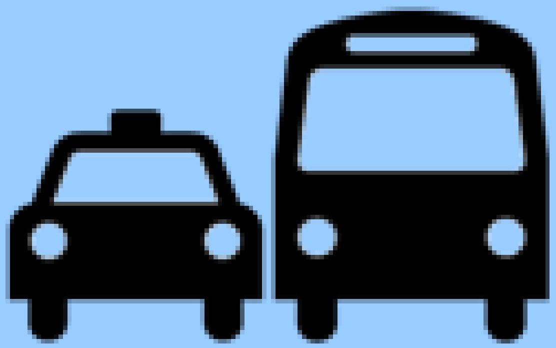
Source: eurostat

Long term view to replace 50% of natural gas with green gas like biogas synthetic gas



Source: Creative Energy, Let's give full gas!

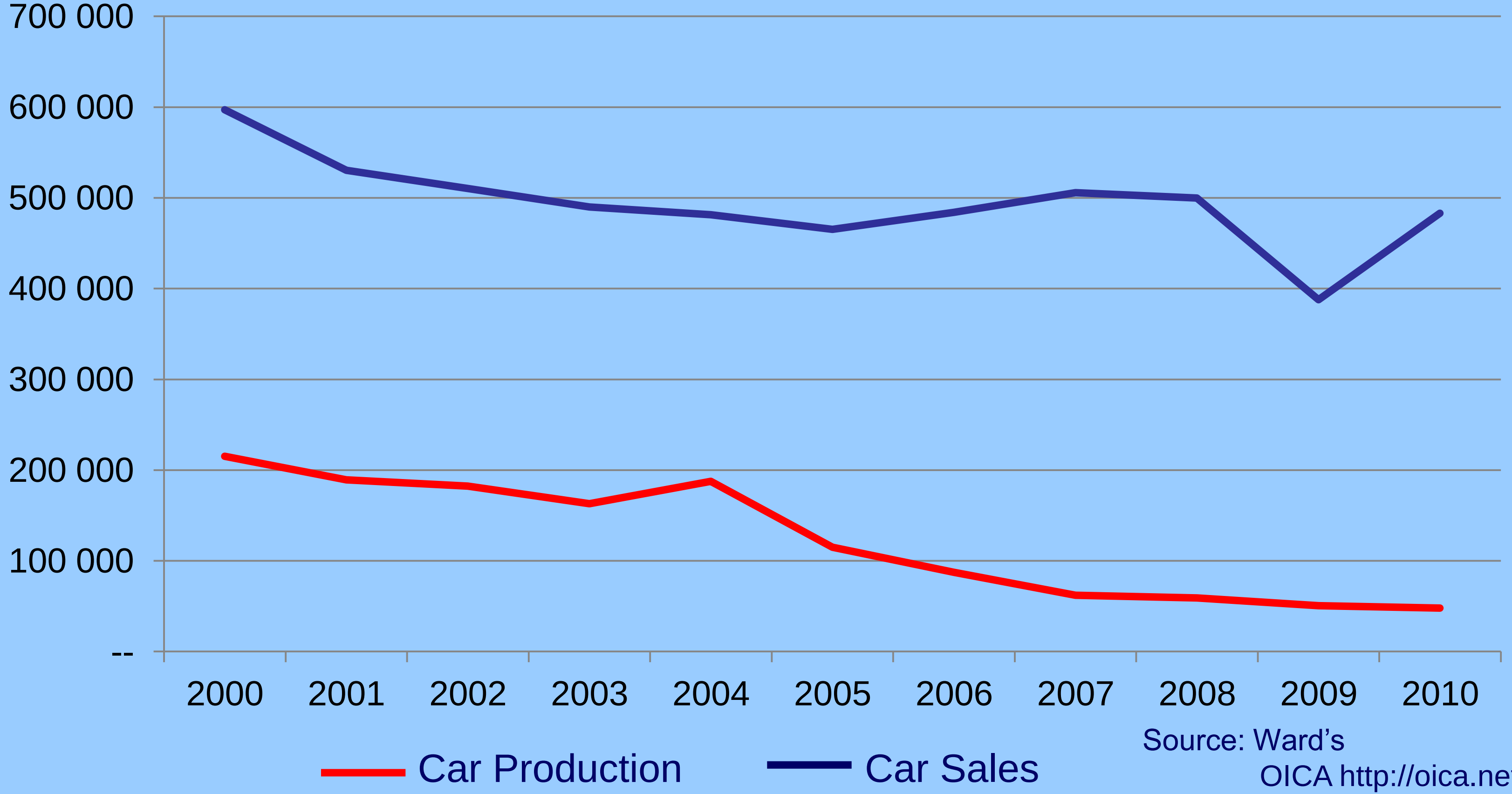
VEHICLE PROFILE



VEHICLES PROFILE

