



Sustainable
United Nations

Sustainable Procurement Guidelines

VEHICLES

BACKGROUND REPORT



UNOPS

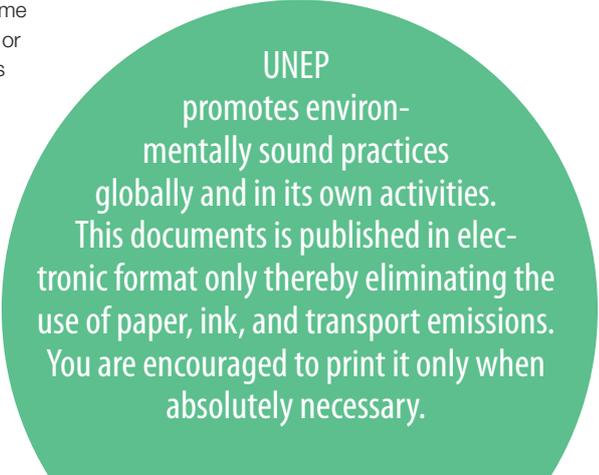
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Messages from the United Nations and UNEP

"I would like to make a public commitment. We are already moving towards making our Headquarters in New York climate-neutral and environmentally sustainable. I would like to see our renovated headquarters complex eventually become a globally acclaimed model of efficient use of energy and resources. Beyond New York, the initiative should include the other UN headquarters and offices around the globe.

We need to work on our operations too, by using energy more efficiently and eliminating wasteful practices. That is why, today, I am asking the heads of all UN agencies, funds and programmes to join me in this effort. And I am asking all staff members throughout the UN family to make common cause with me."



Ban Ki-moon
UN Secretary General
New York, 5 June 2007
World Environment Day



Achim Steiner
Executive Director, UNEP
Geneva, 8 October 2007
117th Assembly of the Inter-Parliamentary Union

"Ban Ki-moon is determined to put global warming at the top of the global political agenda and determined to build the trust so urgently needed if we are to succeed in combating climate change. Under his leadership, the UN is also determined to demonstrate its 'sustainability credentials' by action on the ground and by good housekeeping at home.

Reviews are underway across all agencies and programmes to establish a strategy for a carbon neutral UN and to make the refurbishment of the UN headquarters in New York a model of eco-efficiency.

UNEP is committed to take part in the fight for climate change and in showing leadership. We are committed to become carbon neutral by reducing our energy consumption and carbon footprint and by offsetting emissions."

Acknowledgements

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The guidelines were prepared by Fleet Forum and UNOPS under the supervision of the UNEP Division for Technology Industry and Economics (DTIE) and UNOPS.

The set of guidelines was written by Shoa Eshani (Fleet Forum). Nives Costa (UNOPS) provided substantial input to the Product Sheet. The work builds on the extensive experiences of Fleet Forum (www.fleetforum.org/website) and of the Partnership for Clean Fuels and Vehicles led by UNEP (www.unep.org/transport/pcfvl).

On the UNEP side, the work was coordinated by Isabella Marras, Farid Yaker, Cécile Bordier and Carlos Andrés Enmanuel, all team members of the Sustainable United Nations (SUN) Unit. On the UNOPS side, it was coordinated by Niels Ramm.

The Sustainable Procurement Guidelines for Vehicles were developed thanks to the valuable input and technical advice of UN colleagues and experts outside of the UN. We would like to thank: Rose van Steijn (Fleet Forum), Rob McConnell (Consultant), Maurice Bisau (UNHCR), Said Awad (DPKO), Rob de Jong (UNEP), Finn Lundorf (UNOPS) and Thad Mermer (design).

Purpose of this guide

What is Sustainable Procurement?

“Sustainable Procurement practices integrate requirements, specifications and criteria that are compatible and in favour of the protection of the environment, of social progress and in support of economic development, namely by seeking resource efficiency, improving the quality of products and services and ultimately optimizing costs.”¹

Sustainable Procurement practices should be introduced progressively and in full respect of the right of access to the UN market for suppliers from developing countries and countries with economies in transition.

How to use the Sustainable Procurement Guidelines?

The main goal of the Guidelines is to facilitate the implementation of sustainable procurement by providing criteria that may be used by UN staff for the requisition and procurement of goods, civil works and services.

In practice, this means thinking carefully about what the true needs are, as a first step. Then, basing purchasing decisions (for products, services and works) on the lowest environmental impact and most positive social impact which make the most economic sense over the lifetime of the product. Therefore, the guidance covers the following: key environmental impacts, key social considerations, most appropriate means of verification and information on the availability of sustainable products and lifetime costs (where available).

As with local product availability, prices, costs and relevant legislation may vary considerably between regions. The way sustainable procurement is practiced should be adapted to local conditions and markets, and depends on how ambitious the purchasing organization is in terms of sustainable development.

For these reasons, the UN Sustainable Procurement Guidelines comprise of the following for each of the addressed products and services:

- a detailed **background report**, and
- a practical **product sheet**.

The main role of the **background report** is to provide staff involved in procurement with more comprehensive information on the rationale behind the sustainable procurement guidelines presented in the product sheets. The background reports cover various issues related to purchasing a product and service in an environmentally-friendly and socially-responsible way, such as: identifying the key environmental impacts and social considerations, listing the most appropriate schemes for verification, most relevant legislation regarding the environment and social considerations, and providing an indication of the availability on the market of sustainable products.

The **product sheets**, on the other hand, provide sustainability criteria designed specifically for the various phases or steps of the UN procurement cycle. These are: detailing the subject matter of tenders, technical specifications (or terms of reference, for services), sourcing suppliers evaluation criteria and contractual clauses. Guidance is also provided on how compliance with the criteria should be verified. The criteria are also presented in check-list form for use by requisitioners and a weighting matrix is provided.

¹ Definition adopted by the High Level Committee on Management Procurement Network.

Regional differences

As market conditions vary from region to region, the potential for sustainable procurement may also vary. Therefore, for certain product groups different product sheets may be produced for different regions. The region for which each product sheet is produced for will be clearly indicated on the document itself and also on the SUN Greening the Blue website and the UNGM SP knowledge centre where they can be downloaded.

Differences in ambition

Additionally UN procurers must decide whether they wish to apply the “basic” or “advanced” criteria:

- **Basic sustainability criteria** address the most significant environmental and social impacts and require minimum effort in verification and minimal increases (if any) in price
- **Advanced sustainability criteria** are intended for use by procurers who seek to purchase the most advanced environmentally-friendly and socially-responsible products available on the market, and may require additional administrative effort or result in a price increase as compared to other products fulfilling the same function.

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Abbreviations and Acronyms

CFC	Chlorofluorocarbon
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CoC	Chain of custody
CSR	Corporate Social Responsibility
FLEGT	Forest Law Enforcement Governance and Trade
GHG	Green House Gas
HC	Hydrocarbon
HCFC	Hydrochlorofluorocarbon
ILO	International Labour Organization
ISO	International Standards Organisation
kW	Kilowatt, a measure of power
LNG	Liquefied Natural Gas
MDG	Millennium Development Goal
NO_x	Nitrogen Oxides
O₃	Ozone
OECD	Organisation for Economic Cooperation and Development
PM	Particulate Matter
PPM	Parts Per Million
PUR	Polyurethane
SO₂	Sulphur Dioxide
SO_x	Sulphur Oxides
THC	Total Hydrocarbon
UNDPKO	United Nations Department of Peace Keeping and Operations
UNHCR	United Nations High Commission for Refugees
UNOPS	United Nations Office for Project Services
VOC	Volatile organic compound
VPA	Voluntary Partnership Agreement
WFP	World Food Programme

1. Introduction

The advent of higher oil prices, tighter environmental legislation on vehicle emissions and sensitization of vehicle purchasers to environmental impacts of vehicles has resulted in more manufacturers providing a number of cleaner vehicles, fuels and technologies that are now commercially available. However, the complexity of comparing the emissions profiles of each of the options makes it difficult for the consumer, fleet manager or policy maker to decide the most appropriate vehicle or technology for a particular application. Even at the policy maker level there may be a degree of uncertainty regarding the relative benefits of each cleaner option and the relative impacts of fuel and vehicle cycles.

This background report, together with the practical product sheet, constitutes the sustainable procurement guidelines for vehicles for the UN system. While these guidelines are aimed at UN agencies and the UN WEBBUY² system operated by The United Nations Office for Project Services (UNOPS), they have also been developed in consultation with other NGOs and will be of benefit to them. The main objective of this background report is to give comprehensive information on the rationale behind the sustainable procurement recommendations made in the product sheet and to familiarize the reader with the vehicle sustainability issues at hand. This covers aspects such as “key environmental impacts”, “key social considerations”, “vehicle disposal”, “Sustainable Use of Vehicles” amongst others.

1.1 Scope

Motor vehicles exist in many forms and fulfil a variety of functions. Vehicles typically function in similar ways and although their material make-up may vary, it is their engine size/type and weight that distinguishes them from each other. In the United Nations WEBBUY system, operated by UNOPS, over 15 vehicle categories exist. For simplicity, the most popular categories are considered; these include: sedans, pick-ups, SUVs and light duty vehicles. Armoured vehicles are also amongst the most popular types of vehicles purchased, however, these and motorcycles are not covered in this guideline. Some material on heavy duty transporters is provided, although not sold on UNWEBBUY, these are an important part of vehicle fleets in the UN Department of Peace Keeping and Operations (DPKO) and that of the World Food Programme (WFP) as examples. The fleet sizes and makeup of agencies within the UN varies a lot: UNHCR for example has 6,800 vehicles with half being passenger and light duty trucks, a third being heavy duty and SUV models and the rest specialised vehicles; DPKO has about 17,000 vehicles the majority of which are trucks and SUVs with a lot of armoured vehicles and engineering equipment/vehicles; the Fleet Forum of which WFP is part boasts as many as 60,000 vehicles. Fleet size is dynamic; UNHCR for example foresees a decline in fleet size while DPKO sees a growth as global hot spots in need of UN intervention multiply.

While many of the environmental impacts of vehicles is dependent on their size, type of fuel and their energy consumption characteristics, these impacts are all cross cutting in practice. These guidelines are therefore generic in nature. However, certain legislative requirements for the purchase and operation of motor vehicles are dependent on the size and type of vehicle, more information is therefore provided where warranted and available.

² Please see: www.unwebbuy.org/ Participating agencies can obtain a password to enter site

2. Key Environmental Impacts of Vehicles

The manufacture, fuel production, operation and disposal of vehicles all impact the environment. These are described below.

