Green Public Procurement

Transport

Technical Background Report


Owner, Editor: European Commission, DG Environment-C1, BU 9, 1160 Brussels.

Disclaimer: The European Commission accepts no responsibility or liability whatsoever with regard to the information presented in this document.
# Table of Contents

Abbreviations

1. Introduction 1
2. Definition, Scope and Background 2
3. Market Availability 4
3.1. Passenger Cars 4
3.2. Light duty vehicles 6
3.3. Heavy duty vehicles 7
3.4. Conclusions 7
4. Key Environmental Impacts 8
4.1. Extraction of raw materials 8
4.2. Production of vehicles 9
4.3. Use Phase 9
4.3.1. Vehicle emissions 9
4.3.2. Vehicle power technologies 10
4.3.3. Vehicle fuels 11
4.3.4. Vehicle Noise 12
4.3.5. Vehicle Size/Class 13
4.3.6. Vehicle tyres 13
4.3.7. Motor lubricants 15
4.3.8. Mobile air conditioning 16
4.4. End of life 17
4.5. Other considerations 175.

Cost Considerations 18
6. Public Procurement Needs 18
7. Conclusions and Summary 19
8. Recommended core and comprehensive GPP criteria 19
8.1. Recommended criteria for passenger cars and light-duty vehicles 20
8.2. Recommended criteria for public transport vehicles and services 21
8.3. Recommended criteria for waste collection trucks and services 22
9. Verification issues 22
10. Relevant European Legislation and Policies 22
10.2. Emissions 23
10.2.1. EURO standards 24
10.3. Other legislation and policies  

11. Existing Standards, Ecolabels and other criteria sources  

11.1. Ecolabels  

11.1.1. Vehicle fuel consumption and CO₂ emissions label  

11.1.2. Vehicle Ecolabels  

11.1.3. Vehicle tyres  

11.1.4. Lubricants  

11.2. National GPP Guidance  

11.2.1. Belgium  

11.2.2. The Netherlands  

11.2.3. Sweden  

11.2.4. Denmark  

11.2.5. Norway  

11.2.6. ICLEI’s Procura+ Campaign  

11.3. European Projects  

11.3.1. GreenLabelsPurchase  

11.3.2. PROCURA  

11.3.3. Buy Smart  

11.3.4. COMPRO  

11.3.5. Starbus  

11.4. Conclusions
Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEA</td>
<td>European Automobile Manufacturers’ Association</td>
</tr>
<tr>
<td>AFV</td>
<td>Alternative fuelled vehicle</td>
</tr>
<tr>
<td>CH$_4$</td>
<td>Methane</td>
</tr>
<tr>
<td>CNG</td>
<td>Compressed natural gas</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon Monoxide</td>
</tr>
<tr>
<td>CO$_2$</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>EEV</td>
<td>Enhanced environmentally friendly vehicle</td>
</tr>
<tr>
<td>EIPRO</td>
<td>Environmental Impact of Products</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FFV</td>
<td>Flexi-fuel vehicles</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
</tr>
<tr>
<td>GPP</td>
<td>Green public procurement</td>
</tr>
<tr>
<td>GSI</td>
<td>Gear shift indicator</td>
</tr>
<tr>
<td>GWP</td>
<td>Global warming potential</td>
</tr>
<tr>
<td>HC</td>
<td>Hydrocarbons</td>
</tr>
<tr>
<td>HDV</td>
<td>Heavy duty vehicle</td>
</tr>
<tr>
<td>ISA</td>
<td>Intelligent speed adaption</td>
</tr>
<tr>
<td>LCA</td>
<td>Life-cycle assessment</td>
</tr>
<tr>
<td>LCC</td>
<td>Life-cycle costing</td>
</tr>
<tr>
<td>LDV</td>
<td>Light duty vehicle</td>
</tr>
<tr>
<td>LPG</td>
<td>Liquefied petroleum gas</td>
</tr>
<tr>
<td>LRRT</td>
<td>Low rolling resistance tyres</td>
</tr>
<tr>
<td>LVL</td>
<td>Low viscosity lubricants</td>
</tr>
<tr>
<td>NH$_3$</td>
<td>Ammonia</td>
</tr>
<tr>
<td>NMHC</td>
<td>Non-methane hydrocarbons</td>
</tr>
<tr>
<td>NO$_x$</td>
<td>Oxides of nitrogen</td>
</tr>
<tr>
<td>MAC</td>
<td>Mobile air conditioning</td>
</tr>
<tr>
<td>PAH</td>
<td>Polycyclic aromatic hydrocarbons</td>
</tr>
<tr>
<td>PCA</td>
<td>Polycyclic aromatics</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate matter</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl chloride</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>Sulphur dioxide</td>
</tr>
<tr>
<td>TPMS</td>
<td>Tyre pressure monitoring systems</td>
</tr>
<tr>
<td>VOCs</td>
<td>Volatile organic compounds</td>
</tr>
</tbody>
</table>

1. **Introduction**

The European Commission has presented recommended GPP criteria for a range of different products and services\(^1\). Green Public Procurement is a voluntary instrument.

Public authorities are significant vehicle purchasers. The vehicles an authority requires could cover a broad range. For example; standard passenger cars (used as official vehicles, vehicles

---

\(^1\) [http://www.ec.europa.eu/environment/gpp](http://www.ec.europa.eu/environment/gpp)
of inspection bodies etc.), delivery vans, emergency vehicles (ambulances, fire engines, cars and police vans) and special vehicles (sweeping trucks, garbage trucks, buses, etc.).

This Technical Background Report provides background information on the environmental impact throughout the life cycle of vehicle and outlines the key relevant European legislation affecting this product group. It outlines the rationale for the core and comprehensive environmental purchasing criteria that are being proposed. It then goes on to describe existing standards, guidance and labelling that cover the transport area.

This report accompanies the associated EU GPP criteria, which contains the proposed purchasing criteria and ancillary information for green tender specifications and as such they should be read alongside one another.

2. Definition, Scope and Background

According to the European study on the Environmental Impact of Products (EIPRO), transport is one of the three areas of consumption with the greatest environmental impact and as such clearly an important sector for applying green public procurement (GPP).

Vehicle types acquired by public administrations vary between vehicles for ordinary use (for example official vehicles, vehicles of inspection bodies, delivery vans or equipment for gardening); emergency vehicles (ambulances, fire engines, cars and police vans); and special vehicles (sweeping trucks, garbage trucks, buses, etc.). Each type has a specific function and different requirements; therefore, the recommended purchasing criteria will vary accordingly.

Road transportation is responsible for 26% of total energy consumption which relates to about 24% of all CO\textsubscript{2} emissions (the main greenhouse gas) in the EU, with passenger cars being responsible for more than half of these emissions. Despite manufacturers reducing CO\textsubscript{2} emissions, increasing numbers of vehicles of the road means that emissions have been continuously growing by about 2% per year. Therefore, to fulfil the EU obligations with target 20-20-10 and tackle climate change, CO\textsubscript{2} emissions from vehicles need to be reduced.

Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles (Clean vehicles Directive) enacted on 23\textsuperscript{rd} April 2009 requires public authorities to take into account lifetime energy and environmental impacts when purchasing road vehicles from 4\textsuperscript{th} December 2010. The Directive requires that at least the following be taken into account; energy consumption, emissions of carbon dioxide (CO\textsubscript{2}) and emissions of oxides of nitrogen (NO\textsubscript{x}), non-methane hydro-carbons (NMHC) and particulate matter.

The aim of these EU GPP criteria is to go beyond the requirements in the Directive and set minimum criteria that a vehicle should adhere to. Further comprehensive criteria feature ways in which the environmental impact can be limited further. Since an analysis of lifetime energy consumption depends on fuel prices, size and style of the vehicle and how the vehicle is used (especially in the case of heavy goods vehicles) the authority should then perform a life cycle assessment with those vehicles that meet the minimum specification. Article 6 of the Clean Vehicles Directive describes a methodology used to monetise energy consumption.

---

and environmental impacts. The Clean Vehicle Portal\(^3\) was created which calculates the lifetime cost of impacts using this methodology for individual vehicles on the database. This or a similar life cycle tool should be used with the GPP criteria to make an informed vehicle choice which takes into account lifetime energy and environmental impacts.

Directive 2009/28/EC on the promotion on energy from renewable sources sets a target for each nation of 10% of the total energy used in all forms of transport to come from renewable sources by 2020. Although this covers all transport types and not just road vehicles, public procurement of vehicles powered by renewable sources can not only help meet this target but encourage further take of renewable sources within the transport market.

In order to control emissions of NO\(_x\) and particulates EURO standards apply for passenger cars/light utility vehicles and heavy goods vehicles. These are legal requirements for exhaust emissions that new vehicles must meet, and are periodically updated, with each iteration becoming stricter. For cars and light duty vehicles Arabic numerals (EURO 1 – 6) are usually used. The current requirement is EURO 5, with EURO 6 standards coming into force 2014/2015. For heavy goods vehicles Roman numerals are usually used (EURO I – VI). The current requirement is the EURO V standard, with EURO VI from 2013/14. There is also a further voluntary enhanced environmentally friendly vehicle (EEV) standard currently between EURO V and VI.

To improve CO\(_2\) emissions Regulation 443/2009 bounds car manufacturers to lower the average CO\(_2\) emitted to 130g/km in 2015 and targets 95g/km in 2020. There is an equivalent directive for vans requiring a fleet average of 175g CO\(_2\)/km to be phased in between 2014 and 2017. The long term CO\(_2\) target for vans is 147g/km in 2020.

A similar Regulation\(^4\) applies for light duty vehicles, requiring a fleet average for all new vans (of class N\(_1\) with a mass of less than 2610kg when empty) of 175 g CO\(_2\)/km to be phased in between 2014 and 2017. The Regulation has a long term target of 147g/km in 2020. Actual emission targets depend on the mass of the individual vehicle, using a limit curve. The curve is set to achieve a fleet wide average of 175g/km.

Criteria have been developed for three main vehicle groups that public authorities use: passenger cars and light duty vehicles, buses and waste disposal trucks. The passenger cars and light duty vehicles product group encompasses vehicles classified as M1 (passenger cars, all sizes) and N1 according to Directive 2001/116/EC (amending Directive 70/156/EEC). There are also criteria specifically for leasing and renting of these vehicles.

