



25th world gas conference
"Gas: Sustaining Future Global Growth"

Emerging Opportunities for NGVs Worldwide

By: Gabriele Gozzi, Chairman – NGV Global

Date: June 7, 2012

Venue: Kuala Lumpur, Malaysia



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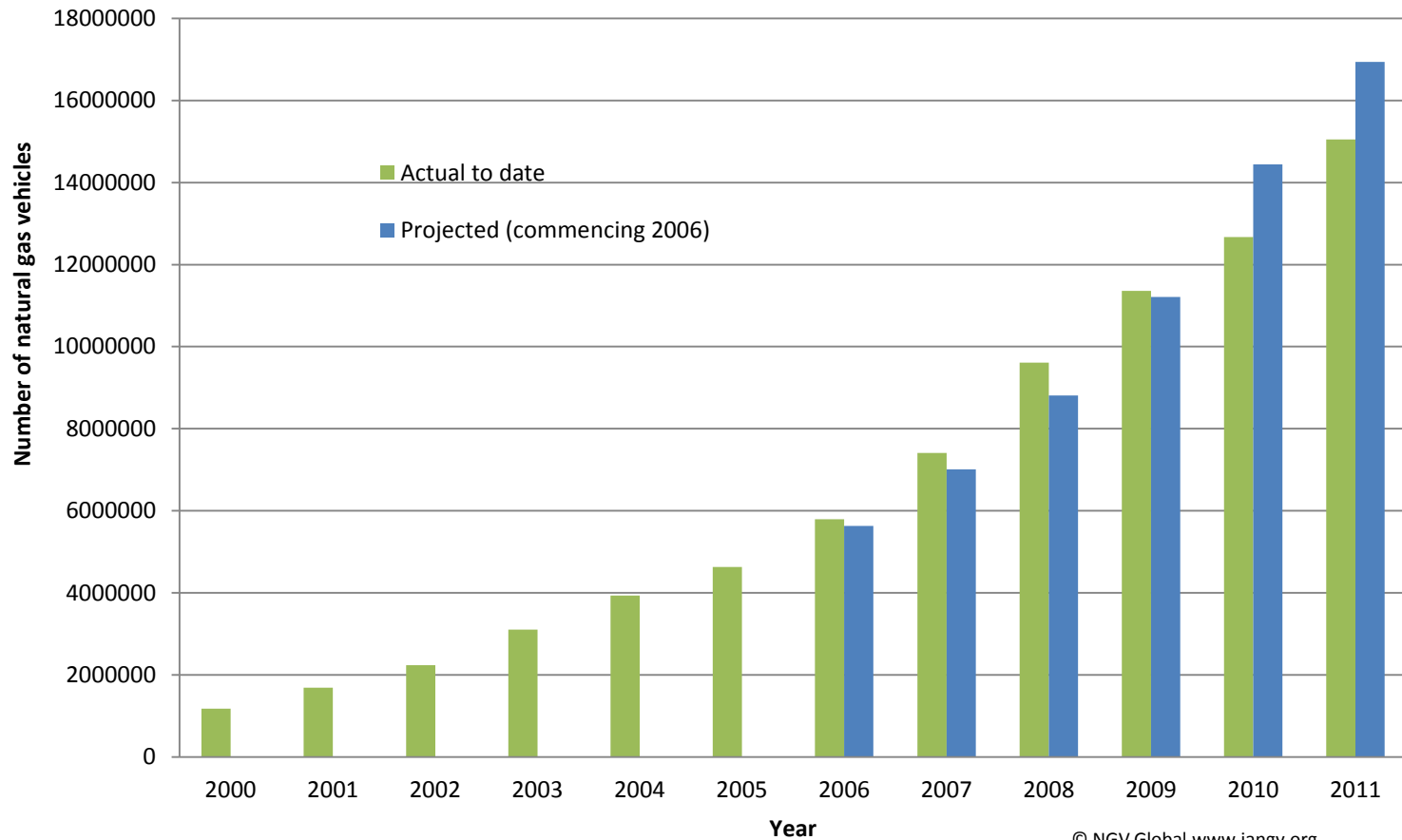


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Status and Growth

NGVs growth to 2011 vs projections



- Initial premium on vehicle or engine (conversion or OEM). Improving dramatically
- Refuelling infrastructure
 - Lack of
 - Increasing evidence of investment
- Shorter driving range than gasoline or diesel (due to lower energy density)
- ‘Comfort levels’ with gasoline and diesel (more so in OECD countries)
- Misperceptions about safety

Oil Supply Vulnerability Highlights Need to Step Up Natural Gas Vehicles Programs

July 1, 2011 – 7:51 pm | Source: Brett Jarman - NGV Global executive director



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"The cost of an NGV program is small compared to the cost of propping up the oil economy with 'emergency reserves'."

