

Operation of a Low Emission Strategies

1 Introduction

European type approval legislation is helping to clean up vehicles and fuel, but there is a significant time-lag whilst the vehicle stock is being replaced. In the interim, mechanisms could be introduced to accelerate the replacement of vehicles or to reduce emissions from the existing stock.

A Low Emission Zone (LEZ) is a defined area in which strategies are used to encourage access by vehicles that comply with enhanced emission standards. This Fact Sheet considers options for the operation of low emission strategies for various vehicles and with different levels of set-up and administration resources. It outlines a number of regulatory, access management and voluntary or partnership approaches that might be used.

Some key assumptions are made in for this Fact Sheet, with regard to operating a scheme:

- the chosen Euro level for each vehicle type has been determined (see relevant Fact Sheet);
- a certification or permit process is in operation to identifying those vehicles that have the required emissions performance to comply with the regulation/agreement in place;
- signing is made prior to and at the zone boundary.

These issues are being addressed to a degree at a national level as part of the work to establish the London LEZ.

2 Operational approaches

There are a number of implementation routes that could be used to set up a zone, any of which could be separately or jointly used in a low emission strategy.

1. Regulatory approach – using powers granted under the Road Traffic Regulation Act (1984), Environment Act (1995) and Traffic Management Act (2004) by a Highway Authority to make Traffic Regulation Orders for the public highway in pursuit of environmental objectives, and pursue those committing traffic offences.
2. Tendering/licensing approach – using mechanisms such Quality Bus Contracts and Traffic Regulation Conditions to encourage lower emissions from buses and taxi licensing.
3. Voluntary approach – using protocols agreed between an Authority and the vehicle owner, Bus Quality Partnerships, Freight Quality Partnerships, other key vehicle operators (e.g. large fleets) or the construction industry.
4. The planning process, and the mechanism of a Section 106 agreement to apply conditions to site development and users of developed sites.

Each of these four broad categories of approach are relevant to a low emission strategy. A low emission strategy may contain one or more of these approaches, depending on the objectives for that specific area, the types of vehicles it focuses upon and their number.

3 Regulatory approach

A regulatory approach is sometimes assumed necessary for effective operation of a low emission zone. If another approach is not suitable, it should first be considered if existing road networks and regulations can be adapted to support the low emission strategy. Regulations are already in place on nearly all road networks. Drivers are guided by road markings, traffic lights, road signs, speed humps, one-way streets, road narrowing, pavements and pedestrianised areas. Traffic is controlled, limited in volume and banned from entry without an active policing presence being required in most instances.

3.1 Access control options

Depending on the size and nature of the road network a LEZ could follow a basic design from the following range of access control schemes:

- Signed only scheme, without physical restriction. Enforcement would be undertaken within the zone to discourage non-compliant vehicles. Options for enforcement within the zone are covered in the next section.
- Traffic signals – triggered by a transponder or tag. This would not present a physical barrier, but may be appropriate for one or two key locations given a suitable road network and if physical control (e.g. bollards) are not suitable. There may be high levels of infringement if enforcement within the zone is not added.
- Automatic barriers such as rising bollards or signals (e.g. bus gates) – gives priority access to a sensitive area to vehicles that can operate the system by a transponder or tag. Provides an opportunity to issued permission to vehicles that comply with enhanced emission standards. Presents a barrier to non-compliant vehicles and can handle moderate traffic flows. Moderately sized systems are in place in some UK towns/cities (e.g. Cambridge), and extensive systems in place on mainland Europe (e.g. Barcelona). An option for cities with existing or the potential for access control schemes would be to build emission criteria onto these so that air quality considerations are also met.
- Digital cameras and ANPR (automatic number plate recognition) –all number plates are recorded and recognised using optical character recognition (OCR) for matching against a database of LEZ certified vehicles. Only images of vehicles not in the database are kept for checking, and the details are passed on to the enforcement process for a penalty charge notice (PCN) if appropriate. This approach will depend on powers under the Traffic Management Act 2004 and subsequent DfT drafted Regulations.
- Electronic tag systems with conventional enforcement cameras (or digital cameras for more efficient monitoring) – overhead gantries with microwave ‘readers’ for handling near free-flow traffic. Tags are issues to LEZ certified vehicles and those vehicles without tags, passing under the readers, are photographed for enforcement. Such systems would work in

similar way as road user charging (RUC)/tolling systems in Oslo or Melbourne. They would only really be relevant if RUC was planned.