The buses product group encompasses vehicles classified as M2 and M3 vehicles (buses of various sizes) according to Directive 2001/116/EC (amending Directive 70/156/EEC). As bus services are often contracted out to private companies, criteria for public transport services will also be proposed.

Many specialist vehicles, such as waste disposal trucks, are produced almost exclusively for the public sector. Due to different duty cycles (very slow, frequent stops, high auxiliary load for the garbage compactor, everyday service, etc.) they must be dealt with differently from

---

\(^3\) www.cleanvehicle.eu

other heavy-duty vehicles. Criteria have also been developed for this group. Waste disposal trucks also include criteria for where these services are hired out to private companies.

The requirements set out in the Clean Vehicles Directive apply to all road transport vehicles. The criteria for the product groups presented go beyond the requirements of the Directive. If the authority is procuring vehicles not within the scope of the product groups they must still fulfil the obligations within the Directive, but could use the ideas presented in here as a further aid to the purchasing decision.

To summarise, core and comprehensive criteria will be developed for the following three product groups:

- Passenger cars directly purchased or contracted under leasing/renting systems,
- Public transport vehicles and services,
- Waste collection trucks and services.

3. Market Availability

Vehicles available across the European Union cover a range of different models and specifications. Manufacturer market share in different regions may vary and availability of certain models may differ, but a core range of vehicles to suit most needs is available. The main difference in market availability across the EU is due to fuel. Different countries and regions may give preference to certain alternative fuel types (such as compressed natural gas, liquefied petroleum gas, biofuels and electric) and as such availability varies. It is important when considering alternative fuels to check the local refuelling infrastructure to ensure that needs can be met. See Section 4.1 for more on fuel types.

3.1. Passenger Cars

Many different types and styles of passenger car are available to suit a number of needs. The market for vehicles is responding to the desire to achieve lower emissions and environmental impact. Figure 1 below shows the average CO₂ g/km for passenger cars across the EU from 2000 to 2009.

Figure 1: Average CO₂ emissions for new passenger cars by year for EU⁵

Figure 1 shows the average CO₂ g/km decreasing over the preceding decade as manufacturers react to the growing demand for more environmentally friendly and energy efficient vehicles. In 2009 the market share of cars emitting less than 120g/km of CO₂ was 25% for all new car sales within the EU27 region. This is an increase of 60% compared with 2008.\(^6\)

Figure 2 shows the fuel mix of new passenger cars across the EU27 region. The conventional fuels petrol and diesel still dominate the market. Petrol-LPG has seen market share increase to 3.61% in 2009. Other alternative fuelled vehicles (AFV) make up only 0.14% of the market. Very few new cars are designed to be powered purely on alternative fuels. However biofuels are used in blends with conventional fuels. Manufacturers are also investing in hybrid technologies which combine a conventional engine and electric motors with batteries that could be charged during braking. This helps to reduce conventional fuel consumption and therefore emissions, especially in city driving circumstances. Fully electric vehicles are available but they tend to be only suitable for short distances before needing to be recharged.

**Figure 2: New passenger car fuel for EU27\(^7\)**

---

\(^6\) Source: SEC2010 1606 Final Commission staff working document “A European strategy for clean and energy efficient vehicles” Rolling plan

\(^7\) Source: COM2010 655 Final – Monitoring the CO₂ emissions from new passengers cars in the EU data for 2009.
3.2. **Light duty vehicles**

Light duty vehicles range from small vans based on variations of cars, to larger trucks with a maximum mass of up to 3.5 tonnes. Classes I to III define mass categories within this range (Class I ≤ 1305kg, Class II 1305kg – 1760kg, Class III > 1760kg). The task the vehicle is needed for defines the size of van procured and therefore the energy consumption and emissions. It is important to choose a vehicle that is no larger than needed for the job it is to perform.

The fuel market for light duty vehicles is dominated by conventional fuels. Only a small number of sales of new vehicles in 2007 used alternative fuels (such as compressed natural gas [CNG], liquefied petroleum gas [LPG] and electric). Table 1 below shows the new sales splits for different classes and fuel types, along with average CO$_2$ g/km emissions.

**Table 1: Light duty vehicles sales split by fuel type and class**

<table>
<thead>
<tr>
<th></th>
<th>Petrol</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class I</td>
<td>Class II</td>
</tr>
<tr>
<td>Sales</td>
<td>1.20%</td>
<td>0.38%</td>
</tr>
<tr>
<td>CO$_2$ g/km</td>
<td>165.1</td>
<td>198.3</td>
</tr>
</tbody>
</table>

Table 1 shows that diesel is the main fuel type in this vehicle sector and that most new sales are of class III.

---

3.3. Heavy duty vehicles

Heavy duty vehicles such as buses and waste disposal trucks cover a wide range as they vary according to required needs. Energy consumption and therefore emissions have a higher dependence on loadings and style of use (e.g. city start/stop style driving that a bus may perform) compared with other vehicle types. There are however EURO emission standards that are required by law (more information on EURO standards in Section 10.2) that a vehicle engine must meet.

The dominant fuel type for heavy duty vehicles is diesel. As discussed the availability of alternative fuel types varies across the EU. The COMPRO project analysed the conditions for a common procurement at European scale of collective and public service transport vehicles. It looked at alternative fuels, especially compressed national gas (CNG) and hybrid, and analysed a selection of countries bus fleets from surveys. Table 2 shows percentages of fuel types in 4 countries.

**Table 2: Bus fuel types in four EU countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Diesel</th>
<th>CNG</th>
<th>LPG</th>
<th>Hybrid</th>
<th>Electric</th>
<th>Biogas</th>
<th>Biofuel</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>France (2006)</td>
<td>78.8%</td>
<td>9.8%</td>
<td>0.9%</td>
<td>0.3%</td>
<td>1.3%</td>
<td>0%</td>
<td>4.7%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Germany (2006)</td>
<td>97.8%</td>
<td>2.2%</td>
<td>0%</td>
<td>0.02%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Italy (2005)</td>
<td>92.99%</td>
<td>4.17%</td>
<td>0.26%</td>
<td>0.82%</td>
<td>1.17%</td>
<td>0%</td>
<td>0%</td>
<td>0.58%</td>
</tr>
<tr>
<td>Sweden (2007)</td>
<td>86.6%</td>
<td>3.7%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>4.4%</td>
<td>0%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

The report also analyses figures from an International Association of Public Transport (UITP) survey from 2005 which sampled 170 cities across the EU. Over 90% of the surveyed bus fleet used diesel fuel. Compressed natural gas (CNG) accounted for 4.1%.

Other conclusions from the survey included:

- Liquefied petroleum gas (LPG) widely used in Austria (with all buses in Vienna using LPG) but across the whole EU survey accounted for 1.7%
- Bio-diesel is the fuel choice for 29% of Luxembourg buses, 18% in Austria and 6% in Spain
- Biogas use is only significant in Sweden
- Electric buses are 0.3% of the total fleet
- Hybrid buses account for 0.25% of the total bus fleet

More information can be found via [www.compro-eu.org](http://www.compro-eu.org).

3.4. Conclusions

The market for passenger cars and other light duty vehicles is moving towards more environmentally friendly models with better energy consumption and reduced emissions. European legislation is helping drive this. The specification of heavy goods vehicles such as

---

9 Source: COMPRO Project EIE-06-200 D2.1 Analysis of the heavy duty clean vehicle (buses) market. More information and reports from the COMPRO project can be found at: [http://www.compro-eu.org](http://www.compro-eu.org)
buses and waste disposal trucks varies according to the task required to perform along with the associated environmental impact and energy consumption. EURO standards control emissions of NOx and particulates from vehicles, and get stricter over time.

The fuel market is dominated by the conventional fuels petrol and diesel. Manufacturers are investing in electric and hybrid technologies. Alternative fuels such as compressed natural gas (CNG) or biofuels can be used to help reduce emissions and environmental impacts. However the availability varies by region and support for different fuels may differ from country to country.

4. **Key Environmental Impacts**

The main impact of vehicle procurement comes from emissions and pollutants released in the use phase. However there are many environmental impacts throughout the lifecycle of a vehicle from raw material extraction and end of life considerations to chemicals used in tyres and lubricant oils. The following sections describe the key environmental impacts within the lifecycle of a vehicle.

4.1. **Extraction of raw materials**

Vehicles can be made from a range of different materials, commonly comprising of metals such as steel and aluminium, plastics, rubbers and glass. Therefore a range of impacts regarding the extraction of raw materials exist.

The main ingredient of steel is iron which is found in ore form within the Earth’s crust. Mining operations to extract ores create local ecological issues such as the disruption of local habitats. The iron ore has to be processed to create steel, which takes large amounts of energy given the high temperatures and scale of operations needed. This energy use will have its own environmental impact in the form of CO₂ emissions which will vary depending on the energy source. The steel then needs to be transported to manufacturers, which due to the global scale of the market could involve large distances with an associated impact from CO₂ emissions. Similar impacts exist with the extraction of aluminium.

Plastics can be used for a range of purposes within vehicles, from interiors to parts of the bodywork. Plastics can either be derived from fossil fuels or from biomass sources. Most commonly plastics are derived from oil. Extraction involves drilling into an oil field. The oil would then need to be processed into order to make plastic. Extraction and processing leads to a range of environmental impacts from energy use to ecological impacts from the use of oil wells/rigs. Bioplastics are formed from biomass, which is a renewable source. Common sources include vegetable oil and corn starch. Although a renewable source, environmental impacts of biomass do exist, most significant being land use (using land for biomass purposes that would otherwise be natural or be used for food crops).

Rubber, used in tyres and various other applications within vehicles (e.g. pipes, belts) can either be natural, or synthetic. Natural rubber is derived from latex which is produced in some plants. Synthetic rubber is manufactured artificially with scope for greater control over the material’s properties.

