



Guideline **CLEANER BUSES**



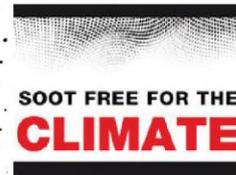
Buses are a major pillar of the public transport system, especially in small and midsize cities. The majority of these buses use diesel and are a significant source of particulate matter (PM) and nitrogen oxide (NO_x). Retrofitting old dirty buses or replacing them with cleaner alternatives is an important part in municipalities' air quality measures.

An important part of today's public transport systems are buses. From the air quality perspective these buses pose a serious problem, because they are among the vehicles with the highest black carbon and NO_x emissions, especially those EURO 3 or older. Without retrofit with particulate filters and selective-catalytic-reduction systems (SCR), buses will remain a huge problem for the air quality in many cities. The city of Berlin, for

example, in 2012 calculated that 7% of the local black carbon emissions come from buses.

Berlin

Berlin's bus fleet has been equipped with diesel-particulate filters already for 10 years. The city additionally aims to modernise all of them to "Enhanced Environmentally Friendly Vehicle" (EEV) standards and continuously retrofits buses with SCR systems. New bus acquisitions are tendered with EURO 6 requirements where possible.



In light of the persistent air quality problems of cities complying with limit values for nitrogen dioxide (NO₂), there is a strong current move towards modernising and retrofitting the buses in cities. Considering the average lifetime of today's buses is about 12 years, the buses purchased today will shape air quality levels until 2025.

Following shows what issues are currently dominating the discussion and what factors are to be taken into account.

Legal Requirements

The Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles (2009/33/EC) required all buses sold after 1 January 2014 to fulfil EURO 6 requirements, setting strict PM and NO_x emission limits. There are substantial differences between different EU countries in regard to their bus fleets and the share of buses that are EURO 4 or higher.

And it is important to note that buses with Enhanced Environmentally Friendly Vehicle standards (EEV) or earlier standards that fulfill the EURO requirements in test situations often do not meet these limits in real circumstances. Studies have repeatedly proven a large gap between test and reality.

New or retrofitted

When it comes to buying a new bus, municipalities can choose from a number of

sources of energy. While other sources might become more important for municipalities in the future, from an economic perspective today diesel buses are still a very attractive choice for municipalities. Civitas, an European platform promoting cleaner, better transport in cities, puts it like this: "If financial resources allow, municipalities and public transport operators should aim for the zero emissions or close to it options. Otherwise, especially within current conditions of economic and financial crises conventional diesel buses (EURO 6) and their hybrid configurations represent a very good environmentally friendly option as well."

New buses deliver further advantages, such as lower fuel consumption, comfort, accessibility or image. But cities might also consider investing into retrofits of their

bus fleet instead of investing into a smaller number of new buses. Simply because a new bus costs as much as retrofitting several old buses.

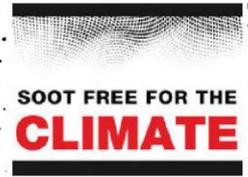
Real world emissions

Currently, the technology used in EURO5 vehicles is subject to rightful criticism as to its ability to reduce NO_x emissions under real world driving condition especially in urban scenarios. Several investigations have shown that the vehicles were not able to meet the NO_x limit values in reality.

While the standard SCR solutions in EURO5 vehicles often failed to deliver, retrofit solutions

Air pollution & Health

In 2010, more than 400,000 people died prematurely in the EU due to air pollution. That makes air pollution the main environmental cause for shortened lives in the EU. The resulting health problems cost society estimated 330-940 billion Euro per year. Over 90% of the urban population in the EU is exposed to concentrations higher than the limit values recommended by the World Health Organisation (WHO). Among the most important pollutants are black carbon (BC), which is a part of particulate matter (PM), Nitrogen Dioxide (NO₂) and ozone (O₃)



performed better. This is partly due to their tailoring to specific driving purposes of the vehicles.

Heating systems that raise the exhaust temperature within the filter to the necessary 220-240 degrees Celsius are able to solve the problem of too low temperatures.

Final Words

In many cities, buses are an important source of NOx and black carbon. Yet they are vital to the public transport systems. While cities might want to choose for investing into new buses, retrofitting might have benefits as well, in particular in difficult economic situations.



Further information:

Civitas – Cleaner and better transport in cities

<http://civitas.eu/>

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ABOUT US

Clean Air is a project by nine European environmental organisations that fight for clean air in European cities. Despite the existing legislative framework and the citizens' right to clean air, continuing violations of air pollution limits remain a problem in many cities. Air pollution threatens health, environment and climate. It's time to take action!

www.cleanair-europe.org

Started in 2009, the associated campaign "Sootfree for the Climate" aims to reduce diesel soot emissions, which accelerate climate change and pose a threat to public health. To this day twelve European NGOs have joined the campaign.

www.sootfreeclimate.org

a project by



project coordination

co-financed by the
EU's LIFE financial
instrument



associated
campaign