Each option is technically feasible and working examples exist across Europe. They are not generally operated for the primary reason of improving air quality, but the technical, procedural and administrative approaches are instructive and transferable to varying degrees.

A legal mechanism, such as a Traffic Regulation Order, would need to be in place to set up the schemes above as this provides the most likely legal basis for enforcement (outside London). The use of TRO is dealt with in a separate NSCA Fact Sheet. Local Authority (civil) enforcement powers, using cameras if required, is contained within the Traffic Management Act (2004) and subsequent regulations drawn up by DfT.

3.2 Application and cost trade-offs

The access control systems described are represented in the diagram below, which illustrate the relationship between human resources and infrastructure. It also suggests links between various traffic management approaches. The basic relationship is that schemes which rely on boundary control the level of automation required increases as traffic flows increase.

Figure 1: Access control and enforcement

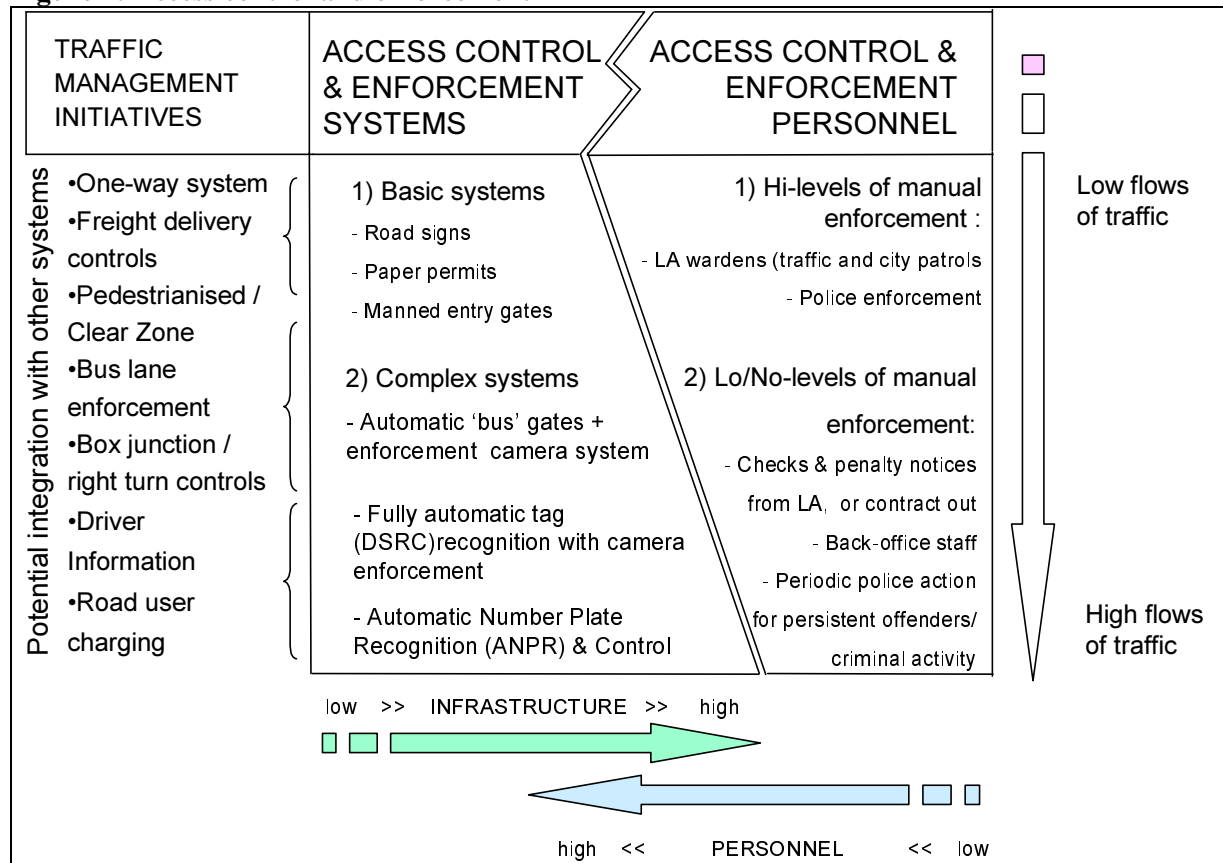


Figure 1 shows that if automated systems are in place the need for staff on the ground diminishes, and other types of human resources are required (back-office, IT support etc). Staff numbers are also related to the size and complexity of the scheme – complex automatic systems covering many access points will require larger teams.

If boundary control is the decided strategy then the choice of systems should be made according to the enforcement needs of the zone. This can be derived from the following factors:

- volume, and likely speed of traffic;
- number of entry points - i.e. degree of complexity to the zone; and
- security target level - i.e. how stringently will it be enforced, or conversely, how difficult will it be to comply with the regulations, and therefore what proportion of people are likely to avoid doing so?

If one or more of the factors above is rated as ‘high’ - for example, traffic flows - then it is likely that one of the automated systems will be required in order control access to the LEZ at the boundary. For example, retractable bollard and transponder systems can control many access points with medium to low traffic flows. In comparison, if entry roads are dual lane carriageways with free-flow traffic (i.e. without physical barriers) it will be necessary to use techniques deployed in large Road User Charging systems to control the cordon.

3.3 Enforcement strategies within a zone

