

# Traffic Emissions Policy Document

**Achieving sustainability through cleaner,  
more efficient and quieter vehicles, and  
climate-neutral fuels**

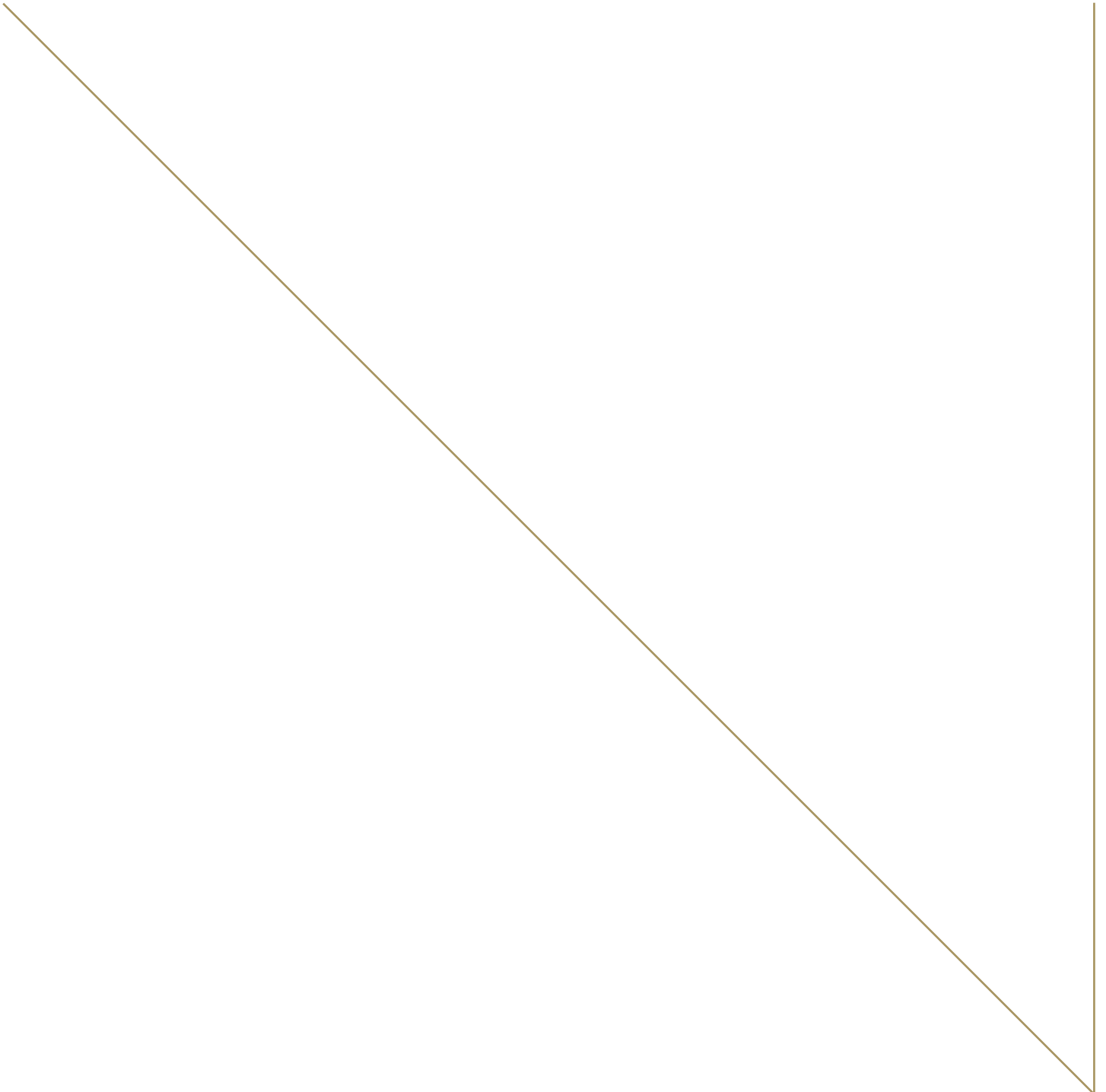




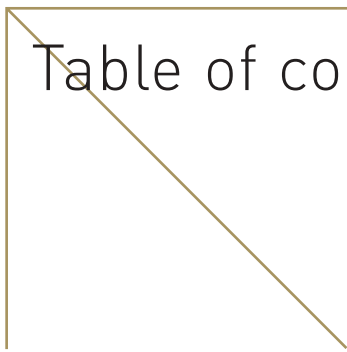


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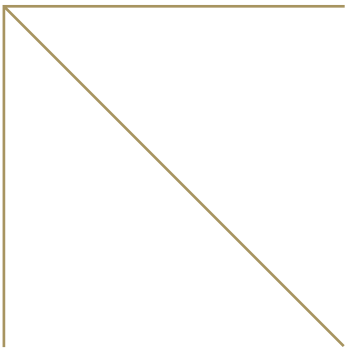






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# Summary

## Executive summary

**It is possible to achieve more sustainable mobility by using cleaner, more efficient and quieter vehicles as well as fuels which do not produce any CO<sub>2</sub> emissions throughout the transport chain. This applies not just to road traffic, but also to inland navigation, maritime shipping and aviation. Sustainable mobility is necessary in order to remove harmful health effects and to avoid burdening future generations with the environmental effects of mobility. However, a lot still needs to be done if sustainable mobility is to be achieved, and there are bound to be some additional costs. Reducing harmful exhaust gases and noise levels can primarily be achieved through international strategies, particularly by setting standards for engines and fuels. But national measures are also required in order to meet international objectives and agreements. The Cabinet will take steps to comply with the EU directives on emission ceilings for air pollutants, air quality, biofuels and sulphur-free fuels, plus the Kyoto protocol on CO<sub>2</sub> levels. Greening the tax system is an important strategy in this respect. In order to reduce NO<sub>x</sub> emissions in 2010, measures are being taken to introduce cleaner heavy goods vehicles and buses as soon as possible. In order to improve the air quality, the Cabinet plans to introduce a subsidy scheme from 2005 concerning soot filters in new diesel-driven cars, and will request European Commission support for this measure. In order to implement EU regulations, the Cabinet is further making every effort to ensure that biofuels start to become available for road traffic from 1 January 2006. The Cabinet also plans to encourage the use of quieter vehicles and tyres, thus avoiding the need to construct expensive acoustic baffles.**