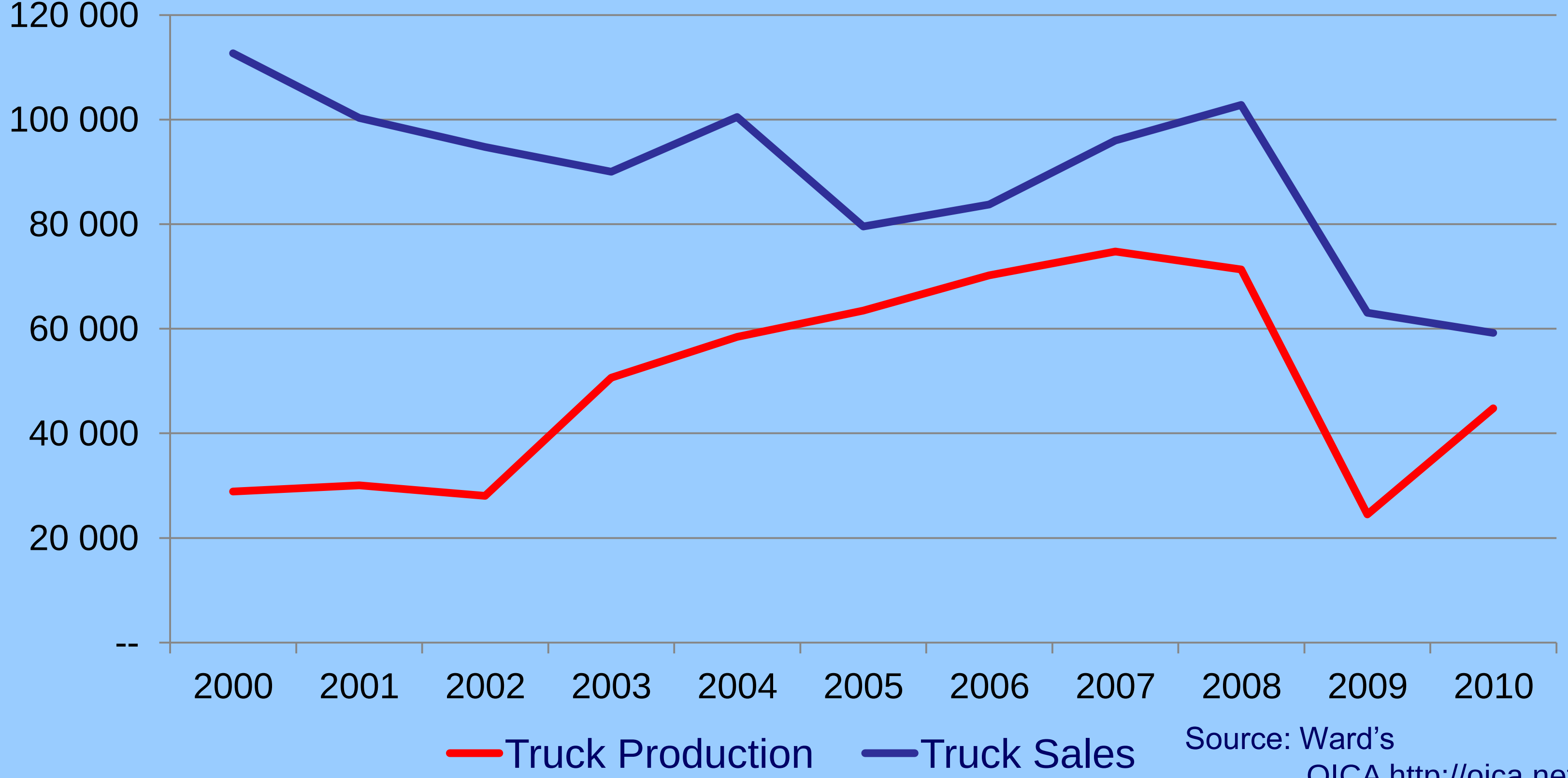
- Netherlands is the sixth largest automotive market in Europe
- Imports dominate the automotive market, with the exception of buses
- Dutch companies develop and produce systems, components and materials for all the major markets worldwide