The main raw ingredient of glass is silica (sand). This is more abundant on the Earth than
fossil fuel sources and therefore the environmental impacts of extraction are not as significant. Vehicles containing recycled content should be encouraged as raw materials are preserved. The use of biomaterials in vehicles instead of traditional materials has the potential to reduce impacts. For example components that would traditionally be made from plastics could be based on starch. If within the vehicle specification the amount of recycled and/or biomaterials are specified, it gives the procurer another environmental factor to compare potential vehicles with.

4.2. Production of vehicles

Most mainstream vehicle manufacturers have large scale facilities that require large amounts of energy to build and run. The construction of a vehicle is not a simple task, bringing together a large number of parts to create the finished product. This has an associated energy cost from creating the parts, to powering assembly lines.

Water will also be needed, and large factors will require a significant supply.

The painting and lacquering of the bodywork could lead to solvent emissions. Elements such as lead, chromium VI and cadmium compounds have potential health effects and can be found in paints.

Delivery of vehicles to customers also involves an associated environmental impact as it involves transportation on a potentially large scale, depending on where the model of vehicle is produced. Most vehicles on the European market are manufactured within the EU; there is a potential for them to have already travelled a large distance, with an associated energy cost, before they reach the consumer.

4.3. Use Phase

4.3.1. Vehicle emissions

Exhaust gases are the main environmental impact in the running of vehicles (except electric and hydrogen fuel cell). Chief amongst these is carbon dioxide (CO₂). CO₂ is a greenhouse gas and therefore a crucial contributor to global warming and climate change. CO₂ emissions are linked to fuel consumption.

The EU has seen an increase of more than 20% in transport CO₂ emissions since the 1990s. EU Directive 1999/94/EC¹⁰ required that information about a car’s CO₂ emissions and fuel consumption be made available to customers. Contracting authorities should aim to purchase passenger cars with low CO₂ emission levels.

For other vehicles, such as buses and trucks (heavy-duty vehicles [HDV]) such a commitment is not in place and information on CO₂ emissions is not readily available. For these vehicles

CO₂ emissions and consumption vary significantly with factors such as loadings.

In relation to other exhaust gas emissions, vehicles (except electric ones and hydrogen fuel cells) not only emit CO₂ in the fuel combustion process, but also generate other substances, mainly carbon monoxide (CO), methane (CH₄), hydrocarbons (HC), nitrogen oxide (NOₓ) and particulate matter (PM) which can cause impacts on human health and the environment.

The EU has been working to control and reduce such emissions since 1992 when the EURO standards were introduced. These standards set limits on the permitted emissions of any new vehicle in the EU according to a certain test cycle, and these limits are becoming progressively stricter over time (minimum mandatory standards are set and more advanced voluntary standards which become mandatory after a transitional period). These standards are one of the central tools for improving air quality in the EU¹¹.

However, in many places ambient air quality still does not meet the legal requirements set in the thematic strategy on air pollution and related Directives¹². The emissions of these substances, even in the case of new vehicles on the market, still varies significantly, so there is scope for contracting authorities to purchase vehicles which perform much better than those meeting just the minimum standards.

Contracting authorities should aim to go beyond existing minimum standards and demand stricter EURO standards in order to combat air pollution.

4.3.2. Vehicle power technologies

These days there are a great variety of vehicle technologies and fuels on the market. Emissions and energy consumption vary with fuel technology. The most commercialised types are:

- Conventional combustion vehicles - these can work with petrol, diesel, biofuels and gaseous fuels either using dedicated engines or bi-fuel engines¹³. Vehicles capable of working with 85% ethanol are known as Flexi-fuel vehicles (FFV).
- Hybrid vehicles - where a conventional engine is used alongside an electric motor. They can either be used separately (current technology limits electric only use to slow speeds) or the electric motor can supplement the engine. Electrical energy could either be generated during the braking phase or by using the engine to generate electricity. It is then stored in batteries.

¹¹ See Section 11
¹² Communication from the Commission to the Council and the European Parliament Thematic Strategy on air pollution (COM(2005) 446) and Daughter Directives:
- Directive 1999/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air.
- Directive 2000/69/EC relating to limit values for benzene and carbon monoxide in ambient air.
- Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air
¹³ Conventional vehicles which are adapted to contain a second deposit fuelled with LNG or LPG
• Electric battery vehicles - electricity is consumed to charge the battery which is used afterwards to power the vehicle.
• Fuel Cell vehicles - which are fuelled with hydrogen. This technology is still in its infancy, mass produced vehicles are likely to take more years to develop fully.

4.3.3. Vehicle fuels

Below are a summary of each fuel type and the environmental impact associated.

**Conventional petrol and diesel**: Diesel fuel has a higher energy density and efficiency than petrol and therefore a lower consumption rate. Since consumption is linked to the emissions of CO₂, these are relatively lower for diesel cars. However, particulates and NOₓ emissions are higher than petrol cars (which are fitted with catalytic converters). Particulate filters fitted to diesel cars can aid. Aside from the emissions created from burning these fuels for energy, the extraction, processing and transportation of the fuel all have associated environmental impacts. The ecological impact of oil extraction and extra energy needed to get it to the pumps all adds to the lifecycle impact of using these fuels.

**Biofuels**: These fuels are produced from plants and waste from different sources and include biodiesel, bioethanol and biogas. Biodiesel is produced from oils or fats, such as animals fats, vegetable oils, rapeseed, palm oil and sunflower oil. Bioethanol can be derived from a number of crops including sugar cane, corn, wheat, barley and grain. Not all ethanol is bioethanol as it is possible to create it from petroleum. Biogas (mainly comprising of methane and carbon dioxide) is formed from the biodegrading of materials such as sewage, municipal wastes and plants.

The environmental impact of biofuels can vary. Final emissions from being burnt in engines do present an advantage in CO₂ emissions compared to conventional fuels. Bioethanols are already being used in blends with conventional fuels. However, how the fuel is farmed has an environmental impact. For example using fertilisers, emissions such as nitrous oxide are produced. There can also be ecological impacts with using extra land for energy crops or impacts from using land that would previously have been food crops. More information about the different options available on the market for biodiesel and bioethanol can be found on the PROCURA project website (www.procura-fleets.eu), and on the Biofuel Cities web platform (www.biofuel-cities.eu).

**Gaseous fuels** – These are fuels usually produced from fossil-fuel sources such as compressed natural gas (CNG) and liquefied petroleum gas (LPG). With regards to NOₓ, CNG and LPG vehicles have a lower impact than diesel fuels and feature no particulate emissions. CO₂ emissions can potentially be 15% - 20% lower than petrol, similar to diesel in the case of LPG and a maximum 10% saving for CNG. Since they are fossil fuel based, similar environmental impacts to that of conventional fuels due to extraction exist. Few new vehicles feature the ability to run on these fuels and in most cases they are retrofitted. More information about the different options available on the market for CNG can be found on the PROCURA project website (www.procura-fleets.eu).

**Electricity**: Fully electric vehicles produce no emissions while running as all the power is generated with electric motors. However how the electricity is generated is important for overall emissions. If the electricity is generated from fossil fuels, then CO₂ etc. emissions are released at the power plant rather than at the car. This may be beneficial, for example in city
circumstances to reduce pollution, but overall emissions savings will be limited. If the electricity is generated from renewable sources such as wind power, then the emissions associated with powering the vehicle will be zero. Currently fully electric cars are limited in the range they can travel, but the technology is developing. Hybrid vehicles combine a conventional engine with electric motors which are either charged when braking, using kinetic energy recovery, or by using the engine. These reduce conventional fuel consumption and emissions. Environmental impacts at end of life need to be considered especially with regard to batteries from electric vehicles.

**Hydrogen:** A secondary form of energy which can be derived from renewable or non-renewable sources. Hydrogen can either be used in conventional engines or in fuel cells. In fuel cells the only emissions are water. Similarly to electric vehicles the overall emissions impact depends on the energy used to produce the hydrogen. Only if using renewable sources does the emissions impact of powering the vehicle become zero. Hydrogen technology is still in its infancy. Prototypes are being used, but mass market availability is not achieved yet. In relation to fuels, there is an ongoing debate about their relative environmental impacts regarding CO₂ and other exhaust gas emissions as well as the impacts caused by their production and processing. For further information the European Commission Joint Research Centre conducted a joint evaluation of the Well-to-Wheels energy use and greenhouse gas (GHG) emissions for a wide range of potential future fuel and powertrain options.¹⁴

Within the EU, Member States are promoting different technologies and fuelling infrastructures. As such there is little consensus on the most environmentally friendly technology or fuel type. This may also depend on the specific (natural or other) circumstances within each region or Member State.

As this is not a straightforward issue and there are substantial differences between the Member States, the criteria will not favour one type of technology or fuel but define crosscutting, performance-based specifications that can be used for most vehicle types. An evaluation of the lifetime cost of the energy consumption of the vehicle can then take place, taking into account energy content and cost of individual fuels.

### 4.3.4. Vehicle Noise

As for noise emissions, in Europe’s congested cities traffic noise is a serious problem. Noise emission sources range from: propulsion noise (engine, powertrain, exhaust and intake systems), tyre/road contact noise and aerodynamic noise.

The engine noise is the dominant source at lower speeds (under 30km/h for passenger cars / under 50km/h for lorries), tyre noise dominates above that, and aerodynamic noise becomes louder as a function of the vehicle speed¹⁵.

Noise emission standards (maximum permissible sound levels for the exhaust system of


Green Public Procurement – Transport

motor vehicles) were first described in Directive 70/157/EEC\textsuperscript{16} and the latest Directive (2007/34/EC\textsuperscript{17}) currently sets noise emission limits of 74dB (A) for passenger cars and 80dB (A) for buses and trucks\textsuperscript{18}.

In order to reduce noise, lower exhaust system emission levels should be promoted through procurement, together with a focus on tyres where appropriate.

4.3.5. Vehicle Size/Class

Finally, in relation to size and power, according to data from the ACEA (European Automobile Manufacturers’ Association), passenger cars have increased in mass (+15\%) and even more in power (+28\%) between 1995 and 2004\textsuperscript{19}. The increased use of heavier, more powerful cars and trucks together with other factors have offset the improvements in fuel economy resulting from improved engine technology.