A low emission strategy could be operated with a flexible or permeable boundary if the methods used to encourage raised emission standards are applied within the zone rather than solely on the boundary or access point.

3.3.1 Mobile camera

An alternative (or complementary) scenario to setting up a ‘water-tight’ zone boundary cordon is to deploy camera units at locations near the boundary and within the zone, where the likelihood of spotting non-compliant vehicles is the highest. Cameras could be manned or work with ANPR software, as planned for the London LEZ. This approach spreads the available resources in a responsive and variable manner. The chance of a vehicle being checked could be relatively high, without enforcement units being required at every access point. An existing example is the London Lorry Ban. Enforcement teams use traffic control cameras to check key junctions for HGV and undertake road-side observations checks.

3.3.2 Road-side vehicle emissions testing (RET)

All local authorities in the UK that have declared an air quality management area (AQMA) can apply for the power to carry out roadside emissions testing of vehicles, with support of the Police or VOSA (for the purposes of stopping vehicles). The Local Authority can issue a fixed penalty notice to the registered owner of a vehicle that fails the MOT standard test, or direct for maintenance to be undertaken to bring it up to standard.

Roadside vehicle testing aims to support tackling the problems of poor local air quality by reducing pollutant emissions from some of the most polluting vehicles and raising awareness of the importance of regular vehicle maintenance. It has generally been found valuable as an awareness raising device, rather than making any measurable contribution to pollution reduction.

A low emission strategy would not rely on RET, but could contain an element of road-side emission testing for publicity reasons. If emission stricter than MOT emission conditions were in place then checks on compliance (Euro level/certification/permit etc.) could be carried out once a vehicle is stopped through the RET process. This might be applicable in a 'low-tech' low emission strategy where camera based technology was not deemed appropriate.

3.3.3 Parking management

Local authority parking officers can check parked vehicles for compliance with parking regulations on the public highway if the area is declared a controlled parking zone (CPZ). Parking offences are decriminalised and dealt with by the Local Authority, rather than Traffic Wardens (under the Police).

