

26th World Gas Conference

1 – 5 June 2015, Paris, France



SG 5.3 on NGV

Natural Gas Vehicles: The Sustainable Road Towards a Clean Planet

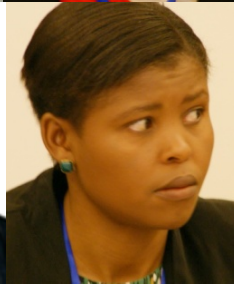
Presenting : Miriam DZAH-EKLO
ENGIE



Thematic session agenda

| Speaker | Presentation | Company |
|---------------------------------|---|-------------------------|
| Miriam Dzah-Eklo | Technical committee report | ENGIE |
| Dr Jeffrey Seisler | NGV Safety: Perceptions & Realities in Shaping New Markets | Clean Fuels Consulting |
| Mr Edmilson Moutinho Dos Santos | The local versus global in the environmental dilemma - Criticism to the ban of CNG on the public transportation system in a major metropolitan area | University Of Sao Paulo |
| Mrs Hala Chergui | LNG as a bunker fuel : a promising substitution for heavy fuel | Sonatrach |
| Mr Mattias Svensson | International CNG standardisation on par with other automotive fuel standards and the future diesel-like gas engine - Will they come true? | Energiforsk |
| Mrs Sandra Capela | Innovative exhaust post-treatment systems for a NGV application: SCR-CH ₄ – Nitrogen oxides reduction by the action of unburned methane | ENGIE |
| Mr Jason Stair | Development of an inexpensive free piston linear motor compressor for home refueling | GTI |

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- Chair: [Miriam DZAH-EKLO](#)
ENGIE, Research and Technologies division
Sustainable mobility senior project manager
France
- Vice-Chair: [David GRAEBE](#)
Gazprom Germany
Head of Gas for Transport
Germany



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- 21 countries represented:

Algeria, Argentina, Brasil, Croatie, Denmark, Egypt, Equatorial Guinea, France, Germany, Iran, Ivory Coast, Japan, Mozambique, Portugal, Russia, South Africa, South Korea, Tanzanie, Tunisia, USA, Venezuela.