Only 10% of passengers cars are produced nationally. The vehicle market is dominated by imports



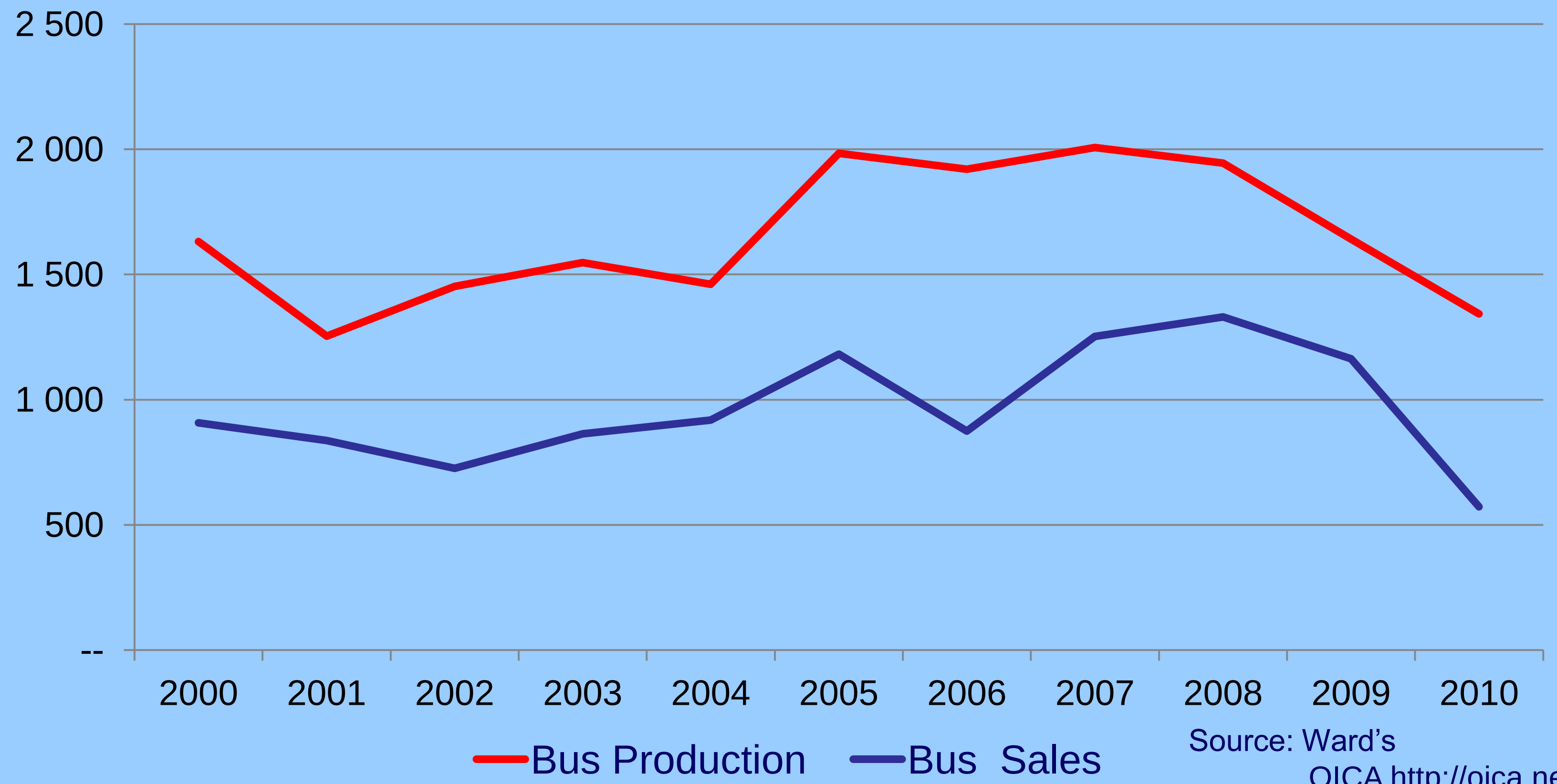
Source: Ward's
OICA http://oica.net/

The growth of truck production, started in 2002, was stopped by the economic crisys in 2009 but is now increasing again