Parking management strategies can only include Local Authority owned public car parks and on-street parking bays. It does not apply to private non-residential parking or impact on through-traffic. Parking management tends to focus on car travel. Thus, the impacts of parking management might offer some potential as a component of a low emission strategy it does have limits.

A recent trial in Winchester has seen drivers of electric and hybrid vehicle being able to park for free in any Local Authority parking bays. In addition, a discount on parking charges is provided to those owner whose vehicles have low CO₂ levels, according to the Vehicle Excise Duty band. There is some evidence that this action has spurred higher levels of hybrid vehicle use in the area.

Parking charges might be applied in a more radical manner to encourage low polluting vehicles. For example, by raising parking charges for drivers not using a low emission vehicle an stronger incentive might be provided for low-emission vehicles. In theory, this strategy could be applied in a manner that was cost-neutral. A more stringent scenario would be use of a low emission vehicle a condition of using any public parking bay. However, given the abundance of alternative parking and the need to support short-term parking for shopping purposes the feasibility of such an approach may be quite low.

4 Tendering and licensing

This section considers complementary strategies based on partnerships, tendering or licensing that can be applied to key vehicle types.

4.1 Buses

4.1.1 Quality contracts

The Transport Act (2000) enables Authorities to enter into Quality Contracts for bus services, with the approval of the Secretary of State or the National Assembly for Wales. In theory, these involve local authorities determining bus networks and service levels, including engine/emission standards, and letting exclusive contracts to bus operators to provide them. There are no Quality Contracts to date, however the concept is being tested by one UK Local Authority that wishes to prepare a pilot quality contract with different bus operators.

4.1.2 Traffic Regulation Conditions

Since late 2004 Local Authorities have been able to apply to the Traffic Commissioner for a Traffic Regulation Condition (TRC) to regulate bus emissions, to reduce or limit air pollution. The TRC is attached to an operator's Public Service Vehicle Operator's Licence. When applying for a TRC, Local Authorities must satisfy the Traffic Commissioner that there is a compelling case for imposing the proposed conditions, supported by evidence. It may be difficult to provide evidence without details of the bus fleet, which are not always available from the operators. However, the Traffic Commissioner can obtain this information as part of the investigation into whether to grant a TRC.

It would be for the Traffic Commissioner to determine the appropriate emission standards for individual area. Presumably this would be informed by the Local Authority case. DfT have produced guidance for the Traffic Commissioners in England and Wales when responding to requests from a local authority for a TRC of this type. The guidance recommends that the Traffic Commissioner should obtain the following:

- Information from operators on the emissions performance of their fleet, including details of the Euro standards, any Reduced Pollution Certificates in place, any exhaust after treatment retrofits, and any alternative fuel or technology vehicles, and the standards achieved in each case.
- A plan from operators on how they could reduce emissions from vehicles on routes in question. This might include operating only the cleanest vehicles in the fleet on that route, improving emissions performance of existing vehicles by retrofit or conversion, operating on cleaner fuels, ensuring that larger vehicles are not encouraged on low occupancy routes, and restricting the number and frequency of buses operating on the route.

The Commissioner must hold an inquiry if requested to do so by a traffic authority or a bus company with services that are, or will be, operated in the area covered by the TRC. Following the Commissioner's decision, there is also an appeal procedure to the Secretary of State and subsequently to the Court of Appeal (though this is only to dispute a point of law).

No Local Authority has used this approach to date, although it seems to be relatively little known as an option.

4.2 Taxis

Taxi (hackney cab) and private hire vehicle (PHV) licensing conditions are a tool that can be used by the licensing Authority to bring in raised standards. Hackney cabs that are required to provide better access for disabled persons are often amongst the newest (and therefore least polluting) vehicles. In London an emissions strategy for taxis will progressively raise emission standards with the specific aim of supporting the Mayor's air quality strategy. Some Local Authorities are currently investigating a similar option. A cross-sector approach to taxi and phv licensing may be worthwhile if a range of objectives, including Air Quality, can garner local support.

