8 May, 2018

Dear Director-General Petriccione,

Heavy Duty transportation sector is expected to play an increasing role in a global economy where logistics will ask for a growing number of freight trade all across Europe. In parallel, public transport and coaches will have to complement more and more personnel mobility in city and inter-city trips to facilitate traffic and improve the fruition of cities. Natural gas is used in the HD sector since few decades: vehicle technologies are mature, affordable, safe and ready to provide a fast and strong contribution to the decarbonisation objective.

Natural Gas represents itself a "family" of fuels, from CNG (Compressed Natural Gas) to LNG (Liquid Natural Gas), including all the corresponding bio and synthetic options, that can be easily blended to natural gas or directly used on the vehicles. The later are already available on the market and used by several fleets of trucks and urban bus, fed today 100% with renewable gas, dramatically reducing the carbon impact of the fuel.

Ahead of the upcoming publication of a new regulation establishing CO_2 standards for HDV, we encourage the European Commission to deliver a balanced proposal which considers the followings:

- Natural Gas provide an **immediate benefit in terms of CO_2 reduction** thank to its composition, being the hydrocarbon fuel with the lowest Carbon content. Heavy Duty engines developed for using natural gas show high efficiencies and new technologies based on direct injection system have been developed to achieve diesel-like efficiency values.

- **Renewable gas**, issued from waste biomass, organic material conversion or methanation processes, is a strong accelerator to the decarbonisation process. GHG emissions reduction up to 95% can be achieved and renewable gas can be directly used on the vehicles or mixed in the grid without any cost impact on the system (distribution and vehicles).

- Over the GHG performance, Natural Gas is the cleanest fuel able to guarantee all over the operating conditions the lowest particulates level, aromatic free and near-to-zero NMHC (Non Methanic Hydrocarbons) as well as dramatically reduced NOx emissions. This makes

Natural Gas the right fuel to quickly **answer air quality issues**, particularly in the urban areas, preserving the environment in the Low Emission Zones.

- It is fundamental to consider other specificities of the sector, where fuel cost represents approximately 30% of the operating costs and most of the operators are composed by small and medium enterprises. Over the **Total Cost of Ownership** – TCO – and the environmental performance, load capacity, vehicle range, reliability and durability of the technologies are also fundamental parameters to be taken into account when comparing technologies.

- While maintaining the CO_2 emissions tailpipe calculation based on the VECTO tool to determine the **type approval** figure of the vehicle, add in the **monitoring phase** a mechanism that can reward technologies, such as renewable gas that, already today, sustain a carbon neutral transport system thanks to the carbon emissions saved during the production of the fuel. Certification of the renewable gas quantity dedicated to the transport sector can be easily tracked at Member State level to award truck/bus manufacturers with CO_2 credits.

This would guarantee a technology neutral approach, leaving different powertrain and fuel solutions provide their own contribution to the final goal on the legislation.

Kind regards,

Andrea Gerini
Secretary General
NGVA Europe

Susanna Pfluger
Secretary General
European Biogas Association

Boyana Achowski
Secretary General
Gas Infrastructure Europe

About

The **Natural & bio Gas Vehicle Association (NGVA Europe)** is a European association that promotes the use of natural and renewable gas as a fuel in vehicles and ships. Founded in 2008, its 140 members from 31 countries include companies and national associations from across the entire gas and vehicle manufacturing chain, including component manufacturers, gas suppliers and gas distributors.

European Biogas Association (EBA) was founded in 2009 as a Belgium non-profit organization aiming at promoting sustainable biogas and biomethane production and use from anaerobic digestion (AD) and biomass gasification in Europe. EBA's membership comprises currently national biogas and biomethane associations, institutes and companies from 26 countries all across Europe.

Gas Infrastructure Europe (GIE) is an association representing the sole interest of the infrastructure industry in the natural gas business such as Transmission System Operators, Storage System Operators and LNG Terminal Operators. GIE has currently 70 members in 25 European countries.