2.1 Green House Gas Emissions

Most vehicles today are equipped with an internal combustion engine that combust fossil fuels, typically gasoline, diesel or natural gas, to provide energy for propulsion. When a litre of gasoline is burned it combines with oxygen to produce nearly 2.4 Kg of carbon dioxide (CO₂), as such, vehicle operation contributes to the emission of Green House Gases (GHGs). The transportation sector as a whole is responsible for the emission of 25% of the annual GHGs globally. Road transport is the fastest growing source of greenhouse gases³. Of the total GHG emissions from transport, over 85% are due to CO₂ emissions from road vehicles. By moving from a conventional car to a green car, you can literally reduce the number of greenhouse gases emitted by several tons a year.

A lifecycle analysis of most conventional vehicles would show that the energy expended in the manufacture and disposal can account for up to 75% of the energy used during its life⁴ (shown as "Primary energy in Figure 1 below). This percentage varies based on the inclusion of different processes in creating a vehicle, but generally includes the energy used in mining and producing raw materials, production of the vehicle, its transport to an outlet, replacement and maintenance and its disposal. The materials used and their impacts can be very different according to the type of vehicle, but typically include iron and steel, non-ferrous metals (particularly aluminium), plastics, composites, glass, rubber and fluids. The disposal of these and other substances also contribute to the production of solid wastes that are either recycled, incinerated or land-filled, each option leading to a complex set of environmental issues and concerns. The lifecycle of a vehicle is best represented by the following figure:

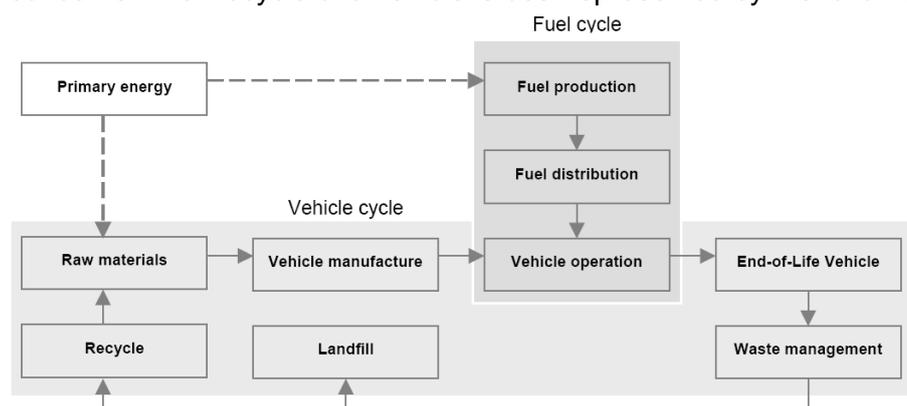


Figure 1: Classification of Energy Inputs in the Lifecycle of a Vehicle

It should be borne in mind that the energy used to create and recycle these raw materials and to produce an automobile is directly proportional to the amount of GHGs (mostly carbon dioxide) emitted into the atmosphere. This is because the energy used in manufacturing automobiles is typically generated in power plants that burn coal, diesel and natural gas (and other sources) that emit carbon dioxide to produce electricity and heat that is used in the production process.

So where does all this leave the reader in getting a better feel for the relative amounts of CO₂ emitted in the manufacturing and operation phase of a vehicle? Figure 2 below better

³ DEFRA, 2005

⁴ Funazaki et al. 2003

illustrates the relative magnitudes of CO₂ as well as other polluting gases for diesel and gasoline vehicles. Note that vehicle operation only accounts for a large amount of CO₂ emitted during a life cycle analysis; the majority of other gaseous pollutants are emitted during the manufacture and fuel production phases of a vehicle's life. The pollutants here are CO₂, nitrogen oxides (NO_x), sulphur dioxide (SO₂), Particulate Matter (PM) and Non-methyl volatile Organic compounds (NMVOC). All but the last pollutant is described in the following section.

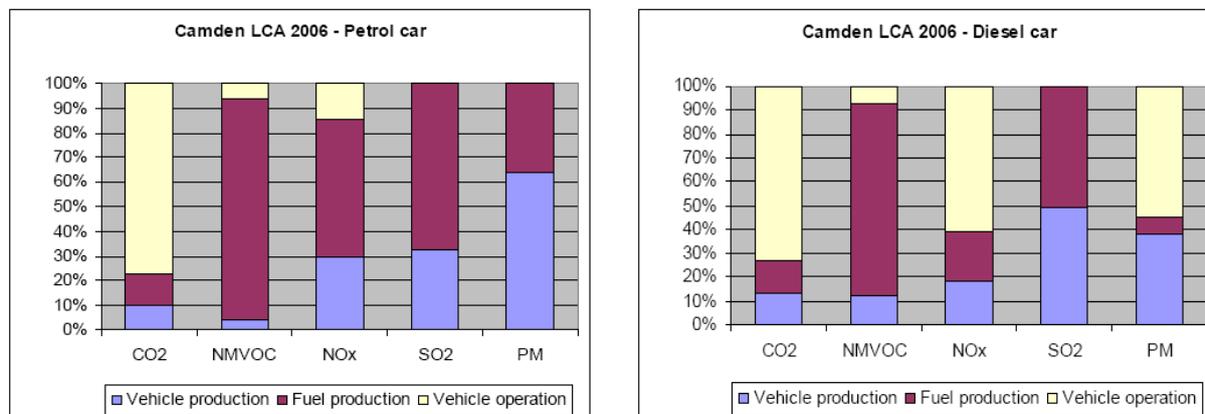


Figure 2: Emission Comparisons in the Life of a Vehicle by Activity

2.2 Other Gaseous Pollutants

The engine combustion process produces a large number of other gaseous pollutants from the vehicle tail-pipe. The following pollutants are typically regulated and reported as primary gaseous pollutants from vehicle operations: particulate matter (PM), carbon monoxide (CO), nitrogen oxides (NO_x), and sulphur oxides (SO_x). A small measure volatile organic compounds (VOCs) and unburnt hydrocarbon (HCs) are also emitted from vehicles. Depending on fuel additives used, heavy metals such as lead or manganese can also be present as particles. Finally, the combustion process in the presence of sunlight can give rise to the production of photochemical smog, a mixture of polluting gases including ozone (O₃) that is an extremely strong oxidizing agent and harmful to human health.

These compounds have various effects on our local environment and human health. Vehicle air pollution contributes to a number of health issues and common diseases. It can increase a person's risk of cancer, impair the body's immune system and cause many respiratory problems. It is also commonly linked to asthma and is believed to be a contributor to birth defects. These and their effects are described further.

Particulate Matter

Particulate matter (PM), as its name suggests, is composed of small particles of solid or liquid material that can have varying composition. Their size is distinguished by a subscript accompanying the acronym PM: so PM₁₀ would refer to all particulate matter with a diameter of 10 microns or smaller. Some particles are large or dark enough to be seen as soot or smoke, but fine particulate matter is tiny and is generally not visible to the naked eye.

Health effects associated with ambient PM – which can be inhaled deep into the lungs – include premature death, aggravation of respiratory and cardiovascular disease. Diesel PM is of special concern because diesel exhaust has been associated with an increased risk of lung cancer⁵. Finally, PM is a cause of fouling of the environment, reduces visibility and is

⁵ USEPA (2004) Final Regulatory Analysis: Control of Emissions from non-road Diesel Engines, Page 2-55: <http://www.epa.gov/nonroad-diesel/2004fr/420r04007c.pdf>

aesthetically undesirable. Acidic PM (such as SO_x) can be transported thousands of kilometres and make lakes and streams acidic, damage soils and forests.

Carbon Monoxide

This gas is formed from the incomplete combustion of fuels. Motor vehicles are responsible for the emission of the majority of Carbon Monoxide (CO) emissions in cities. The concentrations of CO can rise during winter months when inversions can lead to its trapping in cities and enclosed geographies.

CO is most dangerous for people with heart disease, inhaling even a low concentration can lead to chest pains and difficulty in breathing; long term exposure can produce permanent cardiovascular damage. CO is also a precursor for the formation of smog. A properly functioning vehicle after-treatment tail-pipe unit, such as a catalytic converter will help reduce the amounts and concentrations of CO emitted from vehicles.

Nitrogen Oxides

The oxides of nitrogen are produced from the combustion process in engines, power plants and other high temperature fossil fuel burning activities. They are acidic in nature and in the presence of water can form nitrous and nitric acids. NO_x is also a component of photochemical smog, is a constituent in the formation of ground level ozone and can cause acid rain. Inhalation of NO_x for even small periods of time (30 minutes) can lead to respiratory difficulties including the inflammation of airways and asthma. Prolonged exposure, such as staying on congested highways with poor airflow, has led to emergency room visits and hospitalisation.

Sulphur Oxides

Sulphur is a compound that occurs naturally in crude oil, metals and other materials. The combustion of fossil fuels then leads to the emission of SO_x , an acidic gas that is easily soluble in water to form sulphurous and sulphuric acids.

SO_x are in fact the chief ingredient of acid rain, which damages trees, crops, historic buildings, and monuments; damage to bodies of water and soils is also common. SO_x can form small PM that can be transported great distances by winds. In particulate form, SO_x reduce visibility. Because of their acidic nature, SO_x in any form accelerates the decay of building materials and paints, including irreplaceable monuments, statues, and sculptures. Marble is particularly susceptible to the corrosive action of SO_x .

The negative health effects associated with SO_x mainly concern the lungs and the cardiovascular system. The corrosive nature of SO_x also affects the engine life of a vehicle, reducing it if high sulphur fuels are used regularly. While there is no after-treatment solution for SO_x in vehicles, the levels of sulphur in diesel and gasoline are carefully regulated worldwide and although many standards exist, the reduction of sulphur in fuels has become standard operation in most refineries.

Lead

Lead is a metal that is found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Lead tetrachloride is an octane booster that has been used as a gasoline additive. Thus, the use of leaded gasoline in vehicles is the main way of the dispersion of lead in the human environment, being emitted as a particle from vehicle tail-pipes. The addition of lead to gasoline also affects the operation of vehicles negatively. Lead can poison the rare earth metals in a catalytic converter and renders it useless; it also shortens the life of spark plugs and is responsible for the fouling of other

engine components.

Lead is extremely detrimental to human health and development in children. Once taken into the body either by ingesting food/drink contaminated by lead or breathing in the particles, lead distributes throughout the body in the blood and is accumulated in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system. Infants and young children are especially sensitive to even low levels of lead, which may contribute to behavioural problems, learning deficits and lowered IQ.

Ozone

Ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays. However, in the earth's lower atmosphere, ground-level ozone is considered "bad" as it is an extremely strong oxidizing agent. Motor vehicle exhaust and industrial emissions, gasoline vapours, and chemical solvents as well as natural sources emit NO_x and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. It is estimated that in the U.S. alone, ozone is responsible for US\$500 million in reduced crop production each year.

Volatile Organic Compounds (VOCs) and Hydrocarbons (HCs)

These are numerous in number and refer to a large class of compounds. They typically occur in small quantities and concentrations and are emitted through vehicle exhaust systems. VOCs and HCs can have many different effects on human physiology; these can include: Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. An example is the low levels of the carcinogen formaldehyde that is emitted by natural gas vehicles.

