

Commission's Communication COM (2009) 279/4, June 2009
**A sustainable future for transport: Towards an integrated,
Technology-led and user friendly system**

This is the NGVA Europe's contribution to the public consultation closing on September 30, 2009.

NGVA Europe, with headquarters in Madrid, is the only association representing the interests of the entire European NGV industry with relation to the use of natural gas and biomethane in transport. Information on our organization and its activities can be found at www.ngvaeurope.eu

NGVA Europe fully supports the preparation of a White Paper on the future of road transport in Europe and we are happy to make a contribution to the debate. We will in this reply focus on a number of successful experiences of the use of natural gas and biomethane in the heavy urban transport sector (garbage collection and buses), in which the great advantages of the reduced regulated emissions are more appreciated because of the congested areas.

We will present some simple calculations demonstrating the huge potential of reducing oil dependence through the possibility of declaring natural gas/biomethane as the *European recommended urban fuel*. A big improvement of the air quality, and significant reductions of oil dependence, can be achieved without first having to provide a wide gas distribution infrastructure, by the simple reason that both urban buses and garbage trucks always belong to large fleets with own filling stations.

The NGV fleet development within the EU is very different from country to country: Italy, Germany, Austria, the Czech Republic, Slovakia, the Netherlands, and Sweden have a reasonably good coverage of their territories with public CNG filling stations allowing the development of the private use of light duty vehicles powered by natural gas and biomethane. Sweden is the champion in the use of biomethane, which is now accounting for 65 % of all the methane gas used in some 20,000 NGVs. In Italy some 7 % of all new passenger cars sold are NGVs, and Sweden is close to a 5 % share.

France and Spain, on the other hand, have practically no public network of NG filling stations, but both countries have pushed the use of this fuel in urban trucks and buses, obtaining a very important improvement of the air in the cities.

An interesting comparison between an average private car and an urban truck or bus is this: **The power of a bus/truck is about 3 times the power of a car (270-300 hp against 90-110 hp). On the other hand a private car is on average used about 2 hours per day, while an urban truck or bus runs between 2 and 3 working shifts, 16 to 20 hours, that is 8 to 10 times higher use. The consequence is that an urban heavy duty vehicle uses as much fuel as 25 to 30 private cars.**

This simple comparison has to be considered when thinking of the quickest way of replacing oil derived fuels, without having to depend on the establishment of an adequate public CNG refueling infrastructure.

The number of urban buses and refuse trucks is already significant in different cities in Europe, with some European Champions like Madrid where the whole refuse fleet (650 trucks) are running on CNG from 2004. The Madrid bus company, EMT, will in parallel by the end of 2010 have 35% of their fleet (700 urban buses, out of 2.000) also running on CNG, having by now 430 units already in service.

The City of Madrid did also during 2008 open the **biggest in the world** plant for biomethane produced from landfill gas. The plant has the capacity to fuel up to 1.000 heavy duty vehicles annually.

Presently, the 27 EU countries have a total running park of 70.000 urban buses (Source UITP). From this figure, and without dedicated statistics for urban refuse trucks, we estimate an additional number of some 20.000 refuse trucks (30% of the bus number). All this makes a total of 90.000 heavy vehicles working permanently in an urban environment. The total diesel fuel consumption of this urban park is something like 2.000.000 tonnes per year (assuming 50.000 km/year and 55 lit/100km).

The development of the CNG running park in a country where there is not yet an adequate public CNG distribution network is really difficult if we think in terms of private cars. But there are other possibilities based on the experiences of the cities that are already using CNG for urban heavy vehicles.