The uncertainty surrounding oil markets has been demonstrated by an intervention last week from the International Energy Agency (IEA) calling for the release of 60 million barrels of oil from emergency reserves of its member nations. The intervention is only the third in the 35 year history of the IEA and is intended to ameliorate oil supply after disruption caused by events in Libya. While some analysts have questioned the need for the stock release at this time, it reminds us that oil supplies, the lifeblood of most economies, are a fragile balancing act. The

release also follows a [report issued by the IEA](#) suggesting that we are entering a 'golden age' of natural gas. From an overall fuel supply perspective it highlights what the IEA refers to as "oil's twilight" and the need for new mainstream alternatives.

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Heavy-duty vehicles in existing light duty NGV markets

- Distorted Pricing Mechanisms in Non-OECD Markets
- Subsidised fuels (of all types) creating increasing burden on developing economies
- As vehicle ownership increases import and subsidy burden increases
- Even oil rich developing nations impacted by loss of opportunity cost (selling at lower price to domestic markets)

Argentina study

- Substitution in 2011 would have saved more than 500 million U\$S if replaced with imported natural gas
- Fiscal income for the government would have increased close to U\$S 100 Million
- Drastic reduction of subsidies to the Public Transport system

Marine - LNG Shipping

Staten Island Ferry to Run on LNG

August 18, 2011 – 6:55 am | LNG World News



A grant of \$2,340,000, from the US federal Department of Transportation's Ferry Boat Discretionary Program, will pay to convert one Staten Island ferryboat from the use of ultra-low diesel fuel to clean-burning liquefied natural gas (LNG), reports [LNG World News](#). The ferry service, now more than 100 years old, carries thousands of people across the Hudson River each day. The pilot program is designed to cut fuel costs for the ferry by nearly half, reduce harmful emissions by approximately 25% and take advantage of price-

stable domestic natural gas supply. [Read More »](#)

Ferry Feasibility Study Extols Benefits of LNG Fuel

August 26, 2011 – 10:59 am | Source: Marine Log | USA



A feasibility study carried out by The Glosten Associates for Washington State Ferries (WSF) has revealed that utilizing liquefied natural gas (LNG) as a fuel leads to significant economic and environmental benefits, reports [Marine Log](#). The Seattle-based Naval architectural and marine engineering firm built on Glosten's 2010 study investigating the use of LNG fuel in WSF ships, to determine the feasibility of converting WSF's 144-car ferry design to LNG propulsion. The conversion is described as both "technically feasible and cost effective, although technical and regulatory challenges

LNG Heralds New Era for Oil Shipments

December 8, 2010 – 5:18 pm | United Kingdom, London



34% less CO₂, 80% less NO_x, 96% less PM and SO_x

Det Norske Veritas AS (DNV) has introduced a new crude oil tanker concept that is fuelled by liquefied natural gas (LNG), has a hull shape that removes the need for ballast water and will almost eliminate local air pollution. This concept vessel also recovers hundreds of tons of cargo vapours on each voyage and represents a major step towards the new environmental era for the tanker shipping industry. The concept vessel, named *Triality*, has been developed through a DNV innovation project. [Read More »](#)

DNV's new VLCC concept - the 'Triality'
(Image © DNV/Watling Waves)

"K" Line to Develop Low-Emission LNG-Powered Car Carrier

July 28, 2011 – 3:05 pm | Source: Nikkei | Japan, Tokyo



Kawasaki Kisen Kaisha Ltd ("K" Line), a major shipping company headquartered in Tokyo, has unveiled plans to develop a new car carrier that uses liquefied natural gas (LNG) as fuel and is expected to cut carbon dioxide emissions 40% over vessels running on fuel oil, reports [Nikkei](#). The marine shipper will develop the carrier with Kawasaki Heavy Industries Ltd, supplier of the gas engines, and Det Norske Veritas (DNV), the Norwegian body that approves technological standards for ships.