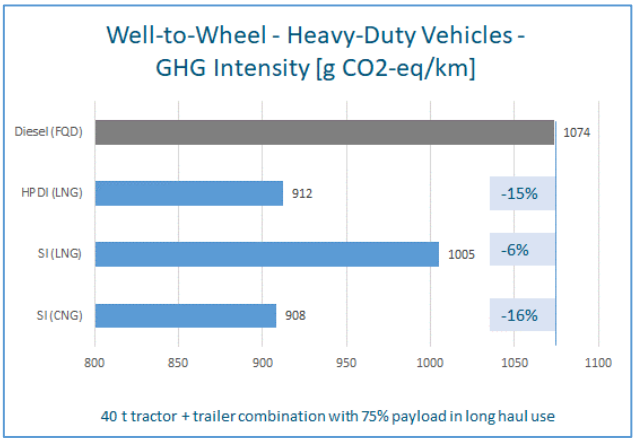
Annex I - Carbon reduction

On top of the continuous engines and powertrains technological evolution, the use of natural gas results in an immediate reduction of CO_2 tailpipe emissions, up to 15% compared to Diesel, thanks to the combination of a high efficient engine and the fuel properties, as Low Carbon fuel.

Nevertheless, CO_2 emissions have to be also assessed looking to the in-use emissions

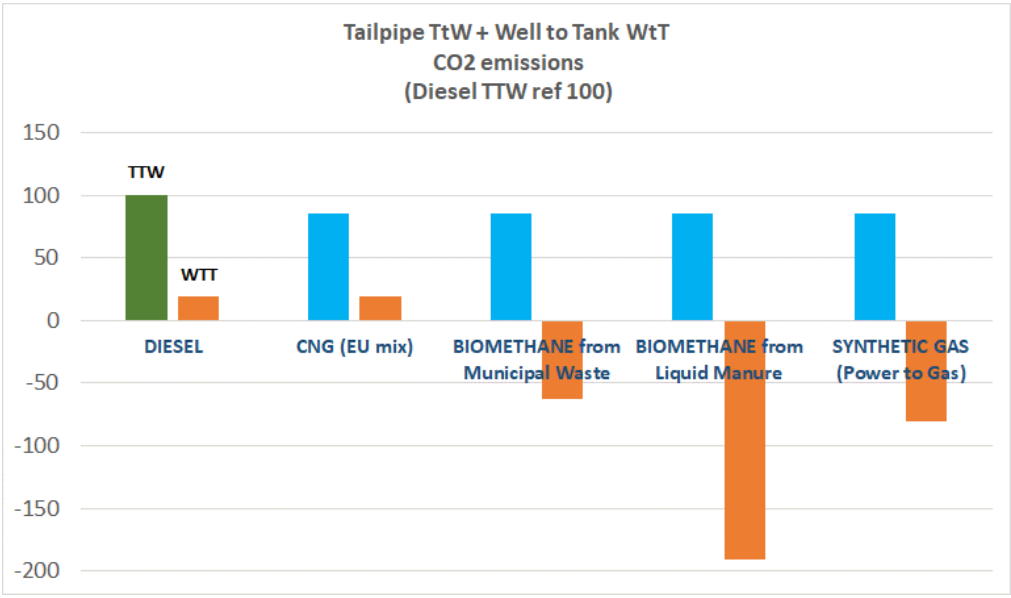
in order to include also the contribution from the fuel production and distribution. This results fundamental in the case of alternative fuels and/or energy carriers where GHG emissions from the production process and distribution can dramatically influence the overall result in terms of real decarbonisation.

Figure 1 shows the result from a recent study on the GHG footprint from the natural gas used as transport fuel[1]; results show a benefit in terms of GHG Well-to-Wheel reduction up to 16% compared to Diesel.



It is also important that the analysis has considered all the GHG emission sources, including CH_4 and N_2O, on both Well-to-Tank and Tank-to-Wheel side.

But figures change dramatically when considering biomethane and synthetic methane: from the so called Well to Wheel perspective, reductions vs Diesel and conventional natural gas are as shown in *Figure 2*, where both contributions are represented.