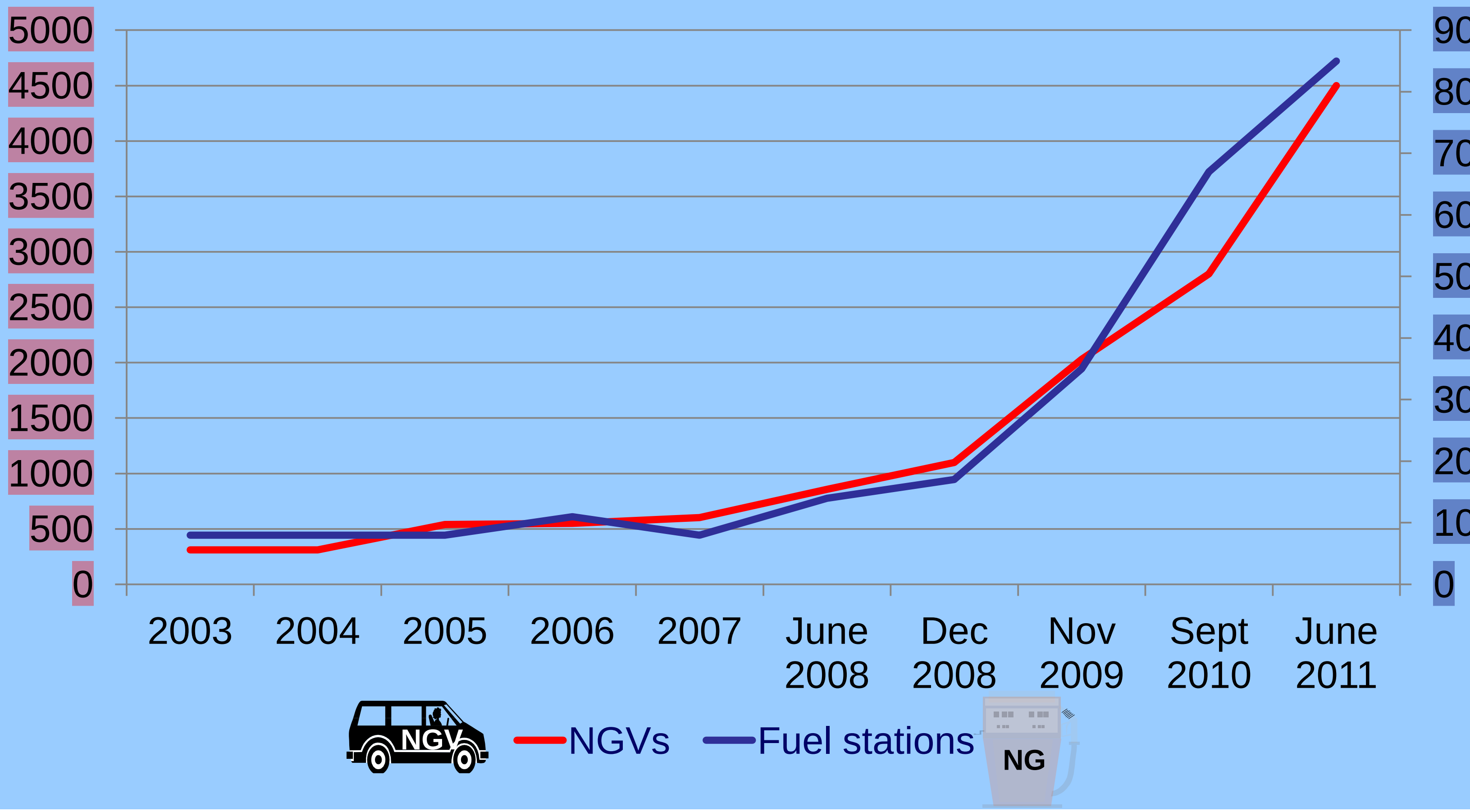
Source: Ward's
OICA http://oica.net/

Bus industry is the only one with a national production that can supply the market demand