NGV market overview

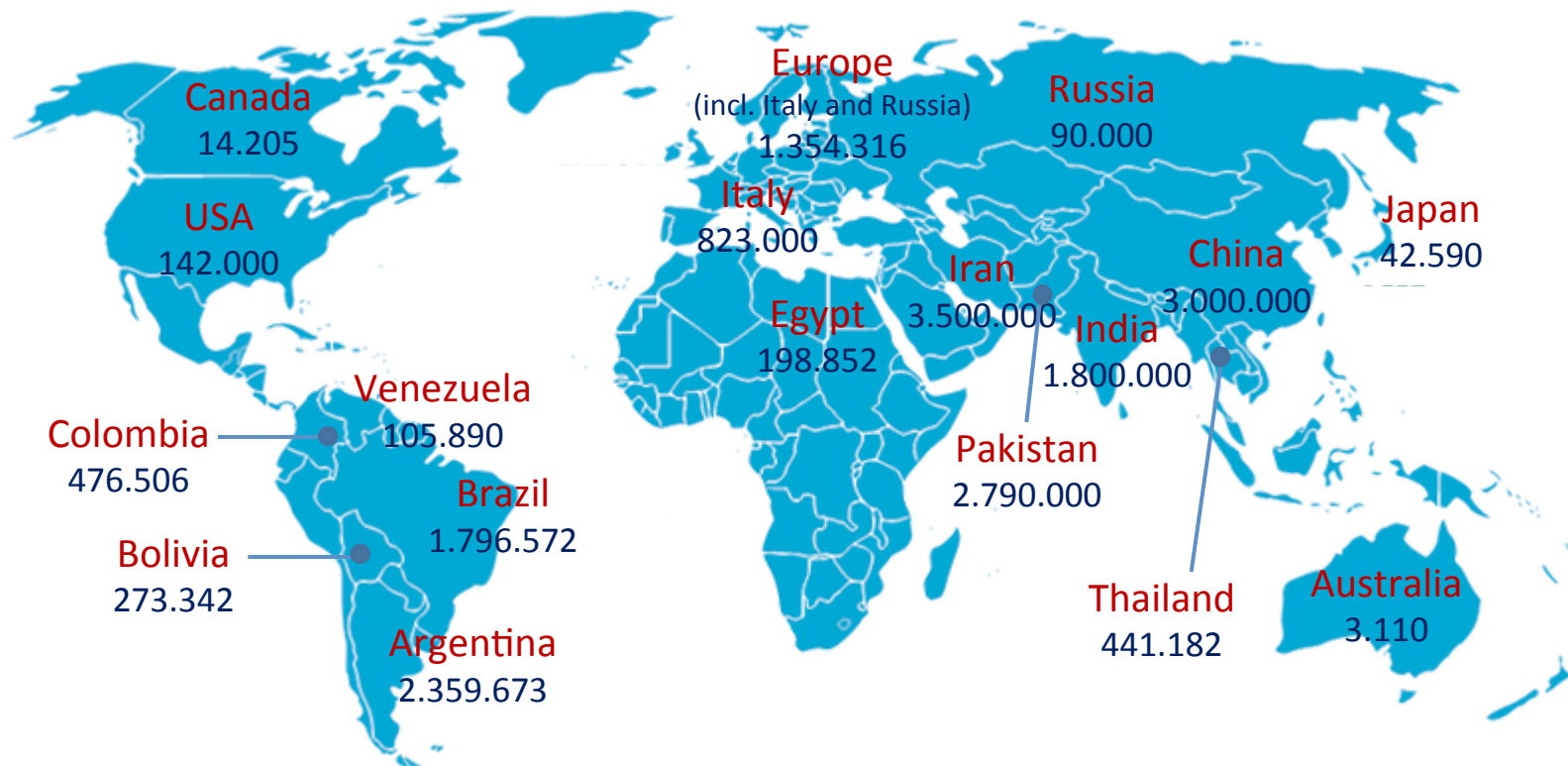


Report - SG 5.3 on NGV

Natural gas is an ideal, mature and available solution for clean transport

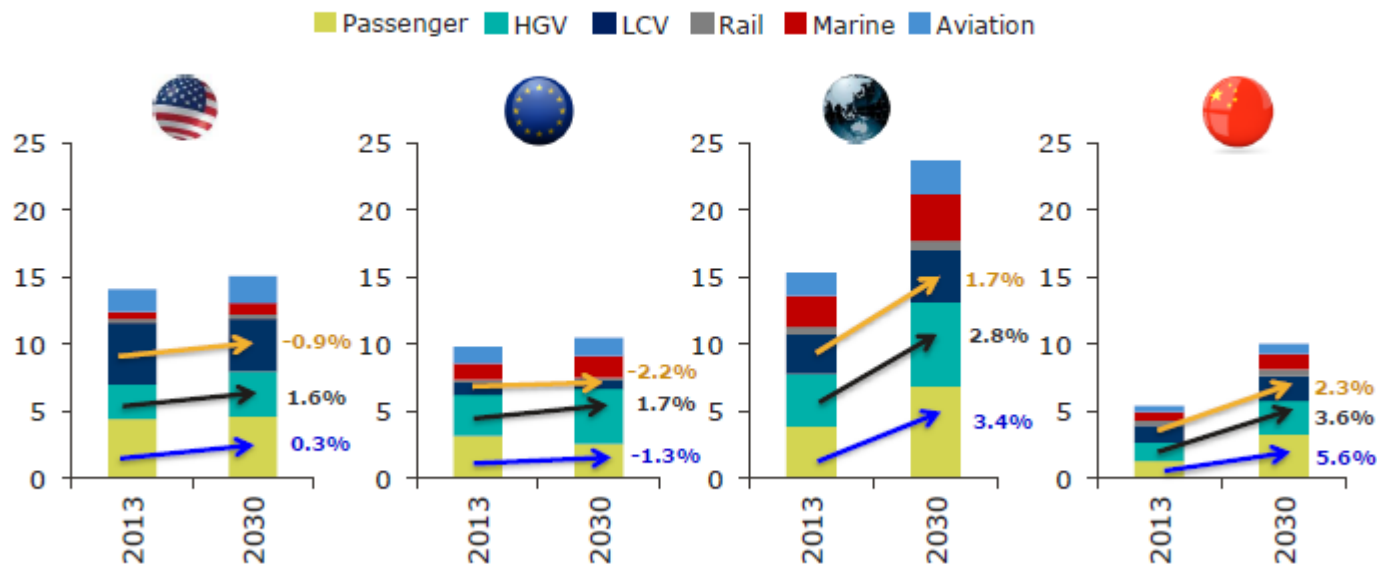
- **In the very short-term and short-term**, it could help reduce the road emissions (compressed form for distances under 400 km, liquefied form for distance beyond)
- **In the mid-term and long term**,
 - for the reduction of sulphur emission in maritime sector
 - its perfect miscibility with biomethane and hydrogen opens up avenues for new opportunities .