Wärtsilä to Build 5th LNG-Powered Platform Supply Vessel for Eidesvik

December 20, 2010 – 12:47 am | Finland



Finland's Wärtsilä Corporation, a ship power solution provider, has received an order from Eidesvik Offshore for a Liquefied Natural Gas (LNG) Platform Supply Vessel (PSV) – Eidesvik's fifth LNG-powered PSV. Wärtsilä's scope of supply for the new PSV includes the dual-fuel main engines and generating sets, the electrical power and propulsion system, integrated automation, and the power management system. The vessel will be fitted for use in arctic waters with 'winterization' and de-icing solutions, and is to be built at

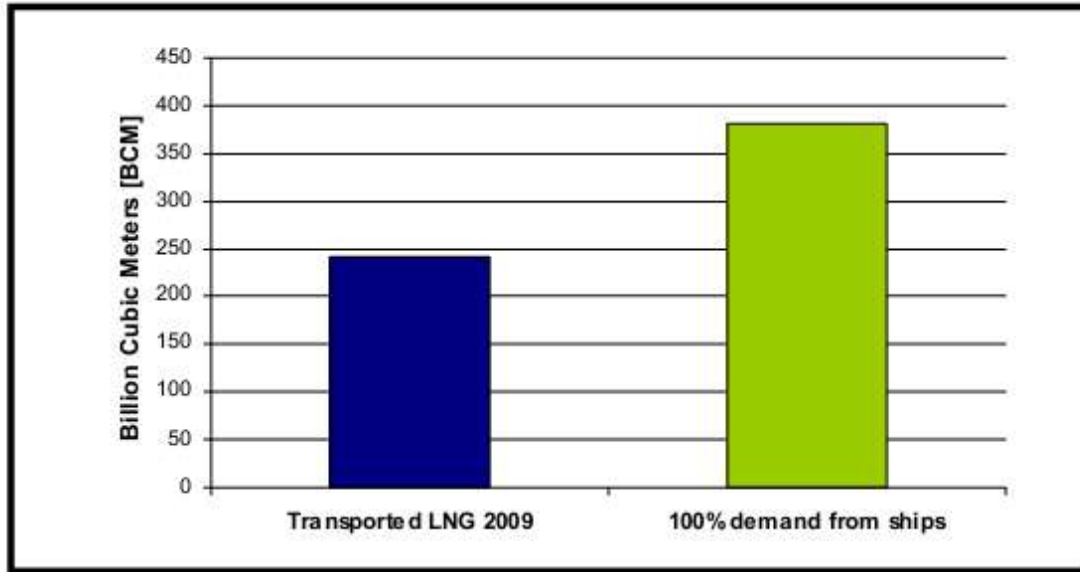
LNG Maritime Infrastructure Project Gets Underway

May 20, 2011 – 12:19 pm | Europe



The Danish Maritime Authority (DMA) is heading an EU project with the aim to make recommendations for creating a framework for the establishment of a maritime LNG infrastructure in the Baltic Sea, the North Sea and the English Channel. The framework, involving the fulfillment of a feasibility study and test of recommendations, is to be considered along two dimensions: a "hard" dimension with maritime LNG filling stations and a "soft" one with regulation,

Marine LNG Infrastructure



- World record
 - September 2011
 - Russia
 - Largest load by a single locomotive of **any** fuel type
 - 16,000 tonnes
 - 170 rail cars
- Potential fuel savings of millions of dollars for operators

LNG-Powered GT1 Locomotive Sets New World Record

September 14, 2011 – 9:15 am | Russia, Moscow



LNG-powered GT1 sets new world record.

The Russian-developed GT1-001 gas turbine-electric locomotive has successfully undergone further field tests in Moscow, in readiness for deployment on non-electrified freight-intensive areas of the railways. Hauling 16,000 tonnes in 170 rail cars, a new world record for a single prime mover with an internal combustion engine, the 300 tonne two-section GT1 combines a turbine and power unit with a separate section containing the 17 tonne liquefied natural gas (LNG) fuel tank. The engine can develop 8300 kW of power and when fully fuelled can drive the train 750 kms with a top speed of 100 km per hour.

Westport to Develop HD Natural Gas Technology for High-Horsepower Applications

February 28, 2011 – 9:42 am | Canada, Vancouver BC



Westport will test the high-hp LNG-fuelled engine in a CN locomotive.

Funding Launches Development Program with CN Rail and Gaz Métro

Westport Innovations Inc., an alternative fuel, low-emissions transportation technologies provider, has secured a funding commitment of CAD 2.3 million (USD 2.36m) from Sustainable Development Technology Canada (SDTC) to develop Westport HD technology for high-horsepower applications. Westport is proposing to significantly improve the cost structure for operators of high-horsepower equipment while achieving compliance with increasingly stringent emission

CNG Hybrids

- Best of both worlds, natural gas **and** hybrid
- Weight and cost premium vs diesel hybrids reduced due to reduced on-board fuel needs

Hyundai Hybridizes CNG Bus: 'Blue City'

