

Nachrüstung in den europäischen Low Emission Zonen
Retrofit in European Low Emission Zones

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Introduction

The EU has mandatory, health-based, air quality Limit Values for a number of pollutants dangerous to health. Those that are difficult to meet in the EU are the limit values for particulate matter (PM₁₀) and nitrogen dioxide (NO₂). Road traffic are major sources of both pollutants, particularly in urban areas where air quality is worst. The ozone (O₃) Limit Value will also be difficult to meet. However, ozone is a 'secondary pollutant' caused by reactions of other pollutants, and is tackled through general reductions of emissions of primarily nitrogen oxides and hydrocarbons. The daily average Limit Value for PM₁₀ (50µgm⁻³ not to be exceeded more than 35 times per year) was legally required to have been met in January 2005, and is widely exceeded in EU cities. The Limit Value for nitrogen dioxide (NO₂, 40µgm⁻³ to be met in January 2010) is also likely to be widely exceeded.

In order to meet these Limit Values, further actions are required throughout Europe. These actions include the introduction of Low Emission Zones (LEZs), or 'Environment Zones', where vehicles that do not meet set emissions standards are either banned, or heavily charged to enter a defined area. These zones are being increasingly implemented around Europe, with currently around 50 in place or in planning. More LEZ's are likely to follow in the Eastern part of the EU. Others are already in operation outside Europe, including in Japan, Korea and China. This paper will concentrate on existing or planned LEZ schemes in Europe.

Some of the different LEZ schemes within Europe

All schemes limit the movement of heavy duty (diesel) vehicles (HDVs), which are more polluting per vehicle and therefore have higher emissions per vehicle. In addition, the Italian and Madrid schemes include all vehicles, the German framework includes all vehicles except motorcycles and the London scheme includes heavier vans and minibuses as well as HDVs. Including passenger cars in the scheme adds the particular advantage of reducing the significant NOx emissions from cars, due to their sheer volume.

The emissions standards that need to be achieved by vehicles in order to be allowed to enter an LEZ are based on Euro standards. Most schemes either allow the retrofit of diesel particulate filters (DPFs) to meet the set standard, or require the fitting of a DPF for diesel vehicles of a lower than the set Euro standard. The majority of LEZs planned currently usually have at least two stages; a first introduction followed by a tightening the emission requirements. The second stage often has more impact on emissions than the first stage.

There are differing air quality problems around Europe, as well as economic and political climates (i.e. what is possible to be implemented). Therefore there are differing emissions requirements, dates and enforcement systems depending on the country and/or city. The LEZ standards range from Euro 1 in 2008, to Euro 4 in 2010. Their extent can be anywhere from the very centre of a historic city to the whole of a metropolitan agglomeration.

Netherlands

There is currently a small LEZ in central Amsterdam in existence. This LEZ is primarily a restriction on vehicle size, with Euro standard requirement added. In addition there are 10 full LEZs planned in the Netherlands, due to be implemented in July 2007. These schemes are currently planned to only cover HDVs over 3.5 Tonnes, and allow/encourage retrofits.

UK

London will implement an LEZ in the whole of Greater London (covering an area of 1600km²) from February 2008, and allows retrofits. Other cities in the UK are considering LEZs, but are currently at the post-feasibility study stage.

Germany

In Germany a national framework sets out four classes of standards that cities are allowed to use for LEZs specifying the vehicles they apply to and emissions standards allowed, including retrofit requirements. The local authorities and/or Länder [Federal states within Germany] decide on which of the emissions classes will be required to be met in their LEZs, as well as the extent of the LEZ and the starting date.

Denmark

There is a national framework that allows 5 municipalities to implement LEZs for diesel vehicles over 3.5 Tonnes from 2008, and allows/encourages retrofits.

Italy

The north Italian Regions require schemes to be implemented in cities not meeting air quality standards by September 2007. They operate at peak times on weekdays, and allow/encourage retrofits.

Sweden

There are four LEZs that have been in place since 1996 for vehicles over 3.5 Tonnes. The exact emissions standards have changed a number of times and there is now a national framework replacing the previous local scheme that does not allow retrofits.

Spain

Madrid is planning a LEZ for all vehicles, including cars and motorcycles from 2008.

Norway

LEZs are being considered in three cities, based on differential charges for different Euro standard vehicles. Retrofitting is not envisaged.

Conclusion

Over 50 LEZs are in place or planned around Europe and it is likely that further will follow. These schemes are part of the attempt to meet the EU Air

Quality Limit Values. Especially on the European mainland the 2005 PM₁₀ Limit Value is widely breached.

Most of the zones encourage or allow retrofitting of DPFs, each with its own certification scheme. Full DPFs can reduce PM emissions by over 90%. They make it politically and economically feasible to set higher PM emissions standards than would be possible with pure Euro standards, with the accompanying benefit for health. Due to the EU freedom of movement principle, LEZ emissions standards have to be equivalent to Euro standards, as they are recognised EU-wide. This means that in many schemes, partial filters are also allowed, without the same particulate reductions as a full DPF. A European-wide DPF certification, as recommended in a recent study undertaken for the EU Commission, would enable full DPFs to be required, instead of Euro standard equivalents.

Sources and Further Reading

“Assessment of the impact on costs and emissions of technical measures on existing heavy duty vehicles and captive fleets - How can the EU help support the most promising technical measures to reduce NOx and PM from existing heavy duty vehicles and captive fleets”, prepared for DG Environment, November 2006 By Sadler Consultants. Available from www.airqualitypolicy.co.uk

“Cleaning London’s Air; The Mayor’s Air Quality Strategy”, Greater London Authority, www.london.gov.uk

Stichworte:

Low Emission Zones, Environment Zones, Air Quality, diesel particulate traps, DPF, LEZs, European Air Quality Directives, Air Quality Limit Values.