The general guideline when purchasing cars or contracting transport services should be to identify the real need, in terms of size and power, and define clearly the use requirements of the vehicles and to choose the smallest, lightest and least powerful vehicle that meets these needs. A report for the UK Department for Transport\textsuperscript{20} looking at light goods vehicles found that there is a significant difference in average van loading and total capacity, as little as 38\% of the capacity of the van is used in some cases. This highlights the need to think carefully about not choosing a vehicle that exceeds the requirements of its task. This is especially the case for higher emission vehicles as their unnecessary use has a greater environmental impact.

As size and power parameters will have to be determined in each case depending on the specific use requirements, no general criteria can be provided.

It should also be considered whether the transport needs can be met by leasing or car pooling/sharing. If possible using shared cars effectively reduces costs and environmental impacts by having fewer cars on the road.

Size and class considerations do not apply to buses and waste collection trucks, as their selection is more based on real performance requirements than passenger vehicles.

4.3.6. Vehicle tyres

Tyres can influence two of the main environmental impacts for road transport: greenhouse gas emissions (by increasing fuel consumption) and noise levels. They may also contain


\textsuperscript{18} Detailed authorised emission levels can be found in Annex I.


toxic substances.

**Fuel consumption**

Tyres influence fuel consumption due to differing rolling resistance. In order to maximise fuel consumption, two measures can be applied: the use of **low rolling resistance tyres** (LRRT) and the installation of **tyre pressure monitoring systems** (TPMS). As a tyre rotates, due to the weight of the vehicle, it experiences deformations where energy is lost as heat. LRRT minimise this loss and thus reduce the amount of energy needed to propel the vehicle forward. Tyre pressure also affects this energy loss and TPMS inform the driver when tyre pressures are not optimal. LRRT and TPMS have an important CO₂ reduction potential estimated at 3% and 2.5% respectively\(^{21}\).

Regulation 661/2009\(^{22}\) introduces legislation from 1\(^{st}\) November 2012 with requirements aimed at reducing rolling resistance with TPMS and LRRT. All passenger cars (M\(_1\) class) approved from 1\(^{st}\) November 2012 must have TPMS within their design. All vehicles manufactured after 1\(^{st}\) November 2014 must include TPMS. There are requirements reducing rolling resistance which are introduced in two stages in November 2012 and November 2016.

When using TPMS the vehicle owner, user or vehicle fleet manager must ensure tyre pressure is adjusted regularly according to the indications of the TPMS.

Contracting authorities should still seek TPMS in the purchase of passenger cars before the law requires it. It should also be promoted in other types of vehicles. LRRT tyres fitted to vehicles should go beyond the minimum standards set out in Regulation 661/2009 and the GPP criteria (based on the Nordic Swan and Blue Angel ecolabels) aims to encourage this.

**Tyre noise**

In relation to noise levels, tyre rolling noise emissions have increased over time due to the increased use of wider tyres. Regulation 661/2009 also includes minimum legal standards for tyre noise to be phased in from 1\(^{st}\) November 2012. Authorities should aim to ensure vehicles are fitted with tyres that are are well within the noise limits set out in the legislation.

In order to aid consumers Regulation 1222/2009\(^{23}\) requires that all tyres produced after July 2012 and on sale in the EU from November 2012 should, at the point of sale, be accompanied by a label with performance specification. This specification covers rolling resistance (expressed as fuel economy), rolling noise levels and wet grip. Rolling resistance follows a familiar A – G style rating, while noise levels are expressed as one of 3 levels representing how far under the maximum noise levels required by law the tyre is. This label will aid authorities in understanding the impacts of tyres provided with procured vehicles.

Additionally, it should be guaranteed that the used tyres are appropriately collected and

\(^{22}\) Regulation (EC) No 661/2009 of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor.  
\(^{23}\)Regulation (EC) No 1222/2009 of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters
managed by an authorised waste collector during routine maintenance.

4.3.7. Motor lubricants

Automobile lubricants represent the biggest market for lubricants. The environmental burden of lubricants is considerable due to the nature of the substances that form them (mostly petroleum-derived compounds and additives characterised by their toxicity and low biodegradability). Environmentally friendly automotive lubricants present a huge market opportunity, but tough performance requirements and the low price of petroleum alternatives make this a difficult market to enter. Furthermore, as automotive lubricants are used in closed systems, they are not perceived as high-risk lubricants. The environmental concerns relate more to their impact on fuel consumption and issues related to the proper collection and recycling of used oil.

Low viscosity lubricants (LVL) have a CO\(_2\) reduction potential estimated at 2.5\%\(^{25}\). Motor oils are categorised according to their viscosity at cold start and at high motor temperature by means of the SAE (Society of Automotive Engineers) system\(^{26}\). Oils with SAE viscosity grades 0W30 and 5W30 guarantee the best lubrication function due to their viscosity properties. For this reason, they are described as high lubricity oils. Conventional motor oils (15W40, 10W40) cannot achieve this level of viscosity. LVL are somewhat more expensive but with the reduction of fuel consumption the investment is also financially rewarding after a period of time\(^{27}\).

Lubricants may also contain hazardous substances and mixtures that may have an environmental impact on plant and animal life if allowed to be released (e.g. as waste) into the ground or water. Potentially harmful substances should be limited as far as possible.

It is also important to encourage the use of lubricants that are biodegradable and not bioaccumulative. Bioaccumulative refers to the situation where an organism absorbs a toxic substance at a greater rate than which it can be lost. This can lead to poisoning.

Lubricants can be derived from renewable materials such as vegetable oils and animals fats. This reduces environmental impacts associated with using petroleum as the raw material.

The EU Ecolabel for lubricants\(^{28}\) includes criteria on excluding or limiting hazardous substances and mixtures, aquatic toxicity requirements, biodegradability and bioaccumulation potential and renewable materials content. It covers a range of categories, the most relevant being hydraulic fluids (category 1) and greases (category 2). For hydraulic


\(^{26}\) Society of Automotive Engineers (SAE) is a professional organisation and a standards development organisation for the engineering of powered vehicles of all kinds, including cars, trucks, boats, aircraft and others. The SAE has established a numerical code system for grading motor oils according to their kinematic viscosity, which is internationally used.


\(^{28}\)http://ec.europa.eu/environment/ecolabel/ecolabelled_products/categories/lubricants_en.htm
Green Public Procurement – Transport

fluids it requires that at least 50% be derived from renewable materials. For greases it should be at least 45%.

Another option could be the procurement of regenerated oils, lubricants that are made partly with used lubricant oils that have been selectively collected, purified and mixed with newly produced oils, as long as they comply with the same standards as non-regenerated oils. At the European level, the minimum quality level of lubricant oil must be in accordance with the ACEA 2007 European oil sequences for service-fill oils.

Focus should be given to the procurement of low viscosity lubricants and/or those created at least partly from renewable materials and also contain materials with a low environmental impact meeting the requirements of the EU Ecolabel.

The correct collection and management of used lubricants through an authorised waste collector during routine maintenance should be guaranteed. Where cleaning and washing of vehicles services are provided, it should be ensured that no oil, lubricant or other potentially toxic substance be let unfiltered into waste water.

4.3.8. Mobile air conditioning

Passenger cars now enjoy a number of comfort features that have become quasi-standard, one of which is mobile air conditioning (MAC). MACs link to climate change in two ways:

- An increase in fuel consumption, leading to a higher CO₂ emission per kilometre up to 7 g CO₂/km, but which is not reflected under the test-cycle of the EU type approval system to calculate standard fuel consumption in vehicles.

- The release of refrigerants used in MACs.

Currently there is no standardised test method to determine MAC contribution to fuel consumption, therefore no criteria can be proposed in this direction. However in relation to the refrigerants used in MACs it is possible to act. In 2006 the EU adopted a Directive for M1 and N1, Class I vehicles, aimed at:

- controlling the leakage of fluorinated greenhouse gases with a global warming potential (GWP) higher than 150 (in terms of 100 years) in MACs and

- prohibiting the use in MACs of those gases from a certain date

31 A refrigerant is a compound used in refrigerators/freezers and air conditioners to generate cold.
33 Global warming potential (GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale, which compares the gas in question to that of the same mass of carbon dioxide (whose GWP is by definition 1). A GWP is calculated over a specific time interval and the value of this must be stated whenever a GWP is quoted or else the value is meaningless.
From 21 June 2008 the manufacturer is unable to obtain a type approval for a new type of vehicle if it is fitted with MACs designed to contain F-gases with a GWP higher than 150 leaking more than 40 grams per year (one evaporator systems) or 60 grams per year (dual evaporator systems). This date has been postponed by one year for all new vehicles having been type-approved in the past.

The second phase is the complete ban of MACs designed to use the above-mentioned gases. It shall be effective as from 1 January 2011 for new types of vehicles (the manufacturer will be unable to obtain a type approval for a new type of vehicle if it is fitted with this kind of systems) and as from 1 January 2017 for all new vehicles. From that date on, new vehicles with these systems cannot not be registered, sold and enter into service.

In order to promote the introduction of new components and technologies, public procurement for passenger vehicles and LDV should promote the use of refrigerant gases with <150 GWP, in advance of legislative requirements.

For buses and waste trucks the Blue Angel ecolabel for municipal vehicles and buses limits MAC refrigerating gases to those with a GWP < 2,500.

4.4. End of life

As many materials used in the vehicle as possible should have potential for recycling at the end of its life. The vehicle would ideally come with disposal guidelines giving information on which parts can be recycled or reused at the end of the vehicles life. By maximising the amount of material that can be used again or recycled this minimises waste to landfill, energy consumption and costs of disposal at the end of the vehicle’s life. Directive 2000/53/EC covers target requirements at the end of life of vehicles.

Proper servicing and maintenance of the vehicle helps to extend its useful life. When replacing items the use of second hand parts should be considered to reduce the impact from manufacturing.

End of life considerations also apply to lubricant oils and tyres which should be disposed of in a way that minimises release to ground/water waste and landfill. If electric or hybrid cars are used batteries should also be disposed of carefully.