NGV market overview – vehicles population



NGV market overview

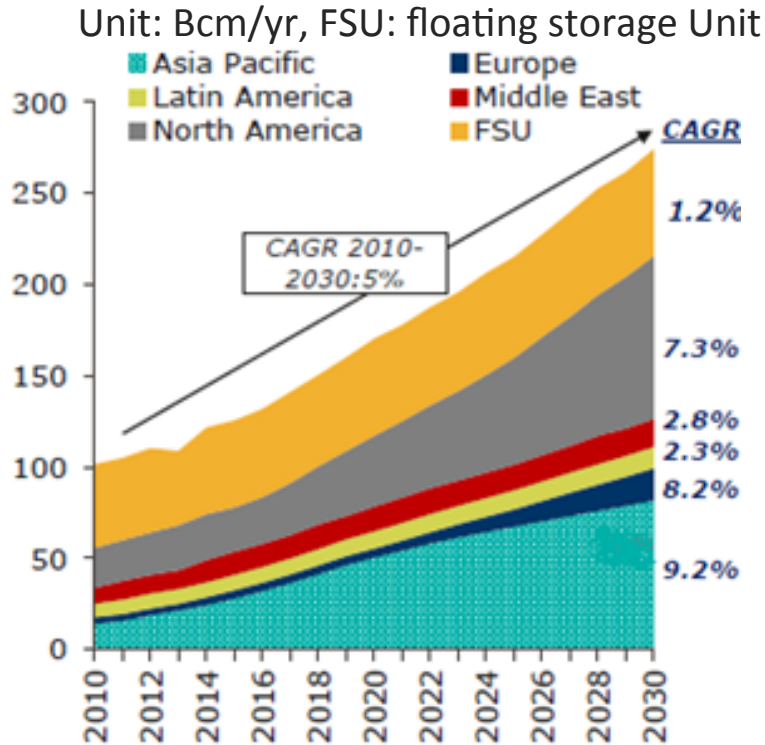
Unit: Mboe/d



Note: % here refers to CAGR

Total Energy demand in transport sector, 2013 vs 2030 (US vs EU vs APAC vs China)
Source: PETRONAS Strategic Research, IHS Energy

NGV market overview



Global gas demand for transport

Source: PETRONAS Strategic Research, Wood McKenzie

- The market should be driven by the demand for transport of APAC and particularly by China which NGVs population is expected to reach 11 millions by 2020.
- In Europe, in the context of energy transition, biomethane should support the development of natural gas for transport. In Sweden, 60% of the production of biomethane had been dedicated to transport in 2013 (869 over 1,493GWh).
- NGV growing market still needs the support of national and regional policies

NGV trends



CNG (<400km)