[1] Greenhouse Gas Intensity of Natural Gas – *thinkstep* – May 2017 – www.ngvemissionsstudy.eu

Figure 2 – TTW and WTT contributions for a HDV compared to Diesel

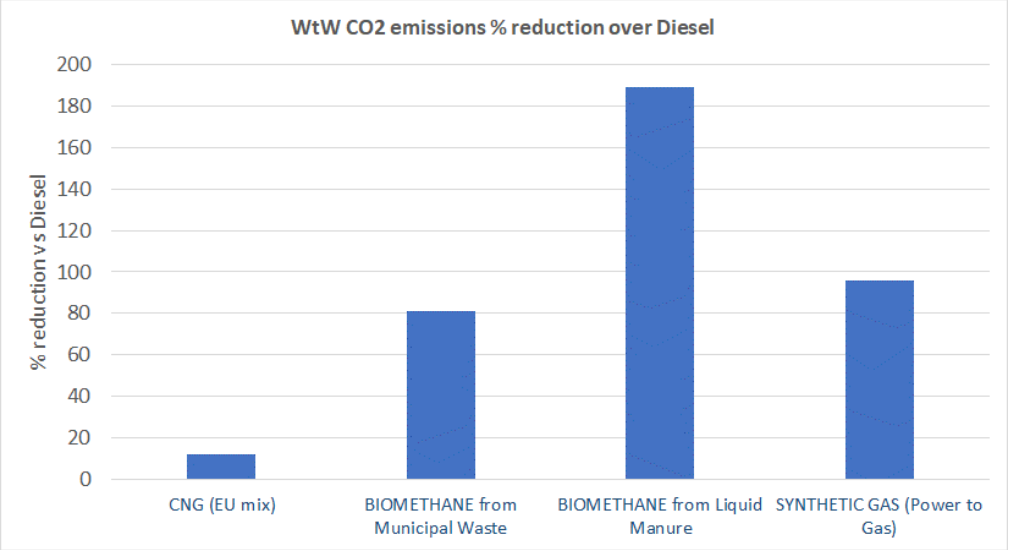


Figure 3 – WtW CO2 emissions saving for a HDV vs Diesel

Figure 3 shows an important benefit related to municipal waste conversion and Synthetic Gas delivering CO_2 reduction rates in the range from 80% to 95% compared to Diesel. Looking to biomethane production from liquid manure residues, the methane capturing effect provide even an overall negative balance, indicating that the conversion from waste to energy provide much benefit on GHG emissions as a high amount of methane is captured from the manure avoiding its effect in the atmosphere.

In all conditions, **carbon neutrality running with renewable gas can be achieved, already today, as natural gas vehicles are ready to run full renewable**.

Annex II – Air Quality

With recent advances in engine technology, natural gas provides close-to-zero tail pipe emission levels. This includes ultra-low particulate levels and very low NOx and NMHC emissions, even in the most severe real driving conditions.

In passenger car applications, the benefits of natural gas have been demonstrated in a recent experimental assessment (EMPA – NFP70 project – Renewable Methane for Transport and Mobility[2]) run on an Euro6b medium-class vehicle. Comparisons between CNG and gasoline emissions were evaluated over both the current NEDC homologation driving cycle on a test stand and the new WLTC driving cycle on the road, which is entered into effect in September 2017 to

[2] http://www.nfp70.ch/en/projects/transport-and-mobility/methane-for-transport-and-mobility

provide an additional indication about fuel economy and CO2 performance under “realistic” driving conditions. The results show that CNG generates “by nature” ten times less NMHC than gasoline, that are important precursors of ozone formation. When lower NOx and NMHC emissions are looked at in combination, the ground level Ozone promoters, which are responsible for respiratory tract diseases, are halved over the NEDC cycle when CNG is compared to gasoline and merely a fourth over the WLTC procedure.