4.5. Other considerations

Even without considering alternative fuels and vehicle technology, reductions in CO₂ emissions can be achieved through improving driving style efficiency. According to the results of the review of the Community Strategy to reduce CO₂ emissions the long-term

---

34 Some basic rules of “eco-driving” are: to shift up gears as soon as possible; to maintain a steady speed (use the highest gear possible and drive with low engine revolutions); to anticipate traffic flow (look ahead as far as possible and anticipate surrounding traffic); to decelerate smoothly (when you have to slow down or to stop, decelerate smoothly by releasing the accelerator in time, leaving the car in gear); and to check the tyre pressure frequently. To know more you can check the website: http://www.ecodrive.org

effect of applying eco-driving is a fuel consumption reduction of 3%, reaching 4.5% when combined with a **Gear Shift Indicator** (GSI), also known as drive-style meters. GSI allow drivers, when trained appropriately, to substantially improve the efficiency of their driving and allow supervisors to keep track of performance. The effect of GSI in the absence of a specific eco-driving training also helps reducing fuel consumption by circa 1.5%.

Regulation 661/2009 requires that GSI be included for passenger cars (Class M1 with mass ≤ 2610kg). From 1st November 2012 appropriate vehicles without GSI will not receive type approval and from 1st November 2014 this will apply to all new stated vehicles. The EU GPP criteria aim to promote GSI in all vehicles.

Another mechanism that encourages eco-driving is an indicator displaying to the driver fuel consumption statistics as they drive. Many cars already have this feature, which can give the driver feedback on instantaneous and average fuel consumption. Where a transport service is provided, fuel use and consumption should be tracked.

Furthermore, efficient driving not only leads to fuel savings, with the consequent economic savings and emission reductions, but also to the reduction of maintenance costs and the risk of accidents.

Start-stop technology is also becoming more common in vehicles. This system automatically shuts down and restarts the engine to reduce the amount of time it spends idling. This helps to reduce fuel consumption and is particularly useful in urban environments where stopping at traffic lights, and/or stopping due to heavy traffic is common.

Efficient driving, combined with a Gear Shift Indicator, fuel consumption indicator and start-stop system, should be taken into account (where applicable) when purchasing vehicles and contracting public transport and waste collection services.

5. **Cost Considerations**

When considering the life-cycle costing (LCC) of vehicles, operating and disposal costs must be considered in addition to purchase price. The following cost elements must be taken into account within the scope of the LCC: **investment costs**, **annual motor vehicle taxes** (although in some countries, publicly purchased vehicles are exempt from such taxes); **energy consumption** based on the costs for the fuel consumed over the course of the service life of the vehicle; **maintenance costs** made up of material costs for engine oil, tyres, spare parts and the corresponding labour costs; **insurance costs**; and **end of life** costs or revenues (depending on whether the vehicle is disposed of or sold). Directive 2009/33/EC requires that energy consumption and emissions be taken into account within the purchasing decision. Article 6 introduces a methodology to calculate the monetised cost of these. This can be used with the other costs to achieve a life-cycle costing for the vehicle taking into account environmental impact. This gives a cost advanced to a more environmentally friendly and energy efficient vehicle.

6. **Public Procurement Needs**
Public authorities require vehicles for a range of activities including; ordinary passenger car (used for example as official vehicles, vehicles of inspection bodies), small vans and light duty vehicles (for example delivery vans or equipment for gardening), buses and waste disposal trucks.

In terms of public procurement, the total annual purchase of vehicles by public authorities has been estimated to be in the order of 110,000 passenger cars, 110,000 light-duty vehicles, 35,000 lorries and 17,000 buses for the EU-25. The corresponding shares of public procurement of the whole sales in the EU-25 are slightly below 1% for cars, around 6% for vans and lorries, and around 30% for buses.

As large procurers of vehicles public authorities have a significant role to play in not only reducing environmental impacts in their own right, but also encouraging the use and manufacturer of greener vehicles in general. Directive 2009/33EC requires that energy consumption and emissions be taken into account in the purchasing decision. This ensures that environmental impacts are taken into account and gives a competitive advantage to green vehicles.

7. Conclusions and Summary

Directive 2009/33/EC or the Clean Vehicles Directive requires that energy consumption and environmental impacts are included in all public authority purchasing decisions for road transport vehicles. The aim of these EU GPP criteria is to go beyond that of the directive and set minimum and award criteria that further aid the purchasing decision and reduce environmental impacts.

The main environmental impact from vehicles comes via CO₂ (a greenhouse gas) and other emissions from the engine. These emissions have a significant effect on climate change and air quality. Alternative fuels and technologies have a potential to reduce emissions. Emissions are linked to energy consumption and there are further techniques that can be used to improve this. Low rolling resistance tyres, and a tyre pressure monitoring system can decrease energy losses within the tyres. Gear shift indicators and fuel consumption displays aid eco-driving, giving the driver feedback and help in driving in a more energy efficient way.

Other environmental impacts to consider include noise from both the car engine/exhaust and the tyres, potentially hazardous chemicals in the tyres and air conditioning systems and recycled content and end of life considerations.

8. Recommended core and comprehensive GPP criteria
<table>
<thead>
<tr>
<th>Key Environmental Impacts</th>
<th>GPP Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Contribution to climate change through the emission of greenhouse gases</td>
<td>• Procurement of low emission vehicles (GHG, other exhaust gases and noise)</td>
</tr>
<tr>
<td>• Depletion of resources (especially non renewable fuels)</td>
<td>• Reduce fuel consumption through eco-driving, tyre pressure monitoring systems and gear shift indicators</td>
</tr>
<tr>
<td>• Air pollution through the emission of other exhaust gases that can cause:</td>
<td>• Reduce fuel consumption by using low viscosity lubricants and low rolling resistance tyres</td>
</tr>
<tr>
<td>o Local health (especially respiratory) and regional problems</td>
<td>• Procurement of vehicles with air-conditioning systems with low GWP (Global Warming Potential) coolers</td>
</tr>
<tr>
<td>o Damage to the environment, buildings and monuments</td>
<td>• Procurement of environmentally friendly tyres and regenerated lubricant oils</td>
</tr>
<tr>
<td>• Noise pollution</td>
<td>• Ensure the correct collection and management of used lubricant oils and tyres</td>
</tr>
<tr>
<td>• Generation of waste lubricant, oils and tyres</td>
<td>• Encourage vehicles made with recycled/bio-materials</td>
</tr>
<tr>
<td>• Generation of waste parts and materials at end of vehicle life</td>
<td></td>
</tr>
</tbody>
</table>

8.1. **Recommended criteria for passenger cars and light-duty vehicles**

Since in most Member States, as a result of lower tax rates, diesel is cheaper than petrol company cars tend to be diesel fuelled. This also applies for contracting authorities although the procurement of vehicles with other technologies/fuels is increasing. The selection of one type or another will highly depend on the performance requirements and the use of the vehicle. Therefore, before drafting any criteria, it is necessary to reflect on whether it is necessary to buy or rent a car and if so, what are its specific requirements. The vehicle should be suitable for the task it is required to perform, and not go beyond it.

Tenders are normally divided into lots for the different categories of vehicles to be purchased which allows the contracting authority to define different technologies for each of them (hybrids, FFV, electric, LGP, etc.).

The environmental criteria proposed below in relation to CO₂ emissions will be based on European studies and guidance. For exhaust gas emissions, reference to the EURO standard will be made. Even if hybrid vehicles, CNG or FFV are purchased, the criteria on CO₂ and EURO emissions will be defined in the same way as for “conventional” vehicles. Other criteria will also be specified for noise, lubricants or tyres.

As mentioned above, the **Core** set of criteria will focus on CO₂, other exhaust gases (pollutant emissions), noise emissions and eco driving.
The **Comprehensive** criteria will cover the other elements that can influence the consumption of fuel or other environmental impacts of vehicles. A specific section will address the cases where vehicles are leased or rented, taking into account the fact that maintenance tasks will be carried out by the contracted company.

In both cases, in order to encourage improvement or to be able to compare offers and choose the most environmentally friendly, award criteria have been defined.

The full recommended criteria sets can be found in the EU GPP criteria.

### 8.2. **Recommended criteria for public transport vehicles and services**

Until some years ago, most public transport services were under the management of public authorities (mainly local and regional administrations) either directly by civil officers or through a public company in charge of the service. However, in recent years, there has been an increasing trend towards competitive tendering for public bus services. Therefore criteria are provided for both the direct purchase of buses as well as for the procurement of public transport services.

When considering HDV (heavy duty vehicles), as they are not labelled with CO₂ emissions - unlike passenger cars - indirect aspects should be taken into consideration in order to specify vehicles with reduced CO₂ emissions, such as reduced fuel consumption, eco-driving, the use of low rolling-resistance tyres and the installation of gear shift indicators (GSI). As with most products, the way buses are driven or used has a major influence on the environmental impact.

It is also necessary to define criteria for exhaust and noise emissions as, in urban contexts, these can be considered the main impacts of public transport. Criteria on exhaust gas emissions will be a bit stricter than for cars because of the longer life span of HDVs.

The use of special fuels or technologies such as biodiesel, CNG, LPG or hydrogen will have to be determined by each authority depending on their own policies, fuel distribution network, etc.

For **bus procurement**, the **Core** criteria tackle the main environmental and health related aspects of buses: exhaust gas and noise emissions (through the technical characteristics of the vehicles).

The **Comprehensive** criteria will consider other elements that will help reduce the impacts defined in section 4.

For **bus service contracts**, the **Core** criteria also concentrate on exhaust and noise emissions and eco-driving training for bus drivers to reduce fuel consumption.

In the **Comprehensive** set, additional criteria aimed at reducing fuel consumption and wider environmental impact are included.

The exhaust emissions criteria for bus service contracts are less exacting than those for new vehicle purchase. This is because most bus service contracts will be let to companies with existing fleets that will have been purchased before the latest emissions requirements became
mandatory. In this case most criteria will be defined as award criteria in order to be able to compare bus fleets and services and award more points to the more environmentally friendly.

8.3. Recommended criteria for waste collection trucks and services

As for transport services, waste collection services are increasingly tendered out to private companies. Therefore criteria are provided for both the direct purchase of trucks as well as for the procurement of waste collection services.

The criteria are very similar to those for buses, as they are also heavy-duty vehicles.