2.3 Other Environmental Impacts

Other non-gaseous pollutants include oil and other car fluids, such as the acid in car batteries that contribute to water pollution and corrosion. Noise pollution and long commutes are other detrimental side-effects from car traffic; this adds to a general reduction in the quality of life and can cause stress and high blood pressure. Air and water pollution also effects the environment around us, compromising the growth of plants and harming animals. Finally, the disposal of a vehicle presents a solid waste issue that will be addressed in the section titled "Vehicle Disposal".

While the purchase of a green vehicle will go a long way to lessen the environmental impacts from its operation, there will still be impacts from the production, operation and disposal of any vehicle. A number of associated issues need to be considered so that the best environmental results can be achieved. These are listed below and discussed in greater depth further on in this document.

Disposal of Vehicles

A vehicle is disposed of in a number of ways:

1. Most often, the automobile is placed in a vehicle dump
2. The vehicle may be sold as a second hand vehicle, often to other nations with less stringent environmental standards
3. A large portion of it is recycled and the rest is put in a landfill
4. The vehicle is refurbished with new parts (engine etc) and reused

In Europe, when a car reaches the end of its useful life⁶, it is generally dismantled into parts. Environmentally dangerous components such as car batteries and fluids such as oil are recycled, as are other useful parts. The rest of the vehicle is then shredded to produce a mix of metal (75%) and fluff (25%). The ferrous metal components are then separated using magnetic machinery and reused. Other valuable non-ferrous metallic components are sorted by hand and recycled.

While in some North American and European countries vehicles are the most recycled consumer product (In the U.S., for example 95 % of all vehicles are recycled), in a lot of developing countries facilities for recycling of vehicles don not exist and cars are just placed in a vehicle dump. This can cause a solid waste problem over the years. While clear guidelines exist in the UN common system for vehicle disposal, some larger agencies have their own methods and means. DPKO for example disposes of vehicles through donations, sale or cannibalization of parts for other vehicles. UNHCR also donates vehicles, especially to programmes and governments that the institution works with. Armoured vehicles are returned to the manufacturer for refurbishment at the end of their useful life and some agencies are also seeing the benefit of leased vehicles in which the manufacturer takes responsibility of vehicle disposal at the end of the vehicle lease.

Some of the older cars in developed countries find their way to second hand markets in developing countries. Initially, vehicles of any condition were exported, but with time regulations and requirements in importing countries were created to keep out the dirtiest and least road-worthy vehicles. These regulations often include limits on the age of the vehicle, requirements on after-treatment technology and a general mechanical soundness of the car.

As can be seen from the table below, for innovative vehicle types (especially those that employ electric drive trains) the range of materials used for vehicle construction differs from those that are based on a conventional mechanical drive unit with more non-ferrous metals used for lightweight body panels and for electric components (e.g. copper, zinc, nickel, lead). This is true to a greater extent for battery-electric vehicles, especially if lightweight composites are used to form the body shell in place of steel or aluminium.

Source: Schweimer 2000	Golf A4 1.4 petrol	Source: Schweimer 2000	Golf A4 1.9 diesel	Source: Daniels 2004	2004 Toyota Prius
	kg		kg		kg
Ferrous	634.4 59.9%	Ferrous	721.8 61.1%	Ferrous	776.9 59.8%
Aluminium	51.8 4.9%	Aluminium	49.9 4.2%	Aluminium	167.3 12.9%
Other non-ferrous metals	19.4 1.8%	Other non-ferrous metals	27.0 2.3%	Other non-ferrous metals	77.4 6.0%
Synthetics	167.5 15.8%	Synthetics	182.3 15.4%	Plastics	154.9 11.9%
Fluids	64.0 6.0%	Fluids	71.5 6.1%	Fluids+Organics	35.5 2.7%
Tyres and rubber	44.1 4.2%	Tyres and rubber	50.5 4.3%	Elastomers	39.7 3.1%
Glass	30.1 2.8%	Glass	30.1 2.5%	Inorganic mat	34.7 2.7%
Electronics	24.9 2.4%	Electronics	25.2 2.1%		
Insulation	16.3 1.5%	Insulation	16.4 1.4%		
Paints	4.2 0.4%	Paints	4.2 0.4%		
Others	2.1 0.2%	Others	1.9 0.2%	Others	13.6 1.0%
Total	1058.8 100.0%	Total	1180.8 100.0%	Total	1300.0 100.0%

Table 1: Constituents of a Petrol, Diesel and Hybrid Vehicle by Weight

The energy use and carbon emissions associated with vehicle disposal are not significant (compared to the vehicle manufacture and assembly stages), the disposal of vehicles poses more of a solid waste dilemma. One exception is the disposal of air-conditioning units and other systems in old vehicles; nearly three-quarters of the impact of ozone depletion is due to

⁶ The useful life of a car varies greatly by country, its regulations and levels of GDP per capita of its inhabitants. Many vehicles disposed of in developed countries are in fact sold as second-hand vehicles in developing countries.

release of CFCs during this disposal stage. Older vehicles with air-conditioning (ac) units typically used R-12 as a working fluid for the ac units. R-12 which is composed mostly of CFC-12 is a very strong ozone depleting substance and its manufacture and sale is banned under the Montreal Protocol; it is also a very strong GHG with a global warming potential (GWP) of 10,890 (i.e. 10,890 times stronger than carbon dioxide). During its lifetime and when disposed, a vehicle with ac could be a source of fugitive emissions of ozone depleting substances and GHGs if the wrong refrigerants are used. R-12 has been replaced with R-134a which is HFC-134a in most newly manufactured vehicles with ac; this is a step forward, while HFC-134a is benign for ozone depletion, it has a GWP of 1,430. Many EU countries and the U.S. are pushing to phase out HFC-134a; a more climate friendly alternative known as HFO-1234y with a GWP of 4 is being experimented with, while German automobile manufacturers are looking at the use of high-pressure carbon dioxide as a working fluid in their ac units (carbon dioxide obviously has a GWP of 1). The magnitude of the effects of these fugitive emissions from discarded appliances such as ac units is potentially quite large on our climate and should be considered.

A number of considerations can greatly assist in the issue of vehicle disposal, these are:

1. **Life-span:** A product that can be used for a longer period of time will need to be replaced less often, which has an overall positive effect on the environment: less usage of raw materials, less pollution related to production, and less waste. For this reason, criteria should also be formulated regarding durability, reparability, maintenance, fitness for use, ergonomics and safety aspects - all of which will prolong the life span of furniture.
2. **'Fitness for use' and 'ergonomics':** Refers to whether a product fulfils the expectations with respect to its function and contributes to a healthy working environment for the user. A product that is not fit for purpose or not comfortable for the user will be replaced sooner. The same applies to safety standards. Durability, fitness for use, ergonomics and safety depend on quality standards.
3. **Ease of disassembly:** Will facilitate the reuse or recycling of vehicle parts and thus reduce the amount of waste to be incinerated or land filled.
4. **Possibility of take-back:** A take-back system could potentially be an effective way to guarantee the recycling of products. Its effectiveness would depend on the recycling options available to suppliers regionally. For this reason it is suggested to only impose criteria with respect to recyclability, but not to require the set up of a take-back system. Leasing of vehicles is an example of this strategy.

3. Key Social Considerations

The social dimension of sustainable procurement operations aims at ensuring that competition among bidders does not exert a downward pressure on the working conditions of the workers employed or, even worse, leads to practices such as the use of child or forced labour, discriminatory practices or denial of freedom of association and the right to collective bargaining. For the furniture industry the core ILO conventions should be binding over the whole supply chain – that is, production, manufacture and disposal of furniture items.

International labor standards adopted by the International Labour Organization (ILO) have an essential role to play in this respect as they provide clear rules on the “do’s” and “don’ts” for bidders and buyers. As will be explained below, a number of other international instruments also provide valuable guidelines on this matter.

3.1 International labour standards

The International Labour Conference, which comprises tripartite delegations (from governments, employers and workers) of all ILO Member States, meets annually and adopts two types of international labour standards: Conventions, which are binding for Member States that ratify them, and Recommendations that often complete the Conventions and provide additional guidance. They are globally designated as international labour standards, which are the legal component of the ILO's strategy for governing globalization, promoting sustainable development, eradicating poverty, and ensuring that women and men worldwide enjoy decent work. Today, international labour standards have grown into a comprehensive system of instruments concerning work and social policy and cover a broad range of subjects, from working conditions to employment policy, and from occupational safety and health to social security to take only a few examples. They are backed by a supervisory system designed to address all sorts of problems in their application at the national level.

Mention will be made here only of a Convention and a Recommendation that deal explicitly with the social dimension of public procurement, and of the eight so-called core ILO Conventions, covering the four categories of fundamental principles and rights at work to which extensive reference is made in other instruments such as the Global Compact or codes of conduct.⁷

Labour clauses in public contracts

The Labour Clauses (Public Contracts) Convention (No. 94) and Recommendation (No. 84), 1949 respond specifically to the concerns around the potentially negative social impact of public procurement operations.⁸ Convention No. 94 is about good governance, it addresses socially responsible public procurement by requiring bidders/contractors to align themselves with the locally established prevailing pay and other working conditions as determined by law or collective bargaining. Its aim is to remove wages and working conditions from the price competition necessarily involved in public tendering.

Convention No. 94 requires bidders to be informed in advance, by means of standard labour clauses included in tender documents, that, if selected, they would have to observe in the performance of the contract wages and other labour conditions not less favorable than the highest minimum standards established locally by law, arbitration or collective bargaining. The same rules apply to their subcontractors as well as to assignees of the public procurement contract. Bidders should prepare their offers accordingly.

The Convention proposes a common level playing field – in terms of labour standards – for all economic actors, and thus promotes fair competition and socially responsible procurement. Most importantly, the Convention enables contracting authorities to evaluate bids based on objective criteria, such as the efficiency of production methods, the quality of materials, or long-term benefits including technology transfer, which ultimately leads to cost-effective public procurement operations and contributes to sound economic development.

Convention No. 94 provides for two specific types of measures in cases where the labour

⁷ Additional information on international labour standards may be found at: <http://www.ilo.org/global/standards/lang--en/index.htm>. The full text of all ILO Conventions and Recommendations, as well as their status of ratification, can be found at: <http://www.ilo.org/ilolex/english/index.htm>.