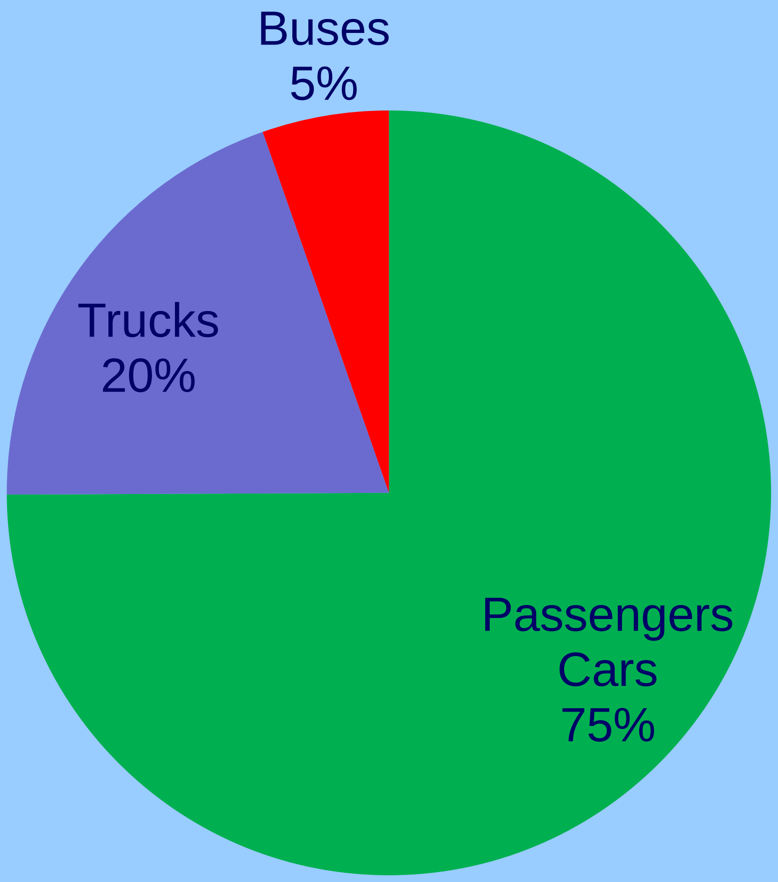


Source: Ward's
OICA http://oica.net/

Fuelling stations and NGVs have followed a parallel growth curve



4.500 NGVs in Netherlands: natural gas market dominated by passengers cars



Source: The GVR, September 2010

Great variety of passengers cars with a marked dominated by FIAT and Volkswagen

FIAT

- Panda
- Punto
- Doblò
- Qubo
- Ducato

Mercedes-Benz

- B-Class
- E-200

Opel

- Zafira

Renault

- Kangoo

Volkswagen

- Caddy
- Touran
- Passat

Source: Fuelswitch.nl

Commercial NGVs with a wide varriety of OEM models

DFM Mini Trucks
- Pick-up
- Panal
- Cargo Van
- Cargo Box
- Cool Cargo

FIAT
- Fiorino
- Doblò
- Ducato

Iveco
- Daily

Mercedes
- Sprinter

Opel
- Combo
- Vivaro

Renault
- Kangoo

Volkswagen
- Caddy Maxy
- Transporter

Source: Fuelswitch.nl

Heavy Duty NGVs are available in different models and sizes

Iveco

- Eurocargo
- Stralis

Mercedes

- Econic

MAN

- Lion's City
- TGL
- TGM
- TGS

Source: Fuelswitch.nl

VOS Logistics, one of Europe's largest trucking & logistics company, has a strong interest in LNG

- VOS Logistics has about 200 Mercedes Econic trucks that drive to Spain and VOS is interested in running these on LNG
- VOS Logistics and Ballast Nedham to build the LNG fuelling stations (as well as L-CNG stations, as may be appropriate)
- Development of LNG fuelling station delayed due to (lack of) local codes as well as related safety issues
- Despite challenging economic times, VOS Logistics remains committed to the LNG project
- Must ensure there are enough trucks for the planned fuelling stations

Fiat Natural Power Vans Come With Free Green Gas in Netherland

- In the Netherlands Fiat Natural Power vans are being offered at the same price as diesel models
- Free green gas (biomethane) is offered in collaboration with regional gas supplier OrangeGas, for the first 10,000 km

Source: "Fiat Natural Power Vans Come With Free Green Gas in Netherlands", NGV Global, March 26, 2011