The only difference is that for trucks it is recommended to exclude the criteria on GWP. Criteria for air conditioning systems seem less relevant as only the driver’s cabin would be climatised and in several countries the service is carried out during the night or early morning when it is unnecessary to use the air conditioning. Therefore the criteria for this element is excluded for waste collection trucks. There is an extra criterion for a separate engine for auxiliary units. This is based on the Blue Angel criteria. The full recommended criteria sets can be found in the EU GPP criteria.

9. Verification issues

Following the European regulatory framework, many of the important environmental performance parameters (fuel consumption and exhaust and noise emissions) must be detailed in the technical sheets accompanying the vehicles, which considerably eases verification procedures.

Regarding CO₂ emissions, as explained in section 10.2 passenger cars must always carry a label where CO₂ emissions are stated, providing a further information source for verification. However it will not be possible to base Europe-wide purchasing criteria on the fuel efficiency classification label (Class A, B, C etc.) as there is no harmonisation in the calculation of the efficiency classes.

For other products such as lubricants or tyres, if criteria are included in rent/lease contracts, tenderers will have to provide the ecolabels for such products or laboratory tests that demonstrate compliance with the criteria defined. Furthermore, as frequent maintenance will be carried out, tenderers will have to provide a report stating how many times lubricant oils and tyres have been changed and the invoices indicating the products purchased to guarantee that the products used really are environmentally friendly.

For other aspects laboratory tests and/or manufacturer’s declarations will serve as means of proof.

10. Relevant European Legislation and Policies
10.1. Clean Vehicles Directive

Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles (Clean Vehicles Directive) enacted on 23rd April 2009 requires public authorities to take into account lifetime energy and environmental impacts when purchasing road vehicles from 4th December 2010. This legislation ensures that energy efficiency and environmental impacts become a key part of the purchasing decision, encouraging the market to develop and promote greener vehicles. Article 6 of the Directive describes a methodology to monetise energy consumption and emissions to form part of the total lifetime cost of the car. This total lifetime cost ensures that a vehicle with relatively higher fuel consumption emitting larger amounts of CO₂ and other emissions becomes more expensive within the purchasing decision.

10.2. Emissions

The Community is taking steps in order to limit the trend of increasing CO₂ emissions from an expanding number of vehicles on the road. With regards to passenger cars, Directive 1999/94/EC\(^{36}\) requires information about a car’s CO₂ emissions and fuel consumption be made available to customers at point of sale. Regulation 443/2009 sets out a target value across the fleet average for a manufacturer of 130g CO₂/km by 2015. This is working towards a target of 95 g/km by 2020. The Regulation also describes an excess emissions premium where manufacturers do not meet emissions targets.

A similar Regulation\(^ {37}\) applies for light duty vehicles, requiring a fleet average for all new vans (of class N₁ with a mass of less than 2610kg when empty) of 175 g CO₂/km to be phased in between 2014 and 2017. The Regulation has a long term target of 147g/km in 2020. Actual emission targets depend on the mass of the individual vehicle, using a limit curve. The curve is set to achieve a fleet wide average of 175g/km.

- These fit within the wider European strategy on clean and energy efficient vehicles, as described in COM(2010) 186 Final\(^ {38}\). This sets out medium and long term plans to ensure efficient vehicles. Below is a summary taken from the strategy containing some of the other main points targeted at reducing environmental impacts within this plan: Propose a strategy targeting fuel consumption and CO₂ emissions from heavy-duty vehicles.
- Present a proposal by 2011 to reduce fuel consumption impacts of mobile air conditioning systems.
- Present a proposal to amend Directive 70/157/EEC by the end of 2011 to reduce noise emissions of vehicles.

---


- Ensure that CO₂ and pollutant emissions are reduced under real-world driving conditions by proposing at the latest by 2013 a revised test cycle to measure emissions, developed through UNECE, including a methodology for taking into account innovative technologies; and develop a robust procedure by 2012 to measure real world emissions, considering the use of portable emissions measurable systems.
- Promote additional measures that may help to decrease CO₂ and pollution emissions from road transport — such as eco-driving, Intelligent Transport Systems (ITS), including onboard technologies and the applications stemming from Galileo, infrastructure measures, and urban transport management.

Further information about the European strategy for clean and energy efficient vehicles including latest state of play reports can be found here: [http://ec.europa.eu/enterprise/sectors/automotive/competitiveness-cars21/energy-efficient/index_en.htm](http://ec.europa.eu/enterprise/sectors/automotive/competitiveness-cars21/energy-efficient/index_en.htm)

Air quality is one of the areas in which Europe has been very active in recent years. The approach has been to develop an overall strategy by setting long-term air quality objectives. In 2005 the Commission’s Thematic strategy on air pollution[^37] was published outlining plans to tackle a number of key pollutants – particulate matter (PM), ground level ozone, ammonia (NH₃), nitrogen oxides (NOₓ), sulphur dioxide (SO₂), and Volatile Organic Compounds (VOCs) by 2020.

Directive 2008/50/EC[^39] on ambient air quality sets specific limits for pollutant emissions. This Directive brings together a number of previous pieces of legislation, including the Framework Directive 96/62/EC on ambient air quality assessment and management, and the three daughter Directives that set specific targets[^40].

Many cities will have difficulty in reaching these limits. One way for contracting authorities to contribute to its achievement is by targeting low-emission vehicles in the authority’s car fleets, public transport vehicles and waste collection vehicles.

### 10.2.1. EURO standards

To reduce vehicle pollutant emissions, the EU introduced the so-called **EURO standards** in 1992. These standards currently regulate the legal emission levels of both new cars and light and heavy-duty vehicles and are applied progressively, becoming stricter over time.

For passenger cars and Light-Duty Vehicles (LDV) EURO levels 1-6 have been defined. First specified in Directive 70/220/EC[^41], and subsequently amended, being repealed and replaced by Regulation 715/2007[^42] which defined emissions for EURO 5 and EURO 6.

[^42]: Regulation (EC) No 715/2007 of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information.
EURO 5 is the current standard, the EURO 6 standard becomes the limit from 2014. Heavy-Duty Vehicles (HDV) with a maximum mass over 3500kg such as buses and waste disposal trucks have standards for their engines usually referred to as EURO I – VI. Originally introduced in Directive 88/77/EEC\(^{43}\), being revised by Directive 2005/55/EC\(^{44}\). Regulation 595/2009\(^{45}\) sets the emission standard for EURO VI. EURO V is the current legal standard, with EURO VI coming into force from 2013. In between EURO V and 6 is the voluntary EEV (Enhanced environmentally friendly vehicle) emission standard.

In addition to introducing more stringent emission limits, the European Commission will be reviewing the need to introduce standards for pollutants that are as yet unregulated, which may be related to the usage of alternative fuels and additive-based emission control systems. The Commission will also investigate whether setting an additional limit for particle levels and size is necessary, and, if so, include it in the proposals.

Further information on EURO standards can be found at [http://www.dieselnet.com/standards/eu/](http://www.dieselnet.com/standards/eu/).

### 10.3. Other legislation and policies

Other relevant legislation includes Directive 70/157/EEC\(^{42}\) as amended by Directive 2007/34/EEC\(^{46}\) on noise emission standards, which outlines the maximum permissible sound levels for the exhaust system of motor vehicles. These noise emission limits are 74dB (A) for passenger cars and 80dB (A) for buses and trucks\(^{47}\).

The Directive 2009/28/EC\(^{48}\) (Renewable Energy Directive) on the promotion on energy from renewable sources sets a target for each nation of 10% of the total energy used in all forms of transport to come from renewable (such as biofuels or electricity from renewables) sources by 2020. This covers all transport types and not just road vehicles.

In 2003 the EU adopted Directive 2003/30/EC\(^{49}\) to promote the use of biofuels in the transport sector, setting a target of 5.75% market share for biofuels in the fuels used by road transport by 2010. This Directive is amended, and subsequently repealed by the Renewable


\(^{47}\) Detailed authorised emission levels can be found in Annex I.

\(^{48}\) Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

Energy Directive\textsuperscript{44}. The EU has a strategy to promote biofuels as described in COM(2006) 34\textsuperscript{50}. Further information and progress reports on biofuels can be found at \url{http://ec.europa.eu/energy/renewables/biofuels/biofuels_en.htm}.

Furthermore, in April 2009 the Commission amended the Fuel Quality Directive 98/70/EC\textsuperscript{51} with Directive 2009/30/EC\textsuperscript{52}. It introduces a requirement on fuel suppliers to reduce the greenhouse gas intensities of their fuel for road transport. It also amends details of petrol and diesel specifications and establishes criteria that must be met by biofuels in order to count towards the greenhouse gas intensity reduction.

Additionally, the EU adopted a Directive 2006/40/EC\textsuperscript{53} aimed at prohibiting \textbf{air conditioning systems} containing fluorinated greenhouse gases with a global warming potential higher than 150. The directive then moves to ban these gases altogether.

From 21 June 2008 the manufacturer is unable to obtain a type approval for a new type of vehicle if it is fitted with MACs designed to contain F-gases with a GWP higher than 150 leaking more than 40 grams per year (one evaporator systems) or 60 grams per year (dual evaporator systems). This date is postponed by one year for all new vehicles having been type-approved in the past.

From 1 January 2011 for new types of vehicles, the manufacturer will be unable to obtain a type approval for a new type of vehicle if it is fitted with this kind of system, and as from 1 January 2017 for all new vehicles. From that date on, new vehicles with these systems cannot be registered, sold and enter into service.

There are a number of laws affecting \textbf{tyres}.

Regulation 661/2009\textsuperscript{54} introduces legislation from 1\textsuperscript{st} November 2012 with requirements aimed at reducing rolling resistance with tyre pressure monitoring systems (TPMS) and low rolling resistance tyres (LRRRT). All passenger cars (M\textsubscript{1} class) approved from 1\textsuperscript{st} November 2012 must have TPMS within their design. All vehicles manufactured after 1\textsuperscript{st} November 2014 must include TPMS. There are requirements reducing rolling resistance which are introduced in two stages in November 2012 and November 2016.

In relation to tyre noise levels, Regulation 661/2009 also includes minimum legal standards for tyre noise to be phased in from 1\textsuperscript{st} November 2012.