⁸ For detailed information on the content of Convention No. 94 and Recommendation No. 84, as well as on national legislation and practice and the current trends in this area, see the General Survey on Labour clauses in public contracts prepared by the ILO Committee of Experts on Conventions and Recommendations, ILC, 97th session, Geneva, 2008, available at www.ilo.org/ilc/ILCSessions/97thSession/reports/lang--en/docName--WCMS_091400/index.htm. In addition, the International Labour Office has published a practical guide on Convention No. 94, available at: www.ilo.org/wcmsp5/groups/public/@ed_norm/@normes/documents/publication/wcms_099699.pdf.

clauses are not fully respected (without prejudice to other available remedies such as judicial proceedings): first, contracting authorities must take measures, such as the withholding of payment due under the contract, so that the workers concerned can receive the wages to which they are entitled; second, contracting authorities must provide for adequate sanctions, such as the withholding of contracts.

Conventions on fundamental rights at work

The ILO Conference has also adopted eight core Conventions, almost universally ratified, on freedom of association, forced labour, equality in employment, and the elimination of child labour. A brief summary is presented below.⁹ One of the major challenges is to monitor the implementation of these Conventions at each level of the global supply chain, including in the context of public procurement operations.

Freedom of association and collective bargaining

The *Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)* provides that workers and employers must have the right to establish and join organizations of their own choosing without previous authorization. Their respective organizations must be free to organize themselves and their activities without undue interference from the public authorities. They must also have the right to establish and join federations and confederations, which themselves must be free to affiliate with international organizations of workers and employers.

The *Right to Organize and Collective Bargaining Convention, 1949 (No. 98)* provides that workers must enjoy adequate protection against acts of anti-union discrimination, including requirements that a worker not join a union or relinquish trade union membership for employment, or dismissal of a worker because of union membership or participation in union activities. Workers' and employers' organizations must also enjoy adequate protection against any acts of interference by each other. Finally, measures appropriate to national conditions must be taken, where necessary, to encourage and promote collective bargaining.¹⁰

Forced labour

The *Forced Labour Convention, 1930 (No. 29)* prohibits the use of forced or compulsory labour in all its forms, defined as “all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.”

The *Abolition of Forced Labour Convention, 1957 (No. 105)* prohibits forced or compulsory labour as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social or economic system; as a method of mobilizing and using labour for purposes of economic development; as a means of labour discipline; as a punishment for having participated in

⁹ For a more detailed presentation, see ILO, *Fundamental rights at work and international labour standards*, Geneva, 2003.

¹⁰ To date, Convention Nos. 87 and 98 have been ratified by 150 and 160 States respectively. For more information, see the General Survey on freedom of association and collective bargaining, ILC, 81st session, 1994 : [http://www.ilo.org/public/libdoc/ilo/P/09661/09661\(1994-81-4B\).pdf](http://www.ilo.org/public/libdoc/ilo/P/09661/09661(1994-81-4B).pdf). See also the Digest of decisions and principles of the Committee on Freedom of Association, 5th (revised) edition, 2006: http://www.ilo.org/wcmsp5/groups/public/@ed_norm/@normes/documents/publication/wcms_090632.pdf.

strikes; and as a means of racial, social, national or religious discrimination.¹¹

Equality in employment

The *Equal Remuneration Convention*, 1951 (No. 100) requires Member States that ratify it to promote the application to all workers of the principle of equal remuneration for men and women workers for work of equal value, and to ensure its application where the State is involved in wage fixing. The Equal Remuneration Recommendation, 1951 (No. 90), which complements Convention No. 100, makes express reference to the desirability of ensuring application of the principle of equal remuneration for men and women workers for work of equal value for work executed under the terms of public contracts.

The *Discrimination (Employment and Occupation) Convention*, 1958 (No. 111) requires ratifying States to declare and pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination in these fields. Discrimination is defined as any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation. The Discrimination (Employment and Occupation) Recommendation, 1958 (No. 111), which complements Convention No. 111, provides that eligibility for contracts involving the expenditure of public funds should be made dependent on observance of the principles of non-discrimination.¹²

Child labour

The *Minimum Age Convention*, 1973 (No. 138) provides that the general minimum age for admission to work or employment must not be less than the age of completion of compulsory schooling and, in any case, must not be less than 15 years. Where the economy and educational facilities are insufficiently developed, the minimum age can be initially set at 14 years. The minimum age for hazardous work is set at 18 (16 under certain strict conditions). For light work, the minimum age is 13 years (12 years if the general minimum age is set at 14 years).

The *Worst Forms of Child Labour Convention*, 1999 (No. 182) requires ratifying States to take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency. "Child" is defined as a person under 18 years of age. The worst forms of child labour include all forms of slavery or practices similar to slavery (such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour, including forced or compulsory recruitment of children for use in armed conflict); child prostitution and pornography; using children for illicit activities, in particular for the production and trafficking of drugs; and work which is likely to harm the health, safety or morals of children.¹³

¹¹ To date, Convention Nos. 29 and 105 are ratified by 174 and 169 States respectively. For more information on the application of these Conventions, see the General Survey on forced labour, ILC, 96th session, 2007: http://www.ilo.org/wcmsp5/groups/public/@ed_norm/@relconf/documents/meetingdocument/wcms_089199.pdf. See also ILO, *Combating forced labour : a handbook for employers and business*, 2008, available at: http://www.ilo.org/sapfl/Informationresources/ILOPublications/lang--en/docName--WCMS_101171/index.htm.

¹² To date, Conventions Nos. 100 and 111 have been ratified by 168 and 169 States respectively.

¹³ To date, Conventions Nos. 138 and 182 have been ratified by 157 and 173 States respectively.

Other relevant ILO instruments

The *ILO Declaration on Fundamental Principles and Rights at Work*¹⁴, adopted in 1998, proclaims that all Member States, even if they have not ratified the eight core Conventions mentioned above, have an obligation arising from the very fact of membership in the Organization to respect, to promote and to realize, in good faith, the principles concerning the four corresponding categories of fundamental rights, namely:

- freedom of association and the effective recognition of the right to collective bargaining;
- the elimination of all forms of forced or compulsory labour;
- the effective abolition of child labour; and
- the elimination of discrimination in respect of employment and occupation.

The Declaration makes it clear that these rights are universal and must be respected in all States, regardless of their level of economic development. It stresses however that labour standards should not be used for protectionist trade purposes.

The *ILO Tripartite Declaration of principles concerning multinational enterprises and social policy*¹⁵, adopted in 1977 and last amended in 2006, recognizes that multinational enterprises play an important part in the economies of most countries and in international economic relations. Its aim is to encourage the positive contribution which multinational enterprises can make to economic and social progress and to minimize and resolve the difficulties to which their various operations may give rise. The Declaration sets out principles in the fields of employment, training, conditions of work and life and industrial relations which governments of host and home countries, employers' and workers' organizations and multinational enterprises are recommended to observe on a voluntary basis. Its provisions do not affect obligations arising out of ratification of ILO Conventions. It provides inter alia that all parties concerned should contribute to the realization of the ILO Declaration on Fundamental Principles and Rights and Work of 1998.

3.2 Other international instruments

UN Global Compact

The UN Global Compact¹⁶ is an initiative launched in 1999 by the Secretary-General of the United Nations during the World Economic Forum meeting at Davos. It is both a policy platform and a practical framework offered to businesses for the development, implementation, and disclosure of sustainability policies and practices around 10 principles in the areas of human rights, labour, environment and anti-corruption. It is not a regulatory instrument but rather a voluntary initiative to which companies around the world are invited to participate through a formal commitment to support the Global Compact and its principles. The four principles related to labour issues are derived from the ILO Declaration on Fundamental Principles and Rights and Work of 1998.

The Global Compact asks companies to embrace, support and enact, within their sphere of influence, a set of core values in the areas of human rights, labour standards, environment, and anti-corruption. Businesses must respect (even if it is not a regulatory instrument) the

¹⁴ For additional information on the 1998 Declaration, including its full text, see <http://www.ilo.org/declaration/lang--en/index.htm>.

¹⁵ The text of the 1977 Declaration is available at: http://www.ilo.org/empent/Whatwedo/Publications/lang--en/docName--WCMS_094386/index.htm.

In addition, the ILO has established a Helpdesk for Business that provides free and confidential assistance service and is available for company managers and workers, as well as government agencies, employers' and workers' organizations and other interested organizations. The Helpdesk can be contacted at : <http://www.ilo.org/empent/Areasofwork/business-helpdesk/lang--en/index.htm>.

¹⁶ <http://www.unglobalcompact.org/>

following 10 principles:

- Support and respect the protection of internationally proclaimed human rights;
- Ensure that they are not accomplices in human rights abuses;
- Protect the freedom of association and the effective recognition of the right to collective bargaining;
- Elimination of all forms of forced and compulsory labour;
- Abolition of child labour;
- Discrimination-free employment and occupation;
- Support a precautionary approach to environmental challenges;
- Undertake initiatives to promote environmental responsibility;
- Encourage the development and diffusion of environmentally friendly technologies;
- Fight against corruption in all its forms, including extortion and bribery.

Global Compact membership is still limited among UN suppliers in developing countries, with the large majority of orders from the UN placed with Global Compact members located in developed countries and especially in Europe. UN procurement from Global Compact members as a percentage of orders of USD 30,000 or more increased from 12.32 % in 2006 to 14.15 % in 2008.¹⁷

UN Supplier Code of Conduct

The UN Code of Conduct¹⁸ provides the minimum standards expected of suppliers to the UN. It is the expectation of the UN that suppliers adhere to all laws, rules and regulations, and strive to exceed both international and industry best practices. The Code of Conduct has been developed with recognition of the importance of the ILO Core Labor conventions and the ten principles of the UN Global Compact, and is viewed as an important means of integrating the Compact's principles into the operations of the UN.

The UN recognizes that reaching the standards established in this Code of Conduct is a dynamic rather than static process and encourages suppliers to continually improve their workplace conditions.

While a number of UN organizations have adopted the UN Supplier Code of Conduct (SCC), others, like ILO, are still to adopt a Code of Conduct. ILO intends to publish such a Code that will contain some provisions which differ from those of the UN SCC, particularly with respect to labour issues.

The OECD Guidelines for multinational enterprises

The OECD Guidelines for multinational enterprises¹⁹ pursue the same goal as the ILO Tripartite Declaration of 1977. They contain recommendations addressed to multinational enterprises operating in or from adhering countries (the 34 OECD countries plus 8 non-OECD countries: Argentina, Brazil, Egypt, Latvia, Lithuania, Morocco, Peru and Romania). These recommendations are directly addressed to multinational enterprises and not to workers' and employers' organizations, since the OECD is not a tripartite organization like the ILO. The recommendations on employment and industrial relations make reference in concise terms to freedom of association, the abolition of child labour and forced or compulsory labour, as well as non-discrimination with respect to employment or occupation. The commentaries that accompany these guidelines recognize that the ILO is the competent body to set and deal with international labour standards, and to promote fundamental rights

¹⁷ 2008 Annual Statistical Report on United Nations Procurement, UNOPS

¹⁸ http://www.un.org/depts/ptd/pdf/conduct_english.pdf

¹⁹ <http://www.oecd.org/dataoecd/56/36/1922428.pdf>

at work as recognized in its 1998 Declaration on Fundamental Principles and Rights at Work. They stress that the provisions of the guidelines on employment and industrial relations echo relevant provisions of the 1998 Declaration, as well as the 1977 Tripartite Declaration.