A growing number of Dutch cities are purchasing natural gas buses

- 45 city buses in Haarlem Connexxion
- 40 city buses in Velsen Connexxion
- HTM 135 buses and 50 buses to Veolia in The Hague
- 75 city buses for Novio in Nijmegen
- 8 intercity buses at Qbuzz in Drachten
- 4 buses from Arriva in Ameland
- 10 buses in Groningen
- 43 buses in Zeeland (Walcheren and Wemeldinge)
- 45 buses in The Hague

Source: Aardgasmobiel

85 fuelling stations in operation and other 45 under construction

Operational
Planned
Private stations

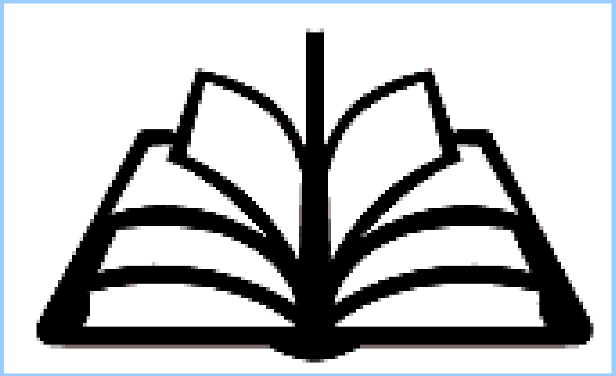
Source: NGV-Holland

The Ministry of Transport (Verkeer & Waterstaat), provinces, regional authorities and municipalities will support biogas

- The program is called TAB (Tanking Alternative Biofuels) with a grant of EUR 3.5 million
- Motorists will be able to fuel up at 53 new green gas filling stations throughout provinces of the Netherlands: Groningen (5), Friesland (2), Drenthe (3), Overijssel (5), Gelderland (10), Flevoland (1), Utrecht (1), Noord-Holland (10), Zuid-Holland (5), Noord-Brabant (6) en Limburg (5)

Source: E-energymarket.com, June 2010

STANDARDS & REGULATIONS



STANDARDS & REGULATIONS

- Multi-fuel stations: allowed
- No limits on opening hours: 76 of 85 total stations are open 24 hours
- Self service: allowed
- Payment practices at the pump: cash, credit card and company fuel cards

In the Netherlands gas quality parameters are agreed between the gas supplier and its customers

- Odorization necessary at the distribution level with an environmental permit required
- Odorization standards: NEN 1059 and NEN 1091
- Odorisation control during the transport with continuous analytical inspections
- Lack of odor in LNG could be an issue

Source: Marcogaz

Gas transportation standards

- BS EN 1964: Transportable gas cylinders - Specification for the design and construction of refillable, transportable gas cylinders of seamless steel with water capacities from 0.5 liter up to and Including 150 liters
- BS EN 12007 Gas supply systems - Pipelines for maximum operating pressure up to and Including16 bar

Source: NEN

Gas delivery systems for motor vehicles standards are specified in 25 PGS*:

- prEN 13945: NGV refueling appliances
- BS EN ISO 15403: Natural gas - Designation of the quality of natural gas for use as a compressed fuel for vehicles
- ISO 14469: Road vehicles - Compressed natural gas (CNG) refueling connector
- ISO 15501: Road vehicles - Compressed natural gas (CNG) fuel systems
- BS EN ISO 15500-17: Road vehicles - Compressed natural gas (CNG) fuel system components

Source: NEN

** Publication Series on Dangerous Substances*

GOVERNMENT SUPPORT

Governmental target to reduce CO_2 emissions in a period of 10 years

	GHG affected	Objective	Estimate of mitigation impact per year, in $MtCO_2$-eq		
			2005	2010	2015
Fuel efficiency through technical vehicle measures	CO_2	Increasing fuel efficiency and reducing CO_2 emissions through technical vehicle measures	0,2	0,4	0,4
Fuel efficiency through driving behaviour and discouraging vehicle use	CO_2	Increasing fuel efficiency and reducing CO_2 emissions through optimization of driving behaciour; discouraging vehicle use through logistical improvements; reducing congestion	0,5	0,9	0,9
Other	CO_2	Raise revenue: reduce CO_2 emissions through investments in material target: 2% in 2007 and 5,75% in 2010; increase use of natural gas as a automotive fuel	0,1	0,1	0,1

