Joint World NGV Report by UN ECE / IGU: Strategic trends for Sustainable Development

Methane—Transportation Fuel of the XXI Century

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Contributions to IGU Final Report

61 Expert from 52 Companies 24 Countries Contributed to IGU Final Report
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• MINIMUM REFUELLING INFRASTRUCTURE NEEDS FOR EUROPE
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Structure of the IGU Final Report

- FROM CONCEPT TO REALITY: SMART TRANSITION TO CLEAN ALTERNATIVE FUELS
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World NGV Market

Share of Regions in the World NGV Fleet

- Asia: 59.26%
- Europe: 30.69%
- America: 8.90%
- Africa: 1.12%
- Australia & NZ: 0.03%

Sources: IGU, GVR, NGVRUS

CNG

- Number of filling stations: 20,712
- Number of NGVs: 14,536,012

World NGV Fleet, 1'000


850 920 1,200 1,700 2,100 3,200 3,900 4,800 5,400 7,111 9,570 10,891 12,200 14,500

Northern Europe 38,716 220
Western Europe 129,036 1,667
Southern Europe 766,291 9,311
Northern Africa 162,159 147
Central Asia 5,090 31
Western Africa 345 6
Southern Africa 24 2

Eastern Europe 359,570 806
Central Asia 573,620 640
Eastern Asia 671,266 3,011

Southeastern Asia 354,593 686

Australia & New Zealand 3,701 65
LPG accounted for 60% of the oil fuel alternatives, whereas natural gas (and biomethane) made up 40% in the sector of gaseous alternatives to diesel and gasoline. The share of LPG keeps shrinking while that of Natural gas / Biomethane is growing.

Sources: Petroleum Economist, World LPG Association, IGU, GVR, NGVRUS
Factors to Boost NGV Market:
- CO2 emissions reduction strategy.
- Methane is also part of the EU strategy of Future Transport Fuels.
- LNG and CNG Blue Corridors.
- Cooperation between NGV OEMs, fuel suppliers/distributors and fleet operators.
- Development of LNG infrastructure market for medium and long distance MD and HD NGVs.
- Steady growth and expansion of NGV industry.

Europe

4 000 - Number of filling stations (5 400 – UNECE Region)
1 559 000 - Number of NGVs (2 000 000 – UNECE Region)
Factors to Boost NGV Market:
- New supplies of shale gas.
- Oil-supply vulnerability.
- Environmental imperatives.
- Major advances in NGV technologies.
- Supportive policy measures.
- Positive response from major private and government fleet operators.
- Expanding trucking corridors and urban fleets.

1,181 - Number of filling stations

126,205 - Number of NGVs
Factors to Boost NGV Market:
- Governmental policies.
- Support of major stakeholders.
- Promotion programs:
  • Financial support for conversions (Bolivia).
  • Required percentage of NGVs (Venezuela).
  • Municipal politics (Argentina, Brazil).
  • Developed conversion industry.

4,872 - Number of filling stations

4,334,819 - Number of NGVs
Factors to Boost NGV Market:
- Plentiful investment (China).
- Decarbonisation of economics (Japan, China, South Korea).
- CNG, LNG, Biomethane among chosen technologies.
- Gas network expansion (India).
- Government strategies towards sustainability and self-sufficiency (Iran, India, Kazakhstan, Pakistan, Thailand, Uzbekistan).
- Local production of NGV models and related components.
- World Bank, U.S DOE, EBRD, UNDP support.

Asia

10 781 - Number of filling stations
8 614 455 - Number of NGVs
Factors to Boost NGV Market:
Demonstration project were success. Governmental support and promotion policies (Egypt, Algeria). Trend to utilize domestic natural gas and reduce oil (products) import (Mozambique, Tanzania, Nigeria). Availability of national resources of natural gas. Availability of affordable conversion technologies. Strategy to reduce emissions and oil dependence.
Synergy of Alternatives

Methane (natural gas and biomethane) will remain premium commercial fuel alternative.

CH4 synergy with hybrid, hydrogen fuel cell, and micro-turbine technologies.
Heavy Duty NGV Trends

Dedicated and/or dual fuel OEM heavy duty CNG/LNG* urban vehicles acquired by municipalities, federal and private fleets: buses, garbage trucks, street sweepers, special purpose vehicles ...

Dedicated and/or dual fuel OEM heavy duty long range (intercity/international) vehicles acquired by private and federal fleets: coaches, trucks.

Conversion is still popular. Although OEM supply becomes principal source for acquisition of new NGVs.

* CNG/LNG = CH$_4$ based compressed or liquefied gas regardless of origin = natural gas, shale gas, biomethane, e-gas, coal bed methane
Diversity of CNG light duty vehicles offered by OEM and QVM keeps broadening.

New trends with OEM CNG models are expected to continue in the direction of downsizing and hybridization.

Bi-fuel (NG or gasoline) OEM NGVs will be popular until gas filling network is properly developed.
Coal Mines. Super HD mine hauling trucks (dual fuel or dedicated, CNG or LNG) were successfully tested during past two decades in the USA, Ukraine and Russia.

Airports have high concentration of HD & LD vehicles serving both inside and outside needs. A concentrated, emission and budget concerned, 24/7 guaranteed methane customer of CNG/LNG will tempt investment into both fleets and infrastructure.
**Inland waterways.** The rivers Amstel, Chao Phraya, Dubai Creek, Mississippi, Moscow and Neva, Seine, Yangzi have seen successful demonstration and commercial operation of different size and purpose river boats that use CNG or LNG (dedicated and dual-fuel) instead of diesel.

**Maritime.** Emission Control Areas (ECAs) in the Baltic and Northern seas, North America, the Mediterranean and Sea of Japan will require ship owners to use cleaner marine fuels with low sulphur dioxide and particle content. The most attractive option is to use LNG. It might be expected that as many as 10% short-sea ships calling at ECAs will be running on LNG by 2015.
Rail Road. In addition to current utilization of NG to power locomotives (U.S, Brazil) the new projects will show technical, economic and environmental viability of LNG (Russia, Canada) and CNG (India) engine technology for locomotives (offering greenhouse gas reductions of up to 500 tonnes per year for each natural gas locomotive relative to diesel locomotives).
Golden Age of Gas is coming

The global natural gas resource base is quoted to sustain current consumption for over 250 years.

The world population of NGVs by 2020 may reach 50 million units.

In terms of gas consumption HD OEM NGVs may overwhelm that of the LD NGVs. By 2020 HD sector may reach annual CH4 consumption of 200 BCM.

LNG (LBM) may become a primary alternative for heavy duty on- and off-road applications: buses, trucks, rail road, water- and aircraft.

Small scale LNG sector (liquefaction, storage, transportation, dispensing) will grow.

International Blue Corridors, Green Highways, Gas Highways – and not only for on-road vehicles - will connect cities, sea- and airports, railway terminals.
What Has to be Done?

To achieve the modest goal of 50 million NGVs on the roads by 2020 it is necessary to:

- improve and harmonize national legislative/regulatory environment;
- expand incentives for investors;
- build up public awareness;
- secure leadership of gas industry in developing filling infrastructure;
- further develop NGV diversity;
- invite oil-fuel retailers to expand the range of products to sell CNG/LNG.
Thank you for your attention

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