Other Codes of Conduct

In addition to the above-mentioned instruments that were adopted under the auspices of intergovernmental organizations, a number of codes of conduct were developed, either at the sectoral level or at a broader scale. Some of them are relevant for the social dimension of public procurement.

The NGO Social Accountability International (SAI)²⁰ developed the *SA8000 standard* that makes express reference to a number of ILO Conventions, including the eight core Conventions. Nonetheless, the ILO is not linked in any manner to the development and supervision of the implementation of the SA8000 standard. A voluntary certification procedure for companies has also been put in place.

In September 2010, the International Organization for Standardization (ISO) adopted the ***International Standard ISO 26000:2010, Guidance on social responsibility***. *Contrary to other standards developed by the ISO, this standard cannot be used for certification purposes*. It is more comprehensive than the SA 8000 standard and provides guidance for organizations that voluntarily want to strengthen their social responsibility regarding in particular human rights (including fundamental rights at work) and working conditions. A Memorandum of Understanding was concluded between the ISO and the ILO to ensure consistency of the new standard with ILO standards.

3.3 Corporate Social Responsibility and the Vehicle Manufacturer

Vehicle manufacturers are often multinational companies with huge market capitalization and economic strength. As such, they can play an important role in creating sustainable labour and safe and environmentally friendly automobiles. They can also leverage their financial and economic powers in unrelated sectors to better society and some manufacturers do this more than others. Recall of faulty vehicles and standing by their products is another aspect that has been beneficial to both the consumer and the company.

There are organizations that deal specifically with corporate social responsibility (CSR) and have rankings for companies in various sectors based on their sustainability performance. One such organization is CSR International, a community interest company that has rankings of vehicle manufacturers based on their CSR. There are 45 criteria that go into making the rankings and they are classified into 4 groups: working conditions; impact of production; impact of product; and institutional impact on society. These criteria are based on several international treaties that provide the areas of comparison, these include: the Universal Declaration of Human Rights, the OECD Guidelines for Multinational Enterprises, the ILO Declaration of Principles concerning MNEs and Social Policy, the Rio Declaration on Environment and Development, the agreements of the World Summit for Social Development, the UN Global Compact, and the UN Millennium Goals. Many of these have been covered in this chapter. The top 10 vehicle makers according to their ethical/CSR rankings at the time of publication according to CSR International are:

1. (6) Johnson Controls
2. (4) Ford Motor Co.
3. (3) Toyota Motor
4. (5) BMW
5. (1) Honda Motor

²⁰ <http://www.sa-intl.org/>

6. (2) Nissan Motor
7. (7) Mazda Motor
8. (10) Peugeot SA
9. (9) Denso Corp.
10. (8) Fiat

Note that the number in parenthesis indicates previous rank. These rankings are published quarterly and are based on data accumulated from 2002 until the present time. A full and updated list of the top 30 companies can be seen at: www.csrinternational.org/?p=2792

4. Legislation Impacting the Operation and Purchase of Vehicles

As the number of vehicles on the planet grow quickly, it is important to try to minimize the many impacts that they present. This is done through legislative measures that then manufacturing companies and end users try and meet. Through the years, vehicle legislation has been getting more stringent, with cars and fuels become cleaner; this however has not abated the damage to the environment as the rising number of vehicles and cumulative nature of the impact have taken their toll.

Most vehicle legislation has to do with the amount of emissions a class of car may exhaust to the environment. Other legislations indirectly tackle this issue and may also provide other benefits; examples of this are: a manufacturers fleet meeting a certain average minimum fuel efficiency, making the importation of vehicles of a certain age illegal, making certain emission control technology mandatory, requiring a road and emissions licence to be obtained cyclically, different vehicle class tax regimes and so on.

All manufacturers, car dealerships and most vehicle importers know the particulars of national vehicle legislation. Although UN organisations are not always directly affected by the local legislation it is important to be aware of it, as legislation may already sufficiently address some important environmental aspects, which need not therefore be addressed by procurers. Sometimes, UN bodies work with national and regional bodies and encourage the adoption of better and cleaner vehicle legislation.

While most countries have a unique set of regulations for vehicles, a lot of these are based on comprehensive emission standards used in the United States, the European Union and Japan. Some samples of these are shown in the tables below:

Standard	Date	CO	THC	NMHC	NOx	HC+NO _x	PM
Euro 1	July 1992	2.72 (3.16)	-	-	-	0.97 (1.13)	0.14 (0.18)
Euro 2	January 1996	1.0	-	-	-	0.7	0.08
Euro 3	January 2000	0.64	-	-	0.50	0.56	0.05
Euro 4	January 2005	0.50	-	-	0.25	0.30	0.025
Euro 5	September 2009	0.500	-	-	0.180	0.230	0.005

Euro 6	September 2014	0.500	-	-	0.080	0.170	0.005
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Table 2: European Emission Standards for **Diesel** Passenger vehicles, g/km

Note that **THC** represents **Total Hydrocarbons** and **NMHC** represents Non-methane hydrocarbons. Note also that there are no standards for carbon dioxide (CO₂), the major GHG. Little or no legislation exists for the emission of GHGs from vehicles, fuel efficiency being the only legislation that effects GHG emissions directly (this only exists at the manufacturing level). European vehicles are categorized by function and by weight as shown in the table below:

Category	Description	Sub-Category	Number of Persons	Mass Limit
M	Carriage of Passengers Min. 4 wheels	M1	Up to 9 Persons	GVW ≤ 3,500 kg*
		M2	Over 9 Persons	GVW ≤ 5,000 kg*
		M3		5,000 < GVW
N	Carriage of Goods Min. 4 wheels	N1 C11	N.A.	RM ≤ 1,305 kg
		N1 C12		1,305 < RM ≤ 1,760 kg
		N1 C13		1,760 < RM ≤ 3,500 kg
		N2		3,500 kg < GVW ≤ 12,000 kg
		N3		12,000 kg < GVW

* Applies only to vehicles with direct injection engines

Table 3: European Vehicles Categories

Standard	Date	CO	THC	NMHC	NO _x	HC+NO _x	PM
Euro 1	July 1992	2.72	-	-	-	0.97 (1.13)	-
Euro 2	January 1996	2.2	-	-	-	0.5	-
Euro 3	January 2000	2.3	0.20	-	0.15	-	-
Euro 4	January 2005	1.0	0.10	-	0.08	-	-

Euro 5	September 2009	1.000	0.100	0.068	0.060	-	0.005*
Euro 6 (future)	September 2014	1.000	0.100	0.068	0.060	-	0.005*

Table 4: European Emission Standards for Gasoline Passenger Vehicles, g/km

4.1 Global Vehicle Legislation

Apart from the aforementioned Euro standards, the other main standards after which many national standards are modelled are the U.S. “Tier I and II” standards that are based on the Clean Air Act, a charter that strictly governs air quality in the U.S. The Tier standards have been gradually introduced and are based on the year of vehicle manufacture as well as the miles operated. These emission standards and further EU standards for heavy vehicles can be found online at: http://delphi.com/news/featureStories/fs_2009_04_29_001/

Further explanation on the terms and testing methods of these standards can be found on Wikipedia²¹ where matters are explained in more detail. The majority of UN fleet operations occur outside of the EU and the U.S., as such, it is important to have some information on other various national standards. The Table below shows some samples of this. Two tables are provided, the first is for Passenger Vehicles and Light Duty Trucks, the second is for Heavy Duty Trucks and Off-road Vehicles. The Tables cover standards, testing procedures required, all fuel types including: gasoline, diesel, natural gas (CNG, LNG) and ethanol mixed fuels (E100, E60, E22).

Country	Regulations
Algeria	M1: <i>Gasoline/PG/NG</i> . CO:2.3 HC:0.2; NOx: 0.15 g/km <i>Diesel</i> : CO:1; NOx: 0.50; PM:0.05 g/km N1: <i>Gasoline/PG/NG</i> CO:5.5; HC:0.31; NOx:0.25g/km <i>Diesel</i> CO:1; HC:1, NOx:0.90; PM:0.15 g/km
Argentina	Euro 3: New model: 01 Jan 2007- EOBD rot required Gasoline: low temp test not required 01 Jan 2006 — EOBD required - Gasoline: V-SHED test required All models: 01 Jan 20W Euro 4: New model: 01 Jan 2009 Gasoline: low temp test rot required AD model: 01 Jan2011
Australia	Gasoline - LPG /NG: ADR 79/01 Euro 3: for new vehicles from 01 Jan05 For all new registered vehicles from 01 Jan 06 Euro 4: ADR 79/02: From 01 July 2006 for new models – From 01 July 2010 for all production Diesel: ADR 79/01: Euro 4: for new vehicles (model) from 01 Jan06 all production from 01 Jan07
Brazil	1/97: — US 83 Standard incl. Aldehyde limit (0.03 g/km), Diesel: Fixed DFs from Jan 2002: CO and NC 20%, NOx and CHO 10% only valid if annual production is < 15.000 vehicles Durability of DF 80,000 km or 5 years. diesel passenger cars not allowed at the stage

²¹ For further explanation of Euro standards please visit:http://en.wikipedia.org/wiki/European_emission_standards

	Wide range of fuels available on the market: E100(93%ethaiol +7% water) E22 (22% ± 2% ethanol + gasoline) Natural gas (CNG) Certification required with E22 fuel for E22 vehicle, E22/E60/E 00 for a flex-fuel vehicle, E22/E60/E100 and CNG for a tri- fuel vehicle
India	From 04/2005 In cities: Bharat Stage III equivalent to Euro 3 with deviation in test procedure (Max speed limited to 90 km/h as against 120 km/h in Europe) Rest of India. Bharat Stage II (Euro 2) From 04t/010 11 cities: Bharat Stage IV (Euro 4— Max speed 120 km/h) Rest of India: Bharat Stage III (Euro 3 with deviation in test procedure as above)
Zimbabwe	All imported vehicle to be equipped with cat. converter by 2008

Table 5: Sample Legislation by Country for Passenger and Light Duty Trucks

Larger vehicle types have different standards, these include heavy duty diesel vans and also engines used off-road such as that of a tractor (not covered here). The next table shows the various national standards for the operation of these vehicles.

Note that the following acronyms are used in this table. As seen, most national standards are tied into the Euro standards which are listed below for the heavy class of vehicles. Note that HD stands for Heavy Duty and hph stands for break-horsepower-hour a unit of energy.