We can imagine the potential of replacing all the heavy urban diesel vehicles with CNG vehicles with the following interesting effects:

- Replacement of a very important quantity (2.000.000 ton) of oil derived fuel
- Concentration of the use of an alternative fuel precisely in the more powerful and more intensively used vehicles
- Due to the fact that all the vehicles belong to big fleets, with their own filling stations, the decision is not linked to the public CNG stations network
- The concentration of the use of CNG in big cities will optimize the advantages of the reduced emissions, particularly NO_x and particulates, precisely in the congested areas where the pollution problems are more pronounced
- Significant reductions of the noise emitted by the vehicles, again where this advantage will be more appreciated
- Easy possibility of use of renewable biomethane, coming from landfills or other AD plants treating various organic waste resources
- CNG urban fleets open the way for future use of Methane/Hydrogen mixtures (so called "Hythane") using the well known technology of CNG vehicles

In parallel with above suggested short term measures, with an immediate large impact in terms of environmental benefits and reduced oil dependence, our association, of course, also supports the steady development of an adequate public CNG refueling infrastructure right across Europe. If all European countries were to reach the new car registration market shares already achieved in Italy and Sweden, NGVs could by 2020 have a total car market share above 5 % (thus verifying the statement made in the Alternative Fuel Study presented by the EU in 2003).

Concerning trucks used in long distance goods haulage there is also a potential for the introduction of vehicles using gas stored in the form of LNG which has a three times higher energy density than CNG (roughly on par with LPG, ethanol and DME) and with the possibility to offer an adequate operating range on a full tank. LNG filling stations already exist in the UK and Spain, and new stations are already being planned in Sweden, Germany and the Netherlands.

LNG should be interpreted both as liquefied natural gas and liquefied biomethane. The Swedish City of Lidingö is right now building a large plant for production of liquefied biomethane which will be delivered to L-CNG filling stations (see below).

The supply of LNG for refueling of heavy duty vehicles running along the main European highways also opens the possibility to introduce so called L-CNG stations where gas is stored as LNG, but where the gas can be distributed both as LNG (pumped from storage to vehicle) or CNG (pumped under high pressure from storage to a gasifier where it is immediately converted to CNG when exposed to ambient temperatures). The first European station using this technology opened in Sundsvall, Sweden, in July this year. These stations would be supplied via LNG tank trailers and thus need not be located close to a natural gas pipeline. The use of the L-CNG station concept may in the future help to provide good NG refueling opportunities at suitable locations along the main European highways, providing fuel both for light and heavy duty vehicles.

Although NGVA Europe has so far mainly focused on NG/biomethane used for road transports another interesting opportunity is the use of LNG in ships. Norway is world leading in this regard and already has sixteen ships (car/passenger ferries, passenger ferries, supply vessels, coast guard vessels, and small coastal LNG tankers) running on LNG. Together these sixteen ships consume about 60.000 tonnes of LNG annually. New demands from 2015 concerning bunker fuel quality will make the LNG alternative increasingly attractive. The Swedish City of Gothenburg only last week presented a new project, run by Göteborg Energi and Norwegian Gasnor, aiming to have an LNG bunkering terminal in the Port of Gothenburg ready by 2013.

LNG also has the potential to replace diesel used in locomotives used in not electrified rail traffic. There are examples in various countries around the world (e.g. Sweden, Germany, Russia, Iran, and Pakistan).

To make the story complete the Russians already some ten years ago demonstrated the use of LNG as a possible fuel for jet airliners.

All in all NG/biomethane offers excellent opportunities for the replacement of conventional oil based fuels meaning improved security of supply, reduced air quality problems, reduced greenhouse gas emissions, and unproblematic use of the biofuel version – biomethane. Chemically there is no difference between natural gas and biomethane meaning that an engine runs equally well on either fuels or any blend of the two. Biomethane can also be produced from all kinds of organic matter, either via anaerobic digestion, or via gasification (lignocellulosic feedstock). The Swedish government on September 28 announced a 222 million SEK funding of a new project aiming to produce biomethane via gasification of low quality forest waste.

These days various hybrid solutions are high on the political agenda. It is generally accepted that the hybrid technology provides the best pay-off in vehicles operated in city driving conditions with stop and go traffic. A 30 % fuel saving potential is often mentioned. We would like to point out that the hybridization of a CNG bus or refuse truck used in an urban environment is economically more attractive than the hybridization of a conventionally fueled vehicle. The simple reason is that the fuel storage (the most expensive part of the added cost for a CNG vehicle) can be reduced by 30 %. Reducing a diesel tank volume by 30 % gives no similar saving. Secondly, clever use of recovered braking energy, at low engine loads where an Otto engine has lower efficiency than a compression ignition engine, will also give an extra boost concerning fuel saved via the hybridization.

NGVA Europe
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