Regulation 1222/2009\textsuperscript{55} requires that all tyres produced after July 2012 and on sale in the EU

\textsuperscript{50} COM(2006) 34 Final. An EU strategy for Biofuels
\textsuperscript{54} Regulation (EC) No 661/2009 of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor.
\textsuperscript{55} Regulation (EC) No 1222/2009 of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters
from November 2012 should, at the point of sale, be accompanied by a label with performance specification. This specification covers rolling resistance (expressed as fuel economy), rolling noise levels and wet grip.

Directive 2005/69/EC\(^{56}\) limits the use of PAH in extender oils and tyres.

Regulation 661/2009 requires that gear shift indicators (GSI) be included for passenger cars (Class M\(_1\) with mass ≤ 2610kg). From 1\(^{st}\) November 2012 appropriate vehicles without GSI will not receive type approval and from 1\(^{st}\) November 2014 this will apply to all new stated vehicles.

11. Existing Standards, Ecolabels and other criteria sources

11.1. Ecolabels

11.1.1. Vehicle fuel consumption and CO\(_2\) emissions label

The main label for vehicles, although it only applies for passenger cars, is the label on fuel consumption and CO\(_2\) emissions that all new cars have to display as established in the fuel-efficiency labelling Directive 1999/94/EC\(^{57}\). The Directive makes compulsory the display of CO\(_2\) emission information but allows Member States to publish national guidelines on the fuel efficiency of new cars as well as other informative measures. These guidelines classify vehicles in fuel efficiency classes like the ones used in domestic appliances (fridges, washing machines, dishwashers, etc.). A Report on the effectiveness of the car fuel efficiency labelling Directive 1999/94/EC\(^{58}\) concluded that the compulsory labelling of CO\(_2\) emissions has not had the communicative and informative impact intended and that the classification by fuel efficiency is much more useful for procurers.

11.1.2. Vehicle Ecolabels

Blue Angel

The Blue Angel ecolabel has criteria for Low-noise and low-pollutant municipal vehicles and buses\(^{59}\), which defines criteria for:

- Noise emissions (limit values for vehicles, operating noise and occupational safety)
- Pollutant emissions (driving engine, separate engine for auxiliary units and greenhouse potential)


• Paint work (free from lead, chromium V and cadmium compounds)

**Bra Miljöval**

The Swedish Bra Miljöval label has criteria for passenger transportation. This includes all forms of passenger transports and services rather than just road buses. Within the criteria is the concept of comparing performance per passenger-km. This is a measure of total distance taking into account number of passengers served. For example one criterion states that the overall use of non-renewable energy used in the transportation should not exceed 0.18kWh/passenger-km. There are also criteria for emissions in per passenger-km.

There is a proposed update to the criteria which would lower the target amount of energy supplied to run the transport operation to 0.16kWh/passenger-km. Over the entire lifecycle the transportation should not exceed 50g CO₂ per passenger-km. Amongst other criteria there is also provision that the supplier should allocate funds for transport related environment projects.

**11.1.3. Vehicle tyres**

The Nordic Ecolabel⁶⁰ and the Blue Angel label⁶¹ have criteria for vehicle tyres, taking into consideration noise and rolling resistance, amongst other factors. Nordic Ecolabelling also has criteria for vehicle wash installations⁶². The recommended procurement criteria take into account and refer to the criteria set in these ecolabels.

**11.1.4. Lubricants**

The EU Ecolabel on lubricants⁶³ contains criteria on: excluding/limiting hazardous substances and mixtures, aquatic toxicity requirements, biodegradability and bioaccumulation potential and renewable material content. The contain a number of categories the most relevant being for hydraulic fluids and greases. The recommended procurement criteria take into account the EU Ecolabel.

**11.2. National GPP Guidance**

In some countries environmental guidance for the procurement of vehicles and passengers transport services have been published. Below is a summary of guidance provided in various countries. More information on individual countries within the EU and their support instruments and public procurement guidance for cleaner vehicles can be found at [www.cleanvehicle.eu](http://www.cleanvehicle.eu).

**11.2.1. Belgium**

In 2004 the federal government defined guidelines for the procurement or leasing of vehicles to be used by the federal administration⁶⁴. The Government committed itself to procure, rent

---

⁶¹ Low Noise and Fuel Efficient Automobile Tures RAL-UZ 89 January 2009
or lease 50% of all new passenger vehicles defined as environmentally friendly. In order to reach such an objective without surpassing their assigned budget, federal administrations may have to reduce their vehicle fleet sizes. Environmentally friendly vehicles will be those fuelled by electricity, LPG, LNG, hydrogen, hybrids or conventional vehicles with stricter exhaust emissions than the compulsory ones.

Belgium has a guide for sustainable procurement\(^65\). The guidance for passenger cars includes the award of contracts based on the ecoscore\(^66\) system. This scheme gives a car a mark between 0 and 100 based on emissions of CO\(_2\), air pollutants and noise. The higher the ecoscore the less environmental impact the car has. For public procurement of cars, the guidance sets a target ecoscore of 70.

**11.2.2. The Netherlands**

The Dutch SenterNovem\(^67\) published a range of green public procurement guides for transport including criteria for service cars, heavy duty vehicles, public transport, school transport, and transport services. In the Netherlands cars are classified into energy label categories. This is based on Directive 1999/94/EC requiring CO\(_2\) emissions and fuel consumption to be displayed. However in the Netherlands this information is then used to place the car into an energy efficiency label category A – G. The minimum requirements state that for all cars (other than those in specialist classes e.g. sports cars) energy label A or B should be procured. There are also minimum requirements for having a soot filter on diesels, having an indicator that shows the driver the fuel consumption, noise and tyre noise. Within the award criteria extra points are awarded for; cars with an A energy label rating, vehicles which meet future EURO emissions standards or those with alternative propulsion technology. It also recommends considering speed limiters and cruise controls as a way to enhance fuel savings along with efficient driver training and timely and correct maintenance.

In the heavy duty and public transport guides, with regards to emissions the focus is on aiming for future EURO standards. Also recommended are the use of on board computers giving feedback to drivers, tyre noise below that of EU limits, tyre pressure monitors, eco driving and biodegradable lubricants and hydraulic oil. The guides also urge the potential procurer to think carefully about the type of vehicle purchased and ask if it is really necessary or whether more efficient use of current vehicles or rentals may solve the problem. The smallest vehicle possible for the job in order to achieve the highest utilisation rate should be sought. When looking at transport services, reports on what fuels used and consumptions are achieved from the service provider are asked for. The tenderer receives extra points if they have a CO\(_2\) compensation scheme, with either offsetting, or investment into energy savings.

**11.2.3. Sweden**

The Swedish Environment Council provides procurement guides\(^68\) for vehicles and transport services. There are potentially three levels of criteria; basic, advanced and leading edge.

In the light duty vehicles guidance, the advanced criteria for passenger cars have some target

---

\(^{65}\) [http://www.guidedesachatsdurables.be](http://www.guidedesachatsdurables.be)

\(^{66}\) [http://www.ecoscore.be](http://www.ecoscore.be)

\(^{67}\) [http://www.senternovem.nl/sustainableprocurement/criteria/index.asp](http://www.senternovem.nl/sustainableprocurement/criteria/index.asp)


29
emission and consumption values:
- Petrol/Diesel car emissions 110g CO₂/km
- Petrol consumption 8.1 l/100km
- Gas consumption 7.7 m³/100km
- Electric consumption 37kWh/100km

For light duty trucks the basic criteria states 230g CO₂/km and the advanced criteria 195g CO₂/km.

The guidance also recommends support for eco-driving such as a system that gives driver feedback on fuel consumption (alongside driver training and feedback), as well as intelligent speed adaption (ISA). ISA systems monitor the vehicle speed relative to the local speed limit and can either warn the driver or automatically intervene to reduce the vehicles speed. Vehicle noise, tyre noise, PAH content in tyres, ability to be powered with alternative fuels, gear shift indicators, EURO standards and life cycle costs should all also be considered.

When looking at transport service procurement (such as buses or waste disposal services) there are further relevant criteria that are of interest. For example:
- Wash bays – Basic requirements state they should have at least a sludge and oil separator. Advanced requirements call for processing in a separate plant before being released into waste water. Nordic Ecolabel for wash bays can be used as verification.
- Vehicle care products – advanced: fulfil criteria for either Nordic Ecolabel, EU Ecolabel or Bra Miljöval unless no such products exist.
- Age of vehicle – basic: cars - maximum age of 5 years, buses - (with maximum number of passengers 22) maximum age 8 years, buses - (over 22 passengers) maximum age 12 years. Advanced: cars – fuel reported and if it can be powered by renewable energy sources, they should be used at least 80% of the time. Buses – (over 22 passengers) maximum age 8 years.
- Contractors must have an environmental management plan.

11.2.4. Denmark

The Danish Environmental Protection Agency provides manuals for environmentally friendly procurement at www.miljoevejledninger.dk. It has guides for passenger cars and transport services and presents a range of areas the procurer should consider within the purchasing decision.

For passenger cars basic criteria includes low fuel consumption, at least the latest EURO emissions levels, tyres with reduced rolling resistance and cars that perform well in crash tests. Further to this a number of other factors are presented in the award criteria. They include the following ideas to consider:
- Taking into account the consumption figure best suited for the task the car will perform. E.g. City or highway or combined cycle figure?
- Ecolabelled tyres
- Cars painted with water based paints and lacquers with from chrome, lead, mercury or cadmium content.
- Car body free from phthalates. If plasticized PVC is used to protect the underside of

69 Phthalates are used as plasticisers, adding to plastics to increase characteristics such as flexibility and
the car, when worn phthalates could be emitted.

- Can the major plastic components of the car be recycled? Are they marked with plastic type?
- Does the car come with disposal guidelines?
- Does the car maker have a certified environmental management scheme?

The guide also states that the car should be right for the purpose (e.g. vehicle is no larger than needed for the job). Also instead of procuring a car, can the needs be met by bike, bus etc. Environmental impact can be reduced by coordinating use of cars (car sharing etc.) to reduce mileage, and by ensuring proper maintenance.