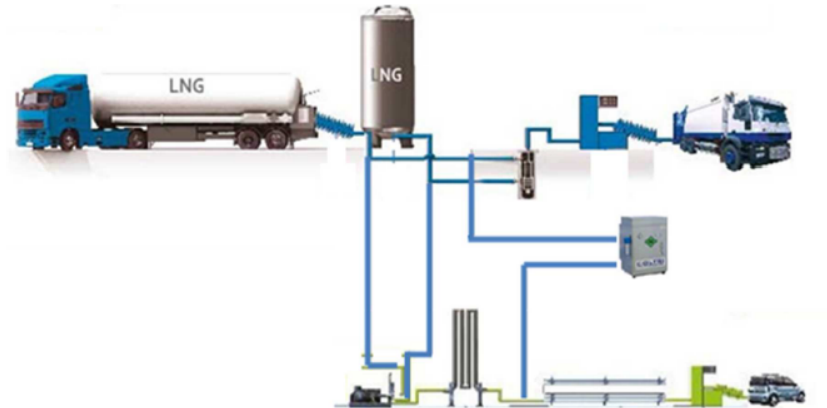


LNG (very long distance)

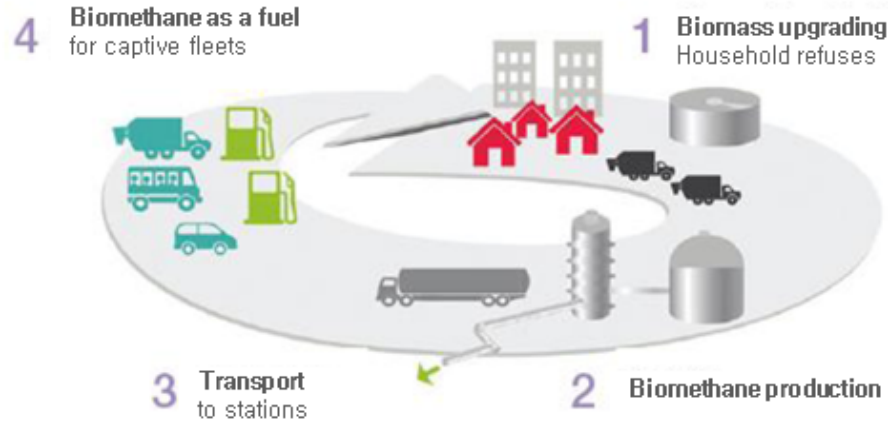
LNG (400 to 1000 km)

CNG is suitable for short and medium distance (< 400 km) while LNG is better for road and maritime, long and very long distance (< 400 km).

The mutualization of liquefied and compressed natural gas infrastructure (L-CNG stations) eases the development of a global alternative fuel offer.



NGV trends



Synergies between natural gas and **hydrogen** are being sought in order to reduce CAPEX, to increase internal combustion engines environmental performances (the GHRYD project, range-extenders).

Biomethane is a great opportunity for the greening of natural gas for vehicles. It encourages the circular economy and the respect of environment (waste recycling).

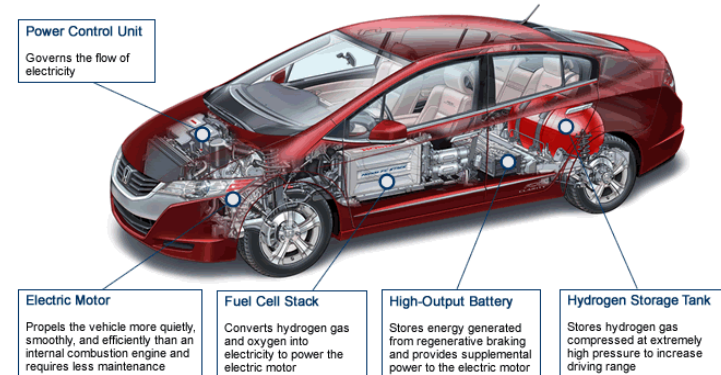


Photo courtesy of American Honda Motor Corp.

A growing NGVs range of offer



Audi A3 G-tron



Volkswagen Golf BlueMotion



Mercedes Class E 200



Mercedes Citaro



MAN Lion's City CNG



IVECO Urbanway EUROVI



IVECO Stralis GNV



SCANIA CP19H CNG



Renault trucks D Wide CNG
EURO VI

Report - SG 5.3 on NGV

NGV still suffering from

- **The high level of CAPEX** -> Innovation is needed in order to reduce the investments and find new solutions.
- **The weakness of NGVs offer** (first and second hand market) -> there is a growing range of vehicles.
- **The lack of support of public policies** in many regions of the world -> local and global actions are necessary to convince public authorities.