For further national standards on heavy trucks, please see: http://delphi.com/news/featureStories/fs_2009_04_29_001/

Country	Regulations
Colombia	From 97: US 13 procedure CO: 25.0; HC+NOx: 10.0 g/hph Buses: Euro II Diesel smoke: from 2001, free acceleration opacity test limits: 40%
India	Euro II: 04/2005: nation wide Euro III: 04/2005: Delhi + selected cities; 04/2010: nation wide Euro IV: 04/20 10: Delhi + selected cities; 2014: nation wide Inter-states buses and trucks in use: Delhi: 01Apr 07: Euro I; 01Apr 11: Euro II; Other cities: 01 Apr 08: Euro I National Capital Region: proposal of restriction of vehicle: vehicle > 10 yrs forbidden: Euro III mandatory for all goods vehicles
Malaysia	HD Diesel engines: Euro II
Nepal	Euro I, from Jan 2000
Peru	Euro III: form 2007
South Korea	Euro III equiv, from Jan 03: Euro V from Jul 09 Durability (of emission control): 300.000 km or 10 yrs
Thailand	Diesel HDV Euro III (TIS 231 5-2550) From 2012: EU IV (TIS 2315-2551)

Turkey	Euro IV, from 2007:
Vietnam	Currently: ECE 49-02/ Euro II (TCVN 6565-1 999) Proposal: Euro III in 2008 Euro IV in 2010 Euro V: TBA in 2010

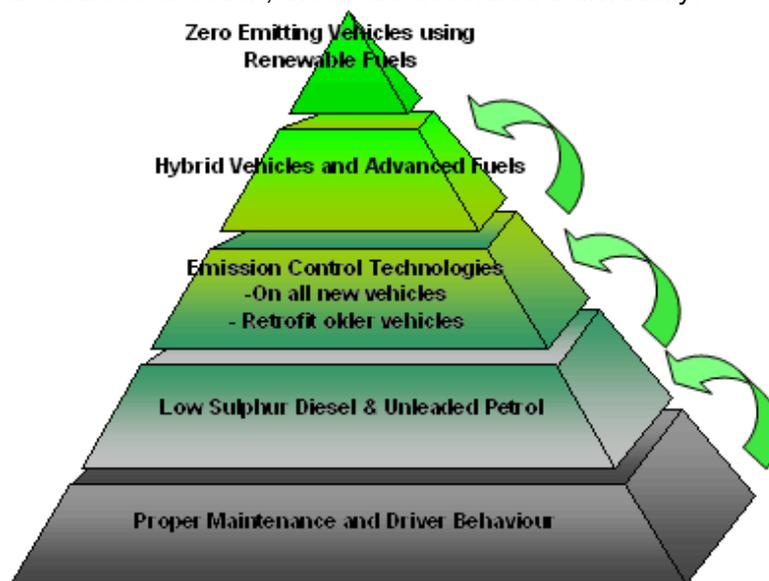
Table 6: Sample Legislation by Country for Heavy Duty Vehicles

5. Sustainable Criteria Sources and Rationale

5.1 Sustainable Use of Vehicles

The development of meaningful sustainable mobility solutions requires detailed understanding of the relationships between vehicle economics, vehicle performance, driver behaviour, emissions, and more general societal and community factors.

A number of solutions and operational procedures exist that can make the use of road transportation as sustainable as possible. Some of these are easy to implement and not so costly, others involve the purchase of hardware and new vehicle types. These methods are shown as a pyramid whose base represents the most common and easily implementable actions for sustainable vehicle operation with the different tiers representing other possible and more complex courses of action; these are described individually:



Progress ladder towards ever-cleaner transport

Figure 2: Steps in Ensuring Cleaner Vehicle Purchase and Operation

5.2 Vehicle Maintenance

The simplest way to ensure sustainable vehicle operation is by maintaining your vehicle, minimising the weight carried in it and ensuring proper tyre pressure. A well tuned engine will reduce emissions of particulate matter, NO_x and VOC by up to 10 -20%. Furthermore, regular maintenance will increase the longevity of engine parts and improve fuel efficiency some 3 - 7 %. Estimates show that typically 10-15 % of a vehicle fleet is responsible for 50 % of the pollution, this being due to poorly operating vehicles.

5.3 Eco-driving and Driver Behaviour

The influence of speed and driver behaviour on emissions and fuel economy is significant. Improved driver behaviour can also save on vehicle parts such as breaks, the clutch and suspension and provide for a safer drive. The main principle of eco-driving is a reduction in sudden acceleration or deceleration and thinking ahead in traffic.

Tests of the eco-driving technique have shown improved fuel efficiency of 5 - 20 %. Drivers typically learn to save the most fuel right after their course at the eco-driving course and then seem to revert to some of their habitual driving methods in time and their fuel savings drop to 5 %. For more information on eco-driving, please visit: www.ecodrive.org

5.4 The Use of Clean Fuels

Vehicles and fuels are a system that works together: the purchase of a clean vehicle and use of unsuitable fuel (leaded gasoline or high sulphur diesel) will not produce good environmental results; nor will the use of an old and inefficient engine with clean fuels. Vehicles can run on a number of fuel types, the most common are gasoline and diesel, while a small but growing number of vehicles run on natural gas. Almost all new gasoline vehicle engines require a minimum of 91 octane gasoline for efficient operation²². Furthermore, nearly all newly manufactured vehicles will only operate on unleaded gasoline, as the fitting of catalytic converters (see next heading) is now standard on most vehicles and lead poisons this after-treatment technology (for the effects of lead on the environment and health, please see the section on Environmental Impacts). Except for a dozen countries that still use leaded gasoline, all others are completely lead free because of the metal's detrimental effects and the availability of many other more effective and sustainable options for meeting gasoline octane requirements. The Partnership for Clean Fuels and Vehicles (PCFV) has worked steadily to support the phase out of leaded gasoline worldwide; the map below shows this global status:

²² This refers to 91 RON (Research Octane number). Other systems of octane measurement exist such as MON and AKI (Anti Knock Index), the latter is used in Canada and the United States. An AKI number of 87 is the same as a 91 RON.



Leaded Petrol Phase-out: Global Status February 2009

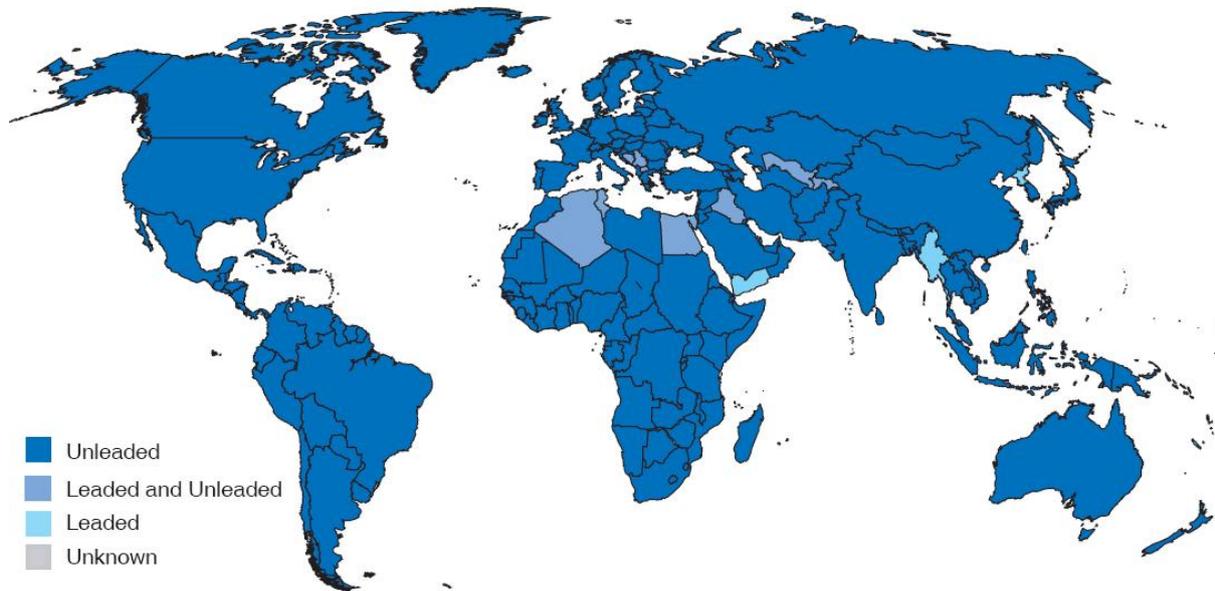


Figure 3: Global Map Showing the Status of Leaded Gasoline Phase-out

One way to increase octane without using lead as an additive is the use of ethanol. Ethanol can successfully be blended with petrol up to 10%. The use of ethanol prevents the need for lead, and as a renewable fuel, reduces net emissions of CO₂ and dependence on oil. Furthermore, ethanol is an oxygenate which helps with the better combustion of fuel.

Many light and heavy duty commercial vehicles use diesel as a fuel. The efficiency and environmental performance of low-sulphur diesel has also resulted in the production of passenger and small-engine diesel cars. As mentioned before, sulphur is a naturally occurring element in oil that when combusted gives rise to emissions of SO_x. This is true in both diesel and gasoline engines, however the effect is more pronounced in diesel (which traditionally tends to have a higher sulphur content) as lower sulphur diesel not only prolongs engine life, but also enables the use of diesel after-treatment technologies that can greatly reduce exhaust emissions from diesel engines.

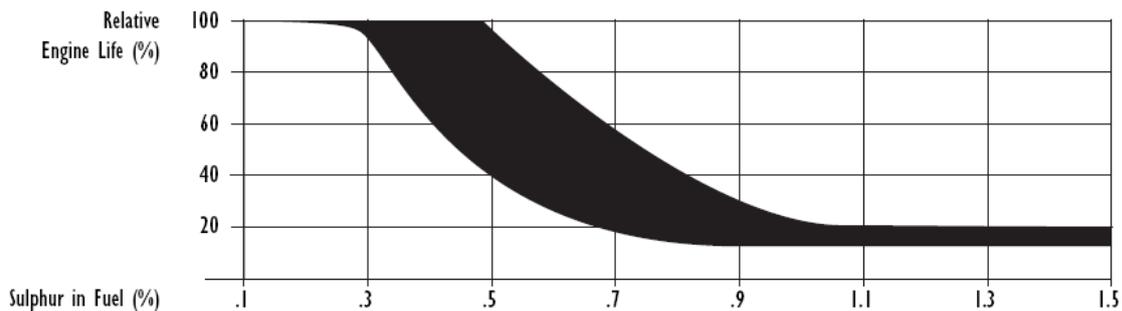


Figure 4: Deterioration of Diesel Engine Life as a Function of Sulphur Content in Fuel

Sulphur generally occurs at 10,000 to 35,000 ppm²³ in crude oils. “Low-sulphur diesel” is recognized by different standards world wide, but generally contains less than 500 ppm sulphur. Sulphur levels in fuels that are as high as 5,000 to 10,000 ppm can be found in some places in the world. In Japan, Republic of Korea, parts of Europe (such as in Scandinavia and Germany) and in some parts of the US, diesel with sulphur levels as low as 15 ppm is currently used. The map on the next page shows the status of sulphur levels in diesel worldwide.