The guide for transport services contains similar ideas, adding factors such as the supplier should optimize capacity utilization and safeguard against unnecessary transportation, saving transport miles. Also the use of retreated tyres instead of new ones saves non-renewable resources and reduces waste.

Most of the public procurement in Denmark is achieved by using the central National Procurement Ltd (SKI). SKI is a limited company part owned by the state and Local Government Denmark. Within the Framework Agreement on cars, there are environmental requirements based on CO2. For passengers cars maximum CO2 emissions are 140g/km with at least a four star Euro NCAP crash rating. For light duty vehicles and smaller four-wheel drive cars maximum CO2 emissions are 190g/km.

11.2.5. Norway

The Norwegian Agency for Public Management and eGovernment provides guides for environmentally responsible procurement\(^70\). The criteria for passenger cars and light duty vehicles consist of basic and expanded requirements. The basic requirements include crash testing and CO2 emissions. The following figures are used:

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>CO2 g/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermini</td>
<td>110</td>
</tr>
<tr>
<td>Small class</td>
<td>120</td>
</tr>
<tr>
<td>Compact class</td>
<td>120</td>
</tr>
<tr>
<td>Middle class/other</td>
<td>120</td>
</tr>
<tr>
<td>Small van</td>
<td>160</td>
</tr>
<tr>
<td>Light duty vehicle &lt;3.5</td>
<td>230</td>
</tr>
</tbody>
</table>

Within the basic requirements for lease cars is the criterion for suppliers to have an durability. There are health concerns exist over expose to phthalates.

\(^70\) [http://www.anskaftelser.no/artforside](http://www.anskaftelser.no/artforside)
environmental management scheme with continuous improvement with regard to environmental, safety and waste management concerns. Within the extended requirements and award criteria factors such as vehicle noise, tyre noise and rolling resistance and eco driving courses. There are also requirements related to colder climates and winter driving. Winter tyres ideally would be without studs (wear and tear of tyres and asphalt leads to various hazardous substances and particles spread) and the car would be fitted with an electric heater. Emissions are especially high when the engine is cold, a heater that pre-warmed the unit would reduce cold start emissions.

11.2.6. ICLEI’s Procura+ Campaign

The Procura+ guidance\(^71\) concentrates on bus purchases and bus services. For bus procurement, the criteria relate to emission levels, defining them according to the EEV standard; driving style - asking for vehicles to be fitted with GSI to monitor fuel usage; and noise emissions based on suggestions by the German Environment Agency, that go beyond the definition of low noise heavy vehicles as specified in European Directives.

For bus service contracts criteria are defined for emission standards of the fleet establishing a minimum of EURO III and giving award phase points if buses are EEV; driving style meters are compulsory for new buses. Contract provisions ensure that the number of kilometres driven per year by EEV buses must be reported annually. This number must increase by 10% per year; all bus drivers involved in carrying out the service must be trained in a locally recognised institution on environmentally-conscious driving on a regular basis to increase fuel efficiency; and the operator must achieve a "good quality service", as evaluated by an independent market research company at the supplier's expense every year.

11.3. European Projects

11.3.1. GreenLabelsPurchase

In the GreenLabelsPurchase project\(^72\), funded by the European Commission, Directorate Energy and Transport, under the Intelligent Energy Programme, criteria had been developed, among other products groups, for the procurement of vehicles (Passenger Cars, Light Utility Vehicles, Trucks, Buses and Municipal Vehicles). Bidders have to provide information on the vehicle manufacturer, brand/product name, vehicle class, fuel, if they are fitted with purification waste gases systems such as particle filters, MACs, fuel consumption displays, fuel consumption and CO\(_2\) emissions in town, out of town and average, EURO standard, type of lubricant oil applied, and type of tyres used (in relation to low noise and low rolling resistance).

In relation to CO\(_2\) emissions, for passenger cars and LDV they define the following specifications\(^73\):

\(^{71}\) www.procuraplus.org

\(^{72}\) Project Summary at http://ieea.erba.hu/ieea/page/Page.jsp?op=project_detail&prid=1599

\(^{73}\) These values were calculated by the Öko-Institut for the European project GreenLabelsPurchase as follows:

The compulsory values are the average CO\(_2\) emissions of new vehicles (by segment type), sold in Germany from January to July 2006. The figures refer to the most sold vehicles by segment. As a same vehicle type has
Table 4: CO₂ emission recommendations according to the GreenLabelsPurchase project

<table>
<thead>
<tr>
<th>Vehicle segment</th>
<th>CO₂ emissions in g/km</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Compulsory criteria</td>
</tr>
<tr>
<td>Small cars</td>
<td>120</td>
</tr>
<tr>
<td>Compact cars</td>
<td>140</td>
</tr>
<tr>
<td>Middle class</td>
<td>160</td>
</tr>
<tr>
<td>Upper middle class</td>
<td>200</td>
</tr>
<tr>
<td>Upper class</td>
<td>270</td>
</tr>
<tr>
<td>Cross-country vehicle</td>
<td>210</td>
</tr>
<tr>
<td>Van</td>
<td>150</td>
</tr>
<tr>
<td>Transporter up to 3.5 Tons maximum permissible</td>
<td>250</td>
</tr>
</tbody>
</table>

Vehicles have to comply with the compulsory CO₂ emissions and points are awarded proportionally as they reach the target criteria.

Vehicles have to comply with the EURO 4-IV standard, but if they reach stricter standards such as EURO 5 or EEV, points are awarded.

Diesel vehicles must be fitted with particle filters.

Points are also awarded for LVL (SAE 0W30 or 5W30 high lubricity oils) and for LRRT if they comply with the levels defined in the Blue Angel ecolabel.

11.3.2. PROCURA

The European Union is aiming at 10% of transport fuels to be renewable by 2020. This will require a substantial effort in infrastructure development and large-scale deployment of Alternative Fuel Vehicles (AFVs). The Procura project⁷⁴, a General Action of the Intelligent Energy for Europe Programme sponsored by the European Union, is developing joint procurement models, fleet scan tools and manuals to facilitate the acquisition and maintenance of AFVs for private and public fleets. The project provides information on ethanol, biodiesel and compressed natural gas vehicles (fuels and vehicle characteristics, opportunities and barriers, fuelling stations and maintenance, models available in the market different CO₂-emissions within the same model due to different power and other configurations, the CO₂ emissions are of the model with the lowest emissions.

The target criteria are values a bit stricter than the lowest CO₂ emission of a vehicle by segment and which are expected to be on the market in the near future. The most environmentally friendly vehicles in terms of CO₂ emissions are those which are as close as possible to the target criteria.

⁷⁴ http://www.procura-fleets.eu
11.3.3. Buy Smart

The Buy Smart Project\(^75\) funded by the European program “Intelligent Energy Europe” provides material on green procurement. Within the vehicle area for passenger cars, light utility vehicles, heavy goods vehicles, buses and municipal vehicles they state a range of must and award criteria. The must criteria should be used to ensure a minimum specification of vehicle is found, with extra points being achieved for award criteria being fulfilled. They then recommend a life cycle cost assessment based using Article 6 of the Clean Vehicles Directive or their own life cycle tools. The performance sheets for vehicles present the following must and target CO\(_2\) emissions for cars and light duty vehicles.

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Must CO(_2) g/km</th>
<th>Target CO(_2) g/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minis</td>
<td>110</td>
<td>80</td>
</tr>
<tr>
<td>Small cars</td>
<td>120</td>
<td>90</td>
</tr>
<tr>
<td>Compact cars</td>
<td>130</td>
<td>90</td>
</tr>
<tr>
<td>Middle class</td>
<td>150</td>
<td>110</td>
</tr>
<tr>
<td>Upper middle class</td>
<td>170</td>
<td>120</td>
</tr>
<tr>
<td>Upper class</td>
<td>270</td>
<td>170</td>
</tr>
<tr>
<td>Cross-country vehicles</td>
<td>210</td>
<td>140</td>
</tr>
<tr>
<td>Vans</td>
<td>150</td>
<td>110</td>
</tr>
<tr>
<td>Light utility vehicles</td>
<td>220</td>
<td>120</td>
</tr>
</tbody>
</table>

Other criteria include; meeting EURO emissions standards, diesel vehicles having a particulate filter, air conditioning gases, gear shift indicators, tyre pressure monitoring systems, rolling resistance and PCA content of tyres, low viscosity oil and noise emissions.

11.3.4. COMPRO

The COMPRO project\(^76\) looked at the common procurement of clean collective and public transport vehicles. It specifically looked at CNG and hybrid technologies and transnational joint procurement. It concluded that joint procurement was feasible and drafted a call for tender and recommendations on transnational common procurement.

11.3.5. Starbus

\(^{75}\) [http://www.buy-smart.info](http://www.buy-smart.info)
\(^{76}\) [http://www.compro-eu.org](http://www.compro-eu.org)
The Starbus project\textsuperscript{77} aimed to aid the purchasing decision making process for buses and promote renewable energy sources by creating a tool that monetises pollutant emissions. The tool can be found at \url{http://www.starbus-tool.eu}.

11.4. Conclusions

All the issues highlighted in Section 4 are covered to some extent by the different national guidelines presented here. The main aspects addressed are the emissions of CO\textsubscript{2} and other exhaust gases.

In relation to CO\textsubscript{2} from light duty vehicles, national guidance is in most cases based on the voluntary energy-efficiency classification and on the procurement of alternative fuel vehicles. For other exhaust emissions, reference is made to a stricter EURO standard than current legislation (normally as a preference but not minimum obligation). In several countries it is recommended that diesel vehicles must be fitted with particle filters to reduce particulate matter. The emissions of CO\textsubscript{2} and other exhaust emissions will be the main aspects covered in the Core set of criteria. The CO\textsubscript{2} compulsory maximum levels for passenger cars will be based on the Buy Smart project with other national guidelines and for the compulsory maximum levels of the other exhaust gases, reference will be made to the EURO standards. The Comprehensive criteria will present stricter figures to meet. Guidance also frequently includes requirements for vehicles to be fitted with GSI (Gear ShiftIndicator), environmentally friendly tyres, lubricants, fuel economy displays, vehicle materials and disposal guidelines and environmental credentials of transport services.

\textsuperscript{77} \url{http://www.starbus-project.eu/}