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Retrofitting, Stricter Vehicle Emission Standards and Clean Fuels Package

Strategic Initiative for an Integrated Approach to Reduce Vehicle Emissions

Executive Summary

The compliance with European air quality standards to protect citizens' health and the need to ensure the necessary access of people and goods to urban areas require a stringent technical strategy and a consistent air quality policy complementary to local planning efforts. This strategy has to bring in line activities with short-term effects and, moreover, those activities that, in the time ahead, improve the situation on a European level. Besides, this strategy also aims at reducing greenhouse gases and the dependence on mineral oil.

Therefore, cities strongly believe that it is time to be emphatic in the support of a strategic technological initiative in favour of an integrated approach in the context of the Green Paper on Urban Transport. This strategic approach consists of three elements:

1. the retrofitting of the existing fleet

The time lag between the introduction of stricter emission standards and a significant decrease in inner city PM 10 and NO₂ concentrations is 10 years and more. This period has to be shortened by a broad retrofitting action. Retrofitting of light and heavy duty diesel vehicles has the highest priority. The European policy so far is focussing on newly registered vehicles. An extended European policy is now imperative to take effective measures that, for the first time, cope with the existing fleet by harmonised certification of retrofitting systems, harmonised labelling of vehicles according to their emission standard and harmonised traffic signs for environmental zones.

2. stricter emission standards for new vehicles with state-of-the-art technology

The proposed Euro 5 standards applicable in 2010 to passenger cars and light duty commercial vehicles are falling short of what is technically feasible. They are more than four times higher when compared with those in the United States where they will have to be met as early as in 2007. The Euro 6 standards proposed for 2014 are too late in order to assist in complying with the air quality standards even by the relaxed deadlines set out in the revised air quality directive. And what is more, heavy duty diesel vehicles are major contributors of exhaust emissions, but European cities still do not see much progress with regard to updating emission standards.

3. a preference for clean fuels available today

To a certain extent, biofuels can substitute fuels from mineral oil. For cities, a significant potential for a reduction in PM and NO_x emissions is paramount when it comes to selecting alternative fuels. Only a few biofuels, i.e. biogas, are among them.

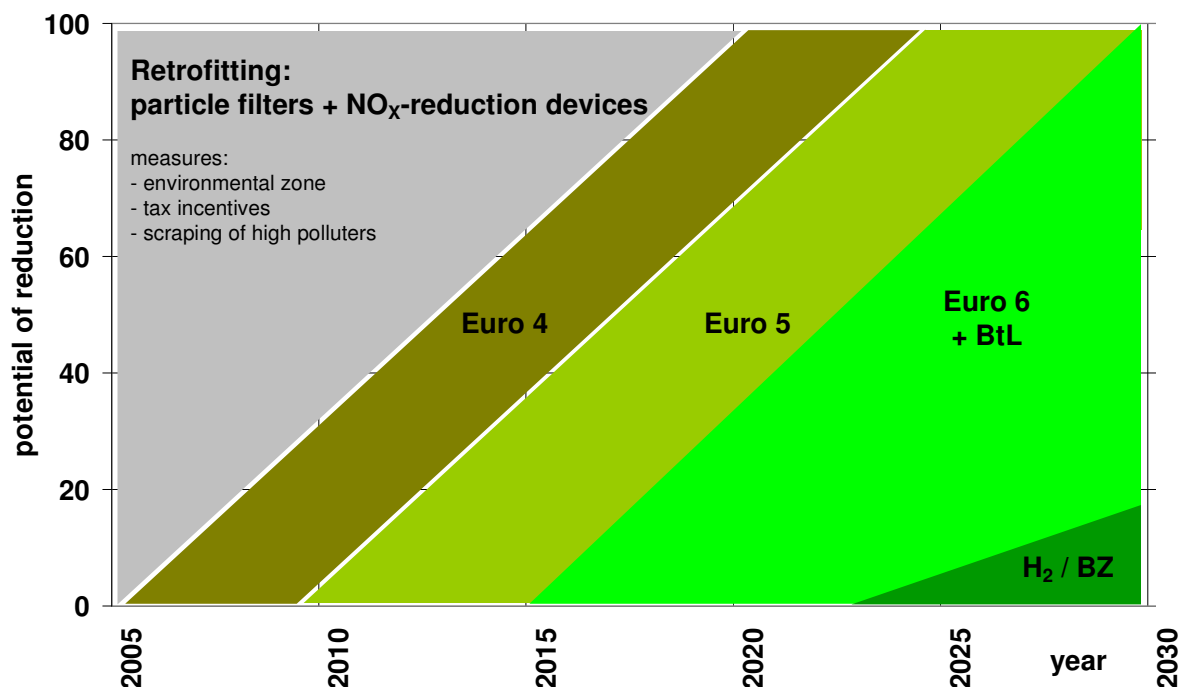
CNG mixed with biogas can form a bridge to a future hydrogen-based transport system. The technology of CNG power train and of CNG filling stations is well known, and its costs can be calculated without economic risks. No other clean fuel combines a comparable potential for halting environmental pollution with a better cost efficiency. The infrastructure of an area-wide gas grid exists in many European countries, and the introduction period is short. Adequate political activities are requisite to get through two decades and more.