5 Partnerships

5.1.1 Quality bus partnerships

Quality Bus Partnerships form a common framework for bus operators and Local Authorities to work together and bring benefits from improved service quality and environmental improvements. Many successful examples of quality bus partnerships exist in the UK, and a number include emission performance as part of the agreed package often because the operators agrees to provide newer vehicles.

5.1.2 Freight quality partnerships

Freight Quality Partnerships can form the framework for industry and Local Authorities to work together and agree on routes and access conditions, to help reduce congestion, emissions and vehicle numbers. Freight Quality Partnerships have received considerable support and promotion by Government and the Freight Transport Association. It is important that a Local Authority can offer something in any negotiation of a partnership.

New partnerships to promote city centre retail are developing to compete with out-of-town retail areas where a high-quality environment is a key selling point. Increasingly, local authorities are setting up city centre management teams. Retailers already set delivery times and other deliver conditions, and one Local Authority objective could be to investigate if there are local incentives available to raise the emission quality of delivery vehicles.

Pre-determined delivery windows and night time operating bans are a common restriction put in place by Authorities, based largely on noise concerns. A relaxation of these might be considered for cleaner vehicles, particularly if noise levels were also reduced. Such an approach could mean that freight companies and retailers have more to gain by making environmental improvements to their vehicles.

6 Planning

6.1 Section 106 agreements

Section 106 of the Town and Country Planning Act 1990 gives a Local Planning Authority (LPA) the power to set an obligation as part of the planning permission granted to a land developer. This could include emissions standards applied to construction vehicles, and to vehicles that will use the development once it is complete. This option requires a strong demand for the site for a developer to take on the additional commitments.

A good example is the Greenwich Peninsula Development. In April 2003, Greenwich Council approved the development of 300 acres of the Greenwich Peninsula; incorporating housing, retail, leisure, offices and the Millennium Dome arena. A section 106 agreement commits the site developers to the set-up and administration of a LEZ. The developer will submit details of how the LEZ will be implemented and enforced with the first application for development submitted to Greenwich Council.

The Council has directed that the LEZ will place restrictions on the types and ages of the vehicles permitted within the Greenwich Peninsula, in order to remove highly polluting vehicles and to improve air quality.

Restrictions will apply to:

- residents vehicles (via parking controls);
- visitors vehicles (including hotel/ leisure car parking);
- taxis;
- buses and coaches;
- goods vehicles;
- office parking; and
- construction vehicles.

This environmentally sensitive and inventive planning approach is most suitable in areas where major re-development is planned and land is in high demand. It will tend to reduce the otherwise additional impact of new development.

7 Conclusions

A number of options have been outlined which can form part of a low emission strategy. A key factor in the choice of strategy elements will be what type of vehicle emission standard the strategy aims to raise. This decision should be informed by source apportionment (i.e. what vehicles contribute most to pollution), cost-effectiveness information (i.e. what amount of pollution reduction can be achieved for every pound spent) and issues of practicability and acceptability.

A number of options have been outlined that apply to a particular type of vehicle or vehicle operator, particularly bus or HGV. They do not require extensive new infrastructure or administration systems and could be applied at low-cost to the Local Authority.

Another key factor is what number of vehicles the strategy aims to deal with. If there are high volumes of traffic, and the strategy aims to targets the majority of these, then level of resources needed for management of the zone will be greater. A number of access control scheme options have been outlined should boundary or entry point management be thought necessary, spanning low-tech to hi-tech and costly.

While boundary control schemes are one approach to consider, another is to distribute monitoring capability within the zone, so that there is sufficient risk of detection to deter non-compliance. This may be more flexible if air quality needs or traffic patterns change, and a practicable option if less than 100% compliance is an acceptable target.

Finally, many of the issues concerning the implementing and enforcement of a high-vehicle flow type of low emission strategy are being addressed as part of the work to establish the London LEZ. Although not all elements will be applicable to elsewhere in the UK, the outcomes of the London work will provide a useful resource for Local Authorities working towards implementing similar low emission strategies.