New taxation system under transformation will be based on CO2 emissions by 2013

- When purchasing a car or motorcycle since 1993 “Taxation of Cars and motorcycles” (BPM) is payable
- In the period 2009-2013, the BPM gradually will be transformed from a tax on the purchase price to a tax based on CO_2 emissions
- During the conversion period, both charges apply

Source: Raivereniging (Dutch Automotive Association)

Favourable fiscal treatment of natural gas as a motor fuel:

- CNG: € 0.3 ct energy tax per Nm^3
- LNG: same excise duty as LPG (€ .09 ct per Nm^3)

Favourable fiscal treatment of natural gas passenger cars:

- No compensation for low excise duty in circulation tax
- Favourable purchase tax (500 euro reduction)
- Favourable taxation of natural gas company cars
- No circulation tax for natural gas cars <= 110 g CO_2/km

Source: International workshop Towards Sustainable Mobility: need for (inter)national standards Green gas and Natural Gas fuelling stations, 21 June 2010

Obligation for suppliers of petrol and diesel for road transport to bring a minimum percentage of biofuels to the market

- For 2010 the minimum percentage was 4%
- Direct delivery as well as indirect delivery of biogas through the grid: allowed
- Tradable system on base of bio-tickets (=> about € 0.20ct per Nm^3)
- Double counting of more sustainable biofuels (biogas from waste) (=> about € 0.40 ct per Nm^3)

Biomass project subsidy schemes in 2010 to stimulate the biogas market

- Renewable gas (+/- 50 million Nm3/y)
- Budget 2010: € 214 million (over 12 years)
  - (co)digestion of animal manure (0,635 – 0,208)
  - digestion of green household waste (0,465 – 0,208)
  - digestion other biomass (0,583 – 0,208)
  - landfill gas (0,218 – 0,208)
  - sewage sludge (0,218 – 0,208)

Source: NL Agency, Country update Netherlands April 2010, IEA-Bioenergy Meeting Task 37

Dutch government sets € 2,6 million for the subsidy scheme 'run on biogas and high blends of biofuels'

- Part of the Grants Program Experimental sustainable mobility
- Subsidy scheme is for taxis, buses, trucks and vans not used for transportation of goods for third parties and used commercial cars
- From € 3,000+ per vehicle subsidy to a maximum of € 100,000. To be eligible there must be a minimum of three vehicles purchased and a maximum of 33
- National funding has expended its money (2012) but several regions provide similar incentives

Source: Raivereniging (Dutch Automotive Association), 23 March 2011

Municipalities actions

- **Leeuwarden** offers free parking for NGVs. Currently there are 2 CNG stations in this city
- The **Haarlem** municipality supports NGVs and the city has 12 trucks, 25 buses, 48 taxis, 130 commercial vehicles and 30 private cars running on CNG with 5 fuelling stations
- **Den Haag** will have 135 CNG buses by April 2009
- **Den Haag** plans to replace all 120 public city buses with NGVs from the end of 2008
- Further plans to replace all 300 buses in the Greater **Den Haag** area
- During 2009 **Nijmegen** and **Arnhem** cities will receive 75 CNG buses they ordered
- Municipalities across the Netherlands have approved the purchase of an additional 210 CNG buses for 2009-2010

Aardgasmobiel coalition to promote the use of NGVs and build fuelling stations

- Coalition of energy firms, fuelling station operators and constructors, car lease firms and vehicle manufacturers are working together to support NGVs
- Carries out lobbying and marketing at the local, provincial and national-level
- Follows the example of the German Erdgasmobile
- Three step policy:
  - 1) Promote NGVs use in city public bus fleets
  - 2) Lobby for the use of NGVs in the fleets of private companies
  - 3) Break into the private car market

Gasunie is the main company responsible for the management, operation and development of the gas transport system in the Netherlands

- Owned by Exxon and Shell (49%) and the Dutch Government (51%)
- Historically GasUnie has not supported NGV development but in the last several years are beginning to take an interest…slowly and cautiously
- Local distribution companies with NGVs consolidated and gas companies lost what little enthusiasm they had for NGVs until more recently

With liberalization beginning in the late 1990s smaller municipal and local gas companies were purchased and consolidated, negatively impacting NGV development in the Netherlands