Air Quality Standards and Emissions of Motorised Vehicles – a Challenge to Cities

The European air quality standards to protect citizens’ health pose a big challenge to cities. Many cities are unable to meet standards for particulate matters (PM 10) and nitrogen dioxide (NO₂) in the near future despite stricter emission standards. Motorised road traffic will continue to be the major polluter. Calculations indicate that there is a need for further emission reduction even in view of a shrinking volume of road traffic as a potential consequence of demographic and economic changes, i.e. in Berlin after a long time of continuous growth the volume of road traffic stopped growing in 2004.

Many local measures such as the retrofitting of the urban bus fleet with particle filters and the introduction of large CNG fleets as well as planning and management policies to reduce road traffic have been and will be undertaken in cities.

However, the compliance with present and future European air quality standards and the need to ensure the necessary access of people and goods to urban areas to maintain vital economic activities require a stringent technical strategy and a consistent air quality policy complementary to local planning efforts. This strategy has to bring in line activities with short-term effects and, moreover, those activities that, in the time ahead, improve the situation on a European level to significantly decrease pollutant emissions at the source. Besides, this strategy also aims at reducing greenhouse gases and the dependence on mineral oil. Experiences made with the introduction of unleaded gasoline and the catalyst technology help to find ways of innovation and political action.



Reduction potential of vehicle-related measures in reducing urban concentrations of fine particles and nitrogen oxides between 2005 and 2030 – principle presentation for the fleet of passenger cars and light duty vehicles.

Therefore, cities strongly believe that it is time to be emphatic in the support of a strategic technological initiative in favour of an integrated approach in the context of the Green Paper on Urban Transport. This strategic approach consists of three elements: the retrofitting of the existing fleet, stricter emission standards for new vehicles with state-of-the-art technology and a preference for clean fuels available today (see graph attached).

1. Stricter Emission Standards Improve Air Quality in the Future – Retrofitting Improves it Today

Vehicles are in use about 15 years. However, some parts of the fleet such as city busses, refuse collection vehicles and taxis even longer, which have a greater share than the average in inner city air pollution. As a result, the time lag is 10 years and more between the introduction of stricter emission standards and a significant decrease in inner city PM 10 and NO₂ concentrations deriving from vehicles. To protect citizens' health and to comply with air quality standards this period has to be shortened by a broad retrofitting action. Due to its overriding contribution and its high potential for a reduction in PM 10 and NO₂ concentrations retrofitting of light and heavy duty diesel vehicles has a high priority.

Retrofitting with technical devices will be technically solved by innovative European car manufacturers and suppliers. Unfortunately up to now, there have been only small national markets for retrofitting passenger cars and heavy duty vehicles with particle traps, and there is an even smaller market for retrofitting systems reducing NO_x emissions, as up to now, no European regulations have been established for the existing fleet. The European policy so far is focussing on emission standards applicable to newly registered vehicles and on regulations for the quality of fuels. An extended European policy is now imperative for European cities to take effective measures that, for the first time, cope with the existing fleet. In addition this policy has to harmonise several national activities, among them the most important elements as follows:

- Harmonised certification of retrofitting systems reduces costs for manufacturers and consumers. Harmonised regulations accompanied by legal and fiscal incentives will create reliable conditions for the planning and investment of car manufacturers and their suppliers. Car manufacturers need clear prospects to see a European-wide market to justify investment in development, production and services.
- Environmental zones will help to improve the air quality and to create a market for retrofitting. For interoperability harmonised labelling of vehicles according to their emission standard, harmonised traffic signs for environmental zones showing permissible emission standards to enter the zone are needed.

Cities facing severe problems of air quality may need to take additional measures. High-emission polluters have to be phased out and replaced by a less polluting fleet.

2. Stricter Emission Standards are needed and technically feasible

In December 2005, the EU Commission proposed Euro 5 standards applicable to passenger cars and light duty commercial vehicles. Whereas the proposed limits for particulate matter emissions from diesel vehicles are stringent enough to ensure the use of the state-of-the-art reduction technology, limits for nitrogen oxides, proposed for the year 2010, are rather

disappointing and, by far, are falling short of what is technically feasible. Moreover, they merely reflect a 20% progress in emission control compared to the existing Euro 4 standards, which were adopted already in 1998. They are more than four times higher when compared with those in the United States where they will have to be met as early as in 2007.