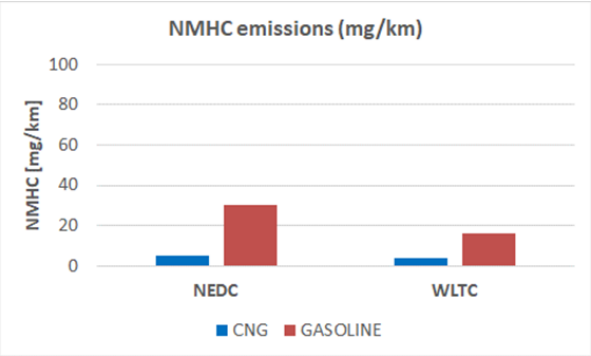


Figure 4 NMHC emissions

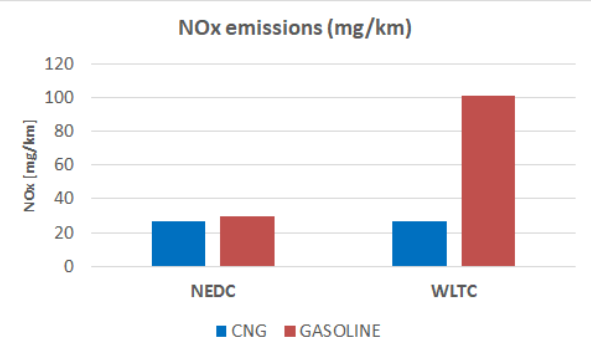


Figure 5 NOx emissions

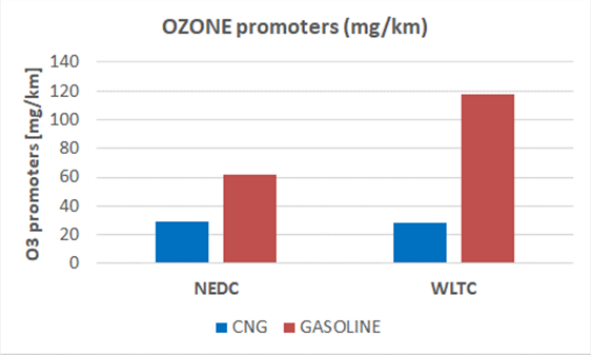


Figure 5 Ozone promoters

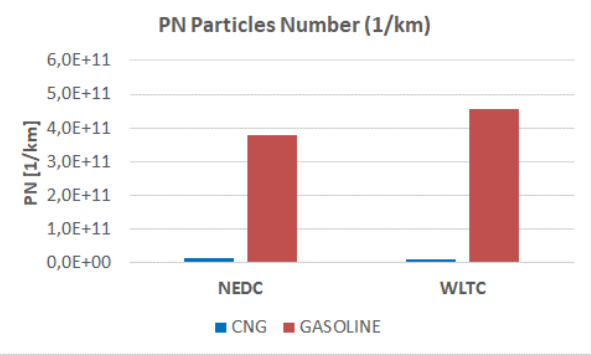


Figure 6 Particles Numbers

The gaseous nature of the fuel results in ultra-low particulate generation: small particles are generated mainly due to the lubricant oil consumption. When compared to the gasoline engine (Direct Injection system in the considered case), particle emissions from CNG are negligible.

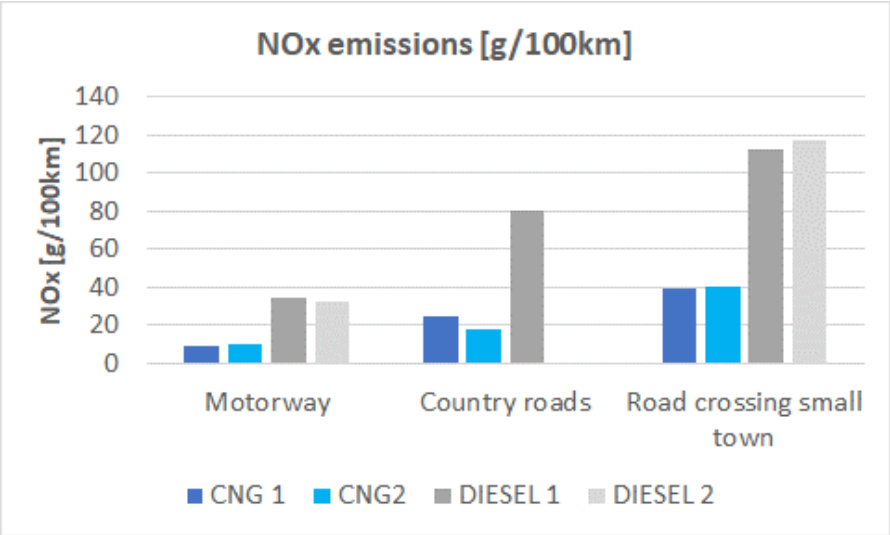


Figure 7 NOX emissions HDV

Comparing to diesel engines, typically in the Heavy Duty sector, natural gas combustion in CNG dedicated engines provides better NOx emissions compared to Diesel. The "Equilibre" project [www.projetequilibre.fr/] measured emissions performance under real driving conditions using PEMS (Portable Emissions Measurement System) on equivalent Diesel and CNG trucks. Under a variety of driving conditions, NOx emissions from natural gas engines were shown to be substantially lower than diesel in all cases.

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