- Small-company NGV champions (Amstelveen, Velsen, etc.) were purchased and some NGV champions in leadership positions left the company.
- Smaller companies with NGV fleets slowly disbanded due to centralized ownership that did not necessarily support NGV development

NATIONAL LAWS & REGULATIONS

The overall regulatory framework is transparent and competitive

- Compliance with rules regarding the formation and operation of private enterprises is not difficult
- The efficient business framework is conducive to innovation and productivity growth

Source: The Heritage Foundation, 2011 Index of economic freedom

Foreign investors receive national treatment

- 100 percent foreign ownership is allowed in almost every industry
- There is no pre-screening of foreign investment, but regulations and restrictions in Dutch and EU policy can add to the cost of investment
- No barriers to currency transfers, repatriation of profits, purchase of real estate, or access to foreign exchange

Source: The Heritage Foundation, 2011 Index of economic freedom

COMMENTS BY STAKEHOLDERS

- "The NL will 'jump over to natural gas vehicles."
(*Gas industry executive)*
- "The NGV market is not growing very fast. Fuel price is about €1 for Dutch gas. The increased price of petrol and diesel helps but if you calculate the whole cost of ownership then the gas cars are not always cheaper. The bigger fleets order 4-5 gas cars and see that the total cost of ownership is not that cheap so they don't convert their whole fleet. The only alternative fuel vehicle to be successful in the Netherlands will be the one with the lower cost."
(NGV system designer and supplier)

COMMENTS BY STAKEHOLDERS

- There is a strong diesel lobby
- VROM (Environment ministry) is not enthusiastic about CNG, biogas or hydrogen
- Now they are tending to support electric vehicles

Stakeholder, City of Nijmegen

COMMENTS BY STAKEHOLDERS

"There are problems with municipalities licensing fuelling stations. They want NGVs but cities in the provinces find many reasons to make it difficult to install fuelling stations (legal barriers exist)."

LNG fuelling station supplier

COMMENTS BY STAKEHOLDERS

"There are a great deal of new activities: The water department is now producing 4 million m3 of biogas, some used in combined heat and power (CHP) and some being flared. But they now are looking at new sources of demand for the gas, including tractors and inland waterways."

NGV system designer and supplier

COMMENTS BY STAKEHOLDERS

- The Dutch NGV program is unbelievably promising. Every month two or three or four CNG stations are opening. Every month the network is growing and we see a steady rise of vehicles and gas consumption. No month has declined.
- The vehicles being sold are almost all business users. There are no private users of NGVs.
- The cost of the grid connection hook up, which is very expensive, remains an issue.

Compressor station designer and installer

CONCLUSIONS

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

Energy Environment

- The Netherlands is and will remain an important natural gas country, for domestic use and in the European energy sector
- Starting from 2015 Government targets to begin replacing CNG with ‘green gas’ (biomethane). By 2050 they want to use biogas, synthetic natural gas (syngas) and will see if a hydrogen infrastructure will develop from the natural gas pipeline network
- NGV market is very price-driven and customers are very price sensitive

Gas Industry Support

- Support from the gas industry for NGVs has been inconsistent, at best. Consolidation of the smaller gas companies has made NGV development more challenging as some of the NGV champions were brought into a larger gas network less interested in NGV development
- Being that GasUnie is 49% controlled by the oil industry, support for NGVs has not and cannot be assured from the domestic gas industry

Government Support

- Only in the last years there was a real support from the National Government (incentives scheme started on July 2011)
- National government has focused on electric vehicles
- Biggest support to NGV comes from municipalities
- The Ministry of Transport has been very supportive in developing NGV regulations at the European and United Nations levels

NGV Market Development

- Today the NGV market is increasing with more models of vehicles available
- Fuelling stations development is growing well with 40 new stations under construction
- NGV are present mostly in a growing number of municipalities and private company fleets
- There is a strong core of NGV stakeholders who continue to drive the market forward but based mostly on private sector initiatives

Legal and regulatory framework for CNG station development

- Clear and transparent regulation, based on European and International standards
- National regulations related to biogas will be favorable to new developments related to feed-in, with tariffs in the hands of the private sector network operators and the gas suppliers

Investment Environment

- With its openness to global trade and investment, the Dutch economy scores well in trade freedom, investment freedom and financial freedom
- The overall regulatory and legal environment, transparent and efficient, encourages robust entrepreneurial activity

NETHERLANDS
(January 2012)