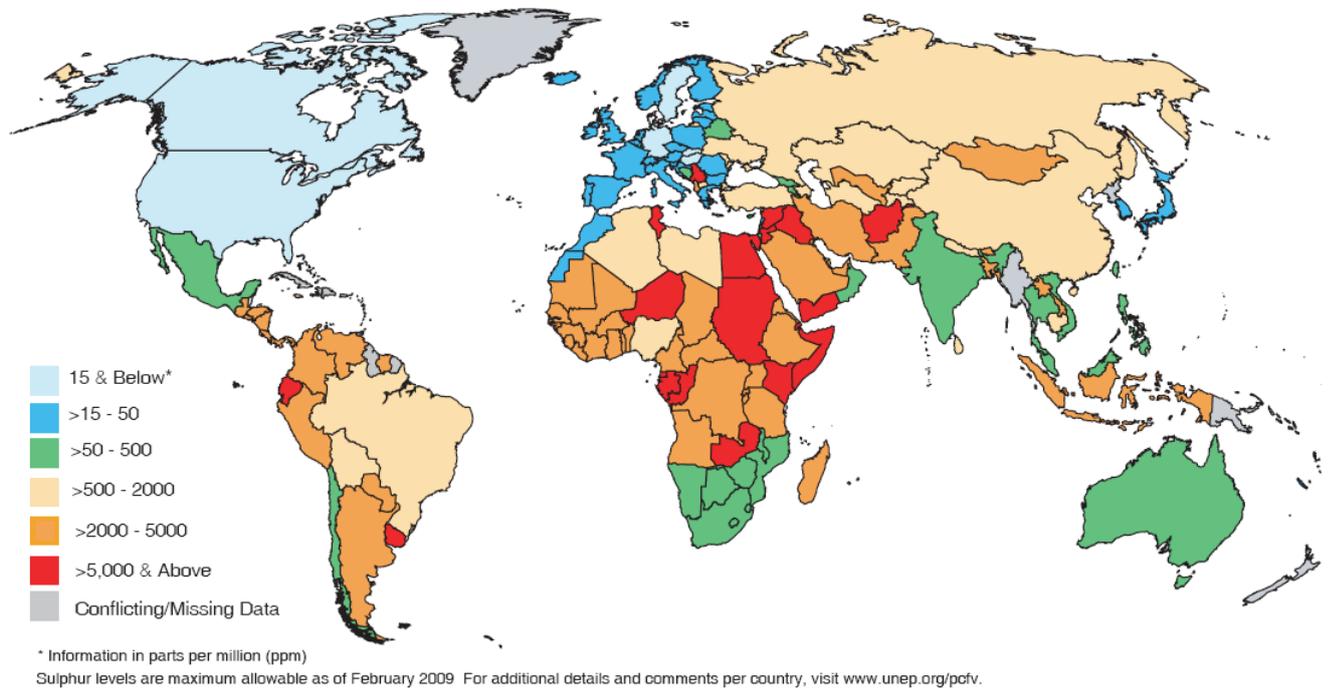


Figure 5: Global Status of Diesel Fuel Sulphur Content, February 2009

The regulations on the levels of sulphur in fuels are constantly becoming more stringent and many new diesel vehicle engines require the use of low-sulphur diesel to operate consistently and for the manufacturers warranty to remain valid. Fuel adulteration continues to be a problem in many field operations. Additional detailed matrices and maps for gasoline and diesel characteristics for different continents can be found on: <http://www.unep.org/pcfv/resources/fuels.asp>

5.5 Emission Control Technologies

These technologies that are mostly placed just before the vehicle exhaust system can do a lot to reduce harmful emissions from vehicles. Many, such as the catalytic converter, come preinstalled on most new vehicles; others can be placed or retrofitted on old vehicles. In a lot of countries, the use of emission control devices on automobiles is mandatory and part of legislation. In fact, a lot of legislative emission targets for vehicles cannot be attained without the use of after-treatment devices.

The Catalytic Converter

The catalytic converter or the 3-way catalyst used for gasoline vehicles needs unleaded gasoline to function and can reduce emissions of CO, NO_x and HC emissions by 90%. It is essentially a honey-comb of palladium and platinum (the catalysts) that allows a reaction of the gaseous pollutants with oxygen in the air. The units cost about US\$ 500 - 1000 each and

²³ ppm stands for “Parts Per Million and is a measure of concentration

can be retrofitted on most vehicles (post 1990). High sulphur levels in gasoline and metallic additives have been known to reduce the efficacy of the 3-way catalyst.

Diesel vehicle manufacturers are now required by some states and countries to produce vehicles that meet very strict emission standards. To meet these standards, new state of the art engines have been developed; furthermore, many manufacturers are using diesel after treatment devices such as diesel oxidizing catalysts as standard equipment with new vehicles destined for these countries. Meanwhile, some manufacturers have opted not to export their diesel vehicles to areas requiring these stringent measures. Unless and until such emission standards are adopted by the developing world, and clean and low sulphur fuels (below 500 ppm) are readily available for consumption, it is unlikely that manufacturers will make diesel after treatment devices standard on all worldwide sales of their diesel vehicles for the present.

Diesel Oxidation Catalyst

The most common and versatile diesel engine after treatment device is the Diesel Oxidation Catalyst (DOC). DOC systems require diesel sulphur levels of 500 ppm or lower, the systems efficiency increasing with a decrease in sulphur concentration. The catalysis removes some 25 – 30 % of the PM and 60 – 90 % of CO and HC pollutants; there is no reduction of NO_x pollutants. A lot of new diesel vehicles supplied to developed countries with the appropriate diesel sulphur levels have DOCs preinstalled on the vehicles. The advantages of DOCs are that they are relatively inexpensive (US\$ 1,000 – 2,000), are easily installed and can be employed with nearly all engine applications. A drawback of this system is its production of sulphate particulates at diesel sulphur levels close to 500 ppm; this can increase the concentration of PM emissions. A DOC typically costs anywhere from US\$ 600 – 2000, units for heavy duty trucks being closer to the US\$ 2000 mark.

Selective Catalytic Reduction

Selective Catalytic Reduction (SCR) devices are similar to DOCs, except that they reduce (rather than oxidize) diesel pollutants to control emissions. In this manner, NO_x is reduced to nitrogen and oxygen resulting in its reduction by up to 90 %. At the same time, PM emissions are reduced by 30 – 50 % and HC emissions are cut by 50 – 90 %. SCRs are emerging as the leading NO_x control system in Europe to meet EURO IV and V heavy-duty diesel standards. While SCR's require low sulphur diesel of less than 50 ppm, their efficiency is not affected as much by higher sulphur concentrations. Typical cost for an SCR system retrofit is US\$13,000. If the SCR system is combined with a DPF the price range is between US\$16,000 and US\$20,000 per heavy duty vehicle.

Diesel Particulate Traps / Filters

As its name implies, the Particulate Trap captures particulates using a ceramic filter in the diesel exhaust system, reducing PM up to 95 % (for 10 ppm sulphur diesel). The Trap is regenerated by the burning of trapped particles with a burner or electrical heater. If this process is done externally, the Particulate Trap would need frequent maintenance. Particulate Traps require sulphur diesel content of 150 ppm and lower, although the use of metal fuel additives makes the device tolerant of operating in diesel sulphur concentration levels up to 350 ppm. Newer systems are being developed that can tolerate sulphur levels of 500 ppm and regenerate.

The advantages of this system is its longevity (certified to last about 150,000 miles) and its price (between US\$3,500 and 9,000, depending on the size of the truck, the regeneration system and whether the DPF is installed in a new truck or is retrofitted in an older one). For light and medium duty trucks prices are from US\$1,000 and up. The more expensive models are often coupled with other technologies such as an oxidation catalyst that removes 80 % of

CO and HC emissions in addition; or a reducing catalyst that removes 75 – 90 % of NO_x emissions; or even an exhaust gas recirculation system that also removes NO_x.

Flow Through Filters

FTFs are a relatively new technology for reducing diesel PM emissions. Unlike a DPF – in which only gases can pass through the filter components – the FTF does not physically "trap" and accumulate PM. Instead, exhaust flows through a medium (such as wire mesh) that has a high density of interrupted flow channels, thus giving rise to turbulent flow conditions aiding in the capture of particles.

The filtration efficiency of an FTF is lower than that of a DPF, but the FTF is much less likely to clog under unfavourable conditions (e.g. high PM emissions, low exhaust temperatures and emergency circumstances). Consequently, the FTF is a candidate for use in applications that are unsuitable for DPFs. The cost of retrofitting an FTF is estimated to be between US\$3,500 and US\$5,000.

Exhaust gas recirculation (EGR)

EGR is used primarily to reduce NO_x emissions. Because the formation of NO_x is highly temperature dependent, EGR works by recirculating 5-10% of the exhaust gases back to the engine air inlet in order to lower the combustion temperature (several hundred degrees), and thus lower these emissions. EGR systems can be either a high or a low-pressure system. Low-pressure systems can be retrofitted since they require no engine modifications. DPFs are an integral part of any low pressure system, ensuring that particulate matter is not being circulated back into the engine. EGR can reduce NO_x by about 40-50%. EGR has been installed in many new trucks in order to reduce NO_x emissions. The extra costs of installation have not been disclosed and the system is well-integrated into the overall engine design, both of which make costs difficult to estimate. The cost of retrofitting a low-pressure EGR into an older truck is estimated to be between US\$13,000 -US\$20,000. This has been done in very few cases.

NOX Traps

These devices absorb NO_x under lean conditions and emit them when NO_x rich, as such they require regeneration. While they can remove some 70 – 90 % of the NO_x tail-pipe emissions, they require very low sulphur diesel content (less than 15 ppm)

NOx control systems/NOx absorbers

Currently under development, these systems absorb NO_x emissions in lean conditions and catalyze them to nitrogen and oxygen when NO_x rich. While they can remove as much as 95% of NO_x emissions from diesel vehicles, they require near-zero diesel sulphur concentrations to operate. In addition they are large, bulky and expensive, costing US\$ 10,000 – 50,000.

5.6 Advanced Fuel Systems, Hybrid and Electric Vehicles

Recent years have seen a number of new technologies developed for both vehicles and fuels. While conventional gasoline and diesel engines have been around for years and been difficult to displace, these fuels and engine technologies aim to augment and improve the sustainability and sometimes the economic dimensions of vehicle operations.