In December 2006, the European Parliament voted for a two-stage approach. Euro 5 standards are proposed to take effect in 2010 and Euro 6 standards in 2014. The Euro 6 proposal would lead to a sufficient NO_x reduction, but the enforcement date is too late in order to assist in complying with the air quality standards even by the relaxed deadlines set out in the revised air quality directive. The present situation, sadly, reminds of lengthy discussions held on the introduction of the catalyst converter for petrol cars twenty years ago. Shall European cities really live to see the same situation again with ecofriendly vehicles being exported to the USA and cars of high pollution for Europe?

And what is more, heavy duty commercial vehicles are major contributors of exhaust emissions, but European cities still do not see much progress with regard to updating emission standards. Of course, manufacturers always put forward the high cost of new technology to decrease pollutant emissions. But restricting urban road traffic to decrease pollution is probably less cost effective.

3. Biofuels Reduce Climate Impacts – Clean Fuels Protect Citizens' Health

To a certain extent, biofuels can substitute fuels from mineral oil. They can reduce greenhouse gases and risks induced by the dependence on mineral oil. Their ecological balances have to be examined and effects to be limited by strict regulations to prevent negative environmental impacts or other kinds of risks or at other places caused by the substitution.

Within the next years, cities must significantly reduce PM 10 and NO₂ concentrations in order to protect citizens' health and to comply with European air quality standards. Some alternative fuels offer a high potential to decrease these concentrations. For cities, a significant potential for a reduction in PM and NO_x emissions is paramount when it comes to selecting alternative fuels. Only a few biofuels, i.e. biogas, are among them.

As large and rising amounts of PM 10 and NO₂ concentrations are caused by light and heavy duty vehicles, this group of vehicle is in the first line when introducing clean fuels. Passenger cars can play the role of ambassadors for clean fuels, they are not in the focus of air quality policies.

As light and heavy duty vehicles without exception are powered by diesel engines, a substitute for diesel fuel has the highest priority when introducing clean fuels. Rapeseed oil and methyl esters show a significant potential for a decrease in greenhouse gas emissions, but only a slight potential for a reduction in urban PM 10 and NO₂ concentrations. Their environmental risks are high, and the overall efficiency is rather minor. Modern diesel technology is not compatible with this fuel.

The so-call second generation of fuels (biomass-to-liquid) will reach quite a better efficiency and a higher potential for a reduction in both greenhouse gases and PM and NO_x emissions. But these new fuels will not be sufficiently available on the market within the next decade, and their price quotation is not possible as yet.

The spectrum of national political strategies preferring different alternative fuels and ways of introducing them has shown to be a major obstacle to progress. Car manufacturers are unable to come to grips with this variety and to optimise the power train system for several alternative fuels. A clear political strategy on the European level is requisite for more than a decade to justify investment both in expensive research and development and in industrial facilities and new infrastructures.

4. Fuel Cells and Hydrogen are Fascinating Technologies – CNG is the Bridging Technology for the next Decades

The European strategy for the introduction of alternative fuels laid down in the Regulation 2003/30/EC defined a share of 10% CNG by 2020. This figure shows the high potential of CNG when compared to other alternative fuels and the short period to open up and develop the market. The share of hydrogen was estimated at 5% and that of biofuels at 8%, both for 2020. European car manufacturers held the view that the fuel cell and hydrogen technology will be introduced in the 2020s with a small market share. During the first decade, however, positive environmental effects of this fascinating technology will be insignificant.

CNG mixed with biogas can form a bridge from the motorised traffic of today that is completely dependent on mineral oil to a future hydrogen-based transport system with regard to reduced environmental effects, high cost efficiency and economic and political dependencies and risks.

The technology of CNG power train and of CNG filling stations is well known, and its costs can be calculated without economic risks. No other clean fuel combines a comparable potential for halting environmental pollution with a better cost efficiency. The infrastructure of an area-wide gas grid exists in many European countries, and the introduction period is short. CNG can be mixed with biogas fed into the existing grid.

Adequate political activities are requisite to get through two decades and more until hydrogen and fuel cells will offer ways of coping with environmental and economic risks induced by the motorised transport system that depends completely on mineral oil. It is essential for car manufacturers to be provided with a clear political course and a commitment for more than a decade to invest in expensive research and development, as is the case with the energy industry and its investment in industrial facilities and new infrastructure.

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