January 31, 2011 – 10:19 pm | Republic of Korea



South Korea's Hyundai Motor Company has unveiled the nation's first compressed natural gas (CNG) hybrid bus, the 'Blue-City'. Fully developed in Korea, the bus delivers fuel efficiency with lower emissions by using a CNG engine and an electric motor. The hybrid bus is equipped with a G-CNG Engine that offers 177kW (240ps) and a 6-speed automated manual transmission, while its 60kW (82ps) electric motor and 3.8kWh lithium-polymer battery enable safe driving and

efficient charging. [Read More >](#)

Tata CNG-Electric Hybrid Buses Trialled by BEST

February 3, 2011 – 1:28 pm | Source: The Times of India | India, Mumbai



The city of Mumbai will have two Tata Motors CNG-electric hybrid buses on its streets this week, trialed by public transport provider Brihanmumbai Electric Supply and Transport Undertaking (BEST), reports [The Times of India](#). BEST will conduct a month-long trial and later order more depending on the feedback. The 55-seater low-floor buses, featuring wheelchair access and accommodation, are expected to be well received by commuters. [Read More >](#)

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Tata CNG-electric hybrid

Barcelona Trials CNG Hybrid Prototype Bus; Builds CNG Fleet

April 7, 2011 | Spain, Barcelona



Almost 50% of TMB's fleet of 1,080 buses will be CNG-powered by 2015

Transports Metropolitans de Barcelona (TMB) and Gas Natural Fenosa are trialing a new hybrid bus prototype with electric and natural gas engines, a pilot scheme under an agreement signed last April between TMB and Gas Natural Fenosa to reduce emissions from buses, with the aim of improving air quality in Barcelona and the metropolitan area. The prototype is to be incorporated progressively into the

- Very heavy fuel use
- Fewer weight restrictions
- Potential fuel savings of millions of dollars for operators

Dual-Fuel Mining Truck Demonstrated in U.S.

October 22, 2010 – 6:44 pm | USA, Harlan County



CAT 777

GFS Corp. Converts CAT 777C to 60% Liquefied Natural Gas


Gaseous Fuel Systems, Corporation (GFS), a manufacturer and seller of equipment that enables diesel engines to operate on both diesel and natural gas, has successfully demonstrated its dual-fuel conversion system for mining vehicles in the United States. The CAT 777 operating at a commercial coal production facility in Harlan County, Kentucky operates with more than 60% gas substitution for diesel without loss of performance. [Read More »](#)

XGMA Produces CNG-Powered Wheeled Front Loader

November 18, 2010 – 6:37 am | Source: KHL News | China



XGMA will be exhibiting a new wheeled loader powered by compressed natural gas (CNG), according to a low-detail report by [KHL News](#) that does not specify which locations. XGMA's CNG machine will apparently reduce fuel costs by about 50% compared with a similar diesel machine, and the company says it is also 40% quieter.

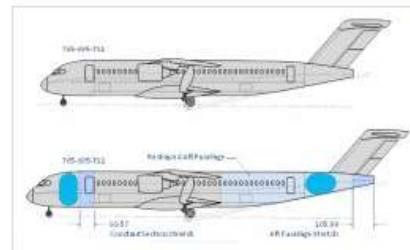
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Extreme Field Trial Commences for Biomethane Snowplough

- NASA N+4
- 2040-2050
timeframe

Boeing Delivers LNG-Fuelled Aircraft Concept to NASA

March 22, 2012 | Source: Aviation Week | USA



Boeing elongated design concept featuring possible LNG accommodation (in blue).

Will technological advances enable liquefied natural gas powered (LNG) aircraft to take to the skies by mid century, asked the US National Aeronautics and Space Administration (NASA). Boeing has addressed this question by submitting a concept study in February under NASA's N+4 generation airliners program for 2040-2050, reports [Aviation Week](#). Considered too immature a technology for the N+3 program, NASA believed LNG to be worthy of further investigation. Boeing's study says it can be done.

The LNG project is named 'SUGAR Freeze' – SUGAR is NASA's acronym for Subsonic Ultra Green Aircraft Research, a term inclusive of eco-fuel, fuel efficiency, reduced emissions and more efficient design. 'Freeze' refers to the cryogenic fuel storage.



**NGV GLOBAL
2012**
MEXICO CITY, MEXICO

Positioning NGVs for Evolving Transportation

**13th NGV Global Biennial
Conference and Exhibition**


November 6, 7, 8, 9 and 10
Banamex Center, Pavilion A
Mexico City

In Partnership with

**EXPO GNV
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*Natural Gas for Vehicles,
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The event

The 13th NGV Global Biennial Conference and Exhibition will take place from the 6th to the 10th of November in the City of Mexico. It will be an event of the International Association for Natural Gas Vehicles organized by NGV Communications Group. It will include exhibitions, conferences and technical visits held by the leading companies of the NGV global market. It will focus on Natural Gas Vehicle as an...

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