One of the main goals of recent developments has been to improve vehicle energy efficiency through improved fuel economy; in conventional vehicles only 10-20% of the total combustion energy gets to the wheels for propulsion. The most noticeable of these fuel efficient vehicle technologies is the hybrid electric vehicle. As the name would suggest, this is a cross-over vehicle that employs both the internal combustion engine and an electric drive

to propel the vehicle. The electric drive gets its power from a large electric battery (or a series of smaller ones) and also from the recuperation of energy often wasted in idling and braking. This means better energy savings and the electric drive makes the need for a large conventional engine redundant. The smaller conventional engine assisted by the electric drive is thus more efficient and less polluting, with fuel economies of 20-30 Km/ litre. The table below compares the fuel efficiencies of the emissions of various popular vehicle models including hybrids available in the market today. Fuel efficiencies are normally quoted for city and highway driving as these efficiencies can vary considerably, the “Combined Fuel Efficiency” expressed in the table is an average of city and highway fuel efficiencies.

Vehicle	Emission Class	Power (kW)	Combined Fuel Efficiency (Litres/100 Km)
Toyota Prius, Hybrid 1.5L	Euro 4	55	5.7
Honda Civic 1.6	Euro 4	81	7.2
Peugeot 307 HDI FAP	Euro 3	71	5.87 (diesel)
Toyota Corolla Verso 1,6 Autom	Euro 3	81	8.39

Table 7: Fuel efficiency of some popular sedan models

A number of hybrid vehicles exist in the market today. They can be classified as: genuine hybrids that have a completely new ground-up design to get maximum fuel efficiencies (example are the Toyota Prius and the Honda Insight); the “soft” hybrids are generally popular car models that have been fitted with an electric drive train and a battery (sometimes lead acid instead of the lithium ion variety that are capable of much higher energy storage per unit weight). Hybrid vehicles operate best on flat terrain and their advantages come into the limelight in city driving. Maintenance of hybrids and disposal of batteries are factors that are of consideration; in developed countries, expertise to maintain hybrids exists as do companies that buy and recycle hybrid batteries. Due to their fuel efficiency and environmental advantages, some governments provide rebates and tax cuts to hybrid purchasers. While hybrids cost more than their conventional counterparts, the cost savings in fuels provide a pay back on investment in their operation. The magnitude of this payback is dependent on the local price of fuel and number of miles driven; the higher the price and the more miles driven, the greater the savings. As an example, European taxis that are high mileage drivers in a region where fuel is expensive are moving towards hybrid vehicles in large numbers. Many believe that the hybrid vehicle is a stop-gap measure for future vehicles that are likely to be fully electric.

The fast growth of urban centres in Asia and the Middle East and the ready availability of natural gas are responsible for the growth of natural gas powered vehicles in these regions. While natural gas produces the same amount of carbon dioxide (a GHG) per kilometre driven as conventional vehicle of the same size²⁴, it is considerably cleaner in the emission of other gaseous pollutants that effect the local environment. Furthermore, this natural resource that was previously flared and unused in the production of oil is cheap and plentiful in Asia and the Middle East. Existing gasoline vehicles can be converted to natural gas vehicles using kits that cost about US\$ 500 – 2,000. Drivers are generally opting for natural gas fuels because of its economic advantages. Natural gas vehicles typically run on compressed or liquefied forms, also known as CNG and LNG respectively. Natural gas vehicles have a lower range due to the limited amount of fuel they can hold.

Apart from the fuels mentioned thus far, a number of biofuels that are compatible with conventional engines (gasoline and diesel) exist. Biodiesel and bioethanol are produced from

²⁴ This assumes that there are no leaks of natural gas from the tank or engine. The main component of natural gas is methane which is very strong GHG gas.

agricultural matter and natural vegetation, making them potentially more sustainable²⁵ with respect to GHG emissions, as the growth of vegetation absorbs carbon dioxide while growing.

In the future, vehicles are likely to operate with complete electric drive trains. Electric engines are much more efficient than the internal combustion engines of today, furthermore they are “zero emitting” vehicles (no gaseous emissions as there is no tail-pipe). Many believe that fuel-cells will generate the electrical power for vehicle function; currently, a number of “plug-in” electric vehicles are in the market: Nissan’s i-MiEV was launched in Japan in 2009, Mitsubishi is partnering with Peugeot-Citroen to sell electric cars in Europe, finally General Motors is launching the Chevy Volt – a fully electric vehicle that is estimated to operate on 100 km/litre equivalent of gasoline – the model is being hybridized to include a small conventional engine to increase the 64 Km range of the vehicle. The advantages of electric vehicles are their efficiency, quiet drive and environmental friendliness²⁶ in the absence of gaseous pollutants. The disadvantages are the small range, the current lack of expertise to maintain these vehicles and the need to recycle the lithium ion batteries which typically last about 8 years.

5.7 Where to Buy

There are several methods of acquisition within the UN system. The largest users purchase directly from manufacturers using LTAs and other instruments in this regard. Smaller agencies and the UN common system use the UNWEBBUY facility offered by UNOPS. While the categories and the number of brands on UNWEBBUY are plentiful, they don’t cover all options. Many manufacturers have set up diplomatic car sale facilities near duty stations or in central locations; Toyota Gibraltar is an example of one such central location that handles duty free vehicles on a large scale. These diplomatic sale facilities also try to match the reduced prices offered by UNWEBBUY (typically 10-25 % below market value for new vehicles, depending on the model/manufacturer).

The criterion for vehicle purchase amongst UN agencies seems to be the technical specification and reliability of the vehicle first, and then the financial or price aspect. Environmental performance and fuel economy of vehicles are not really a consideration, or if they are, they are amongst the last characteristics of a vehicle to consider. This need not be so, as the technical needs and price of a vehicle are generally not at odds with its sustainability.

6. Conclusion and Recommendations

While the science of sustainability aspects for vehicles can be complex, there are a number of lessons that can be distilled from the material in this background paper. The modality of working through practical aspects of vehicle choices will be explored further in the Product Sheets, an associated companion to these guidelines. The points to consider are:

All things (specifications) being the same, always choose the vehicle with the better fuel economy, even if this means that one pays a bit more for a more fuel efficient car. Apart from the savings on fuel that will lessen the yearly operation cost of the vehicle, better fuel economy translates to less natural resource use and therefore less pollution and GHG production.

²⁵ The sustainability of biofuels depends on many factors including land-use practices, energy intensity of the agricultural production, choice of biofeed stock and whether this stock use displaces/ is a human food source.

²⁶ While it is true that the electricity used by electric vehicles is produced by power plants that can produce carbon dioxide and other gaseous pollutants, the control of emissions from a point source such as a large power plant is a lot easier than that of many individual vehicles.

When you have a choice, choose vehicles with emission control technology or low emission profiles. Emission control technology reduces harmful gaseous pollutants from the tail-pipe. Vehicles are rated by their emission profile and manufacturers specify the level of emissions or the legislative standards that the car meets. Many low emission vehicles need emission control technology to actually meet their low profile; it should be borne in mind that emission control technology often needs clean fuel of a certain standard to continue operating.

Whenever available, use clean fuels including unleaded gasoline and low sulphur diesel. Vehicles and fuels are a system; clean operation is only realized when both components are environmentally sound. Clean fuels also improve the life of vehicle components.

Purchase from companies with a good CSR track record. Check to see if the manufacturer recycles vehicle parts at all and if they offer disposal programmes.

7. Information Sources

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SUSTAINABLE UNITED NATIONS

Sustainable United Nations (SUN) is a UNEP initiative that provides support to UN and other organisations to reduce their greenhouse gas emissions and improve their sustainability overall.

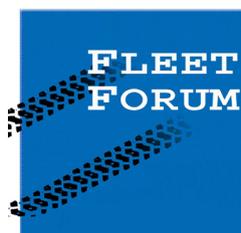


**Sustainable
United Nations**

SUN was established in response to the call from UN Secretary General Ban Ki-Moon at the World Environment Day 2007 (5 June), to all UN agencies, funds and programmes to reduce their carbon footprints and “go green”. This call was echoed in October 2007 in a decision of the UN Chief Executives Board (CEB/2007/2, annex II) to adopt the UN Climate Neutral Strategy, which commits all UN organisations to move towards climate neutrality. Within this context, SUN is working with the UN Environment Management Group – the UN body coordinating common environmental work within UN – to provide guidance, and develop tools and models for emission reduction within organisations.

FLEET FORUM

Founded in 2003 as a joint initiative of the International Federation of the Red Cross and Red Crescent Societies (IFRC), the UN World Food Programme (WFP) and World Vision International (WVI), the Fleet Forum is an interagency association of more than 40 members, including NGOs, international organisations, the UN, academic institutions, donors and corporate partners.



The Fleet Forum is the first independent knowledge centre, focused on issues surrounding humanitarian fleets within the aid and development community. It is the vision of the Fleet Forum to support efficient and effective humanitarian action by catalysing the professionalisation of fleet operations, increasing road safety and security, and improving the environmental impact of fleets. A voluntary association, the Fleet Forum serves as an interface between stakeholders, bringing together humanitarian organisations, donors, governments, and the private sector.

UNOPS

UNOPS mission is to expand the capacity of the UN system and its partners to implement peacebuilding, humanitarian and development operations that matter for people in need. Our partners range from UN organisations, international financial institutions to governments, non-governmental organisations and intergovernmental organisations and our services include project management, procurement, human resources management and financial management.



Working in some of the world’s most challenging environments UNOPS vision is to always satisfy partners with management services that meet world-class standards of quality, speed and cost effectiveness.

As a leading procurement agency, UNOPS intends to mainstream sustainability in procurement processes and infrastructure construction throughout the supply chain, working towards Millennium Development Goal 7: to ensure environmental sustainability.



For more information

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About the Sustainable Procurement Guidelines

The UN operates to achieve the goals of peace, equality, sustainable development and respect for human rights. The way the UN manages its operations and procures products and services should reflect these goals.

Ensuring lowest environmental and most positive social impact of procurement does not only build on the international community commitments. It also manages the reputational risks associated with labour exploitation or environmental damage in the supply chain; it gives a strong signal to the market and encourages the innovative production of cleaner and more ethical products enhancing an economy based on social and environmental responsibility.

These guidelines are designed to assist UN procurers and requisitioners in their choice to include sustainability considerations in their procurement work. They are built on the recognition that market situations are different from one country to another and thus provide advice based on research made about availability of more sustainable products in world regions. Overall, the guidelines provide a comprehensive overview of the specific factors affecting the sustainability of a given product category and suggest a language and specific criteria to include sustainability in tenders.

Guidelines are specifically provided for the areas of:

- IT equipment
- Cleaning
- Furniture
- Stationary
- Vehicles
- Cafeterias, Food and Kitchen equipment.
- Freight Forwarding
- Generators and Batteries
- Carbon Credits

They are available at: www.greeningtheblue.org and www.ungm.org