## Full summary

### Environmental problems caused by traffic and transport

Our society cannot function without mobility. However, the current traffic and transport system is not sustainable. Traffic and transport – by road, water, rail and air – are major contributors to a range of environmental problems. Four types of problem are of most concern.

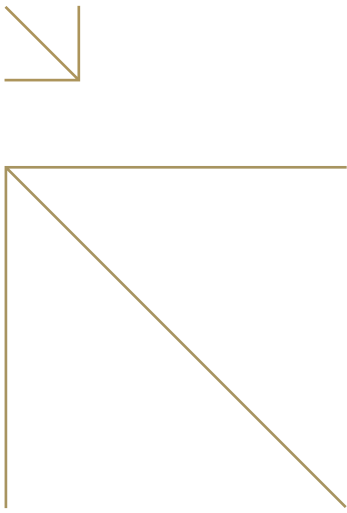
Firstly, traffic causes health problems particularly in densely populated areas by **degrading the air quality**. The city of Overschie is a familiar problem, but European limit values for air quality are being exceeded at many more locations in the Netherlands. This is largely caused by NO<sub>x</sub> and particulate (e.g. fine soot particle) emissions from vehicle and vessel diesel engines. The RIVM (National Institute for Public Health and the Environment) estimates that in 2001, between 1,700 and 5,000 people died prematurely in the Netherlands due to air pollution caused by particulate matter and ozone. People who live next to a busy road for a long time have twice as much risk of dying prematurely from heart or lung conditions.

Secondly, traffic and transport make a major contribution to **acidification of the natural environment** through the emission of air pollutants. These emissions damage farm crops and buildings, cause harm to nature and decrease biodiversity. Traffic is responsible for two thirds of nitrous oxide (NO<sub>x</sub>) emissions and almost one fifth of SO<sub>2</sub> emissions in the Netherlands.

Thirdly, greenhouse gas emissions from traffic contribute to **climate change**. Climate change threatens our health and safety in all manner of ways, and also jeopardises the stability and diversity of ecosystems. In 2010, traffic and transport will be responsible for one fifth of greenhouse gas emissions. This proportion is greater if the greenhouse gas emissions from international aviation and maritime shipping are also included. Greenhouse gas emissions from traffic and transport are growing sharply and the relative share of this sector in the total is increasing.<sup>1</sup>

Finally, traffic is the largest source of **noise pollution** and the noise nuisance, sleep disruption and health problems that are associated with it. This also results in high costs for acoustic baffles and restrictions on spatial developments. If there is no change in policy, by 2030 between 15% and 20% more of the country will have to cope with excessive noise levels from roads, railway lines and aircraft. In 40% of the nature areas of the National Ecological Network (NEN) noise levels will be higher than the natural background level, resulting in a deterioration of the perceived value of these areas.

<sup>1</sup> CO<sub>2</sub> emissions from traffic and transport will rise by 31% in the period 1990-2010, for example, as against 12% for the Netherlands as a whole.



In view of the above, it is necessary and fair that traffic and transport should make a greater contribution to achieving environmental objectives than is currently the case. In order not to undermine the competitive position of Dutch industry, environmental efforts should not be targeted solely at industry. Naturally, the fact that a proportion of goods transport competes internationally must be taken into account. The measures outlined in this policy document are in line with what other EU countries are doing and hence do not disturb the level playing field.

### Policy tasks

Thirty years ago, policy-makers first introduced measures to reduce environmental burden at the source by what is known as the source policy. This mainly international strategy has achieved a great deal in a number of areas. The introduction of the catalytic converter, for example, has helped reduce the air pollution caused by petrol-driven cars considerably. Despite these successes the following policy tasks remain, however:

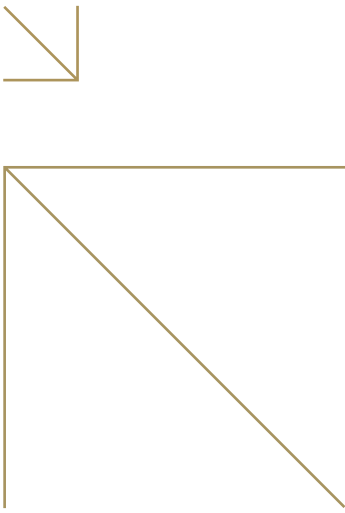
- In 2010, the Netherlands must meet the emission ceiling for air pollutants set out in the EU's NEC (National Emissions Ceiling) Directive. This means that the Netherlands must reduce nitrous oxide (NO<sub>x</sub>) emissions in the traffic sector by at least 8 kiloton through national measures. The emission ceilings are obligations to produce a certain result. Without extra measures, the Netherlands will exceed the agreed maximum emission level and risk a penalty. In the long term, the aim is to achieve no-effect emission levels. In other words, emissions of air pollutants at a level that does not endanger public health and nature.
- The Netherlands cannot meet the EU directives on air quality at all locations without extra measures. The Cabinet has set a target of meeting the EU standards (for NO<sub>2</sub> and particulate matter) at as many locations as possible in 2010. Nevertheless, within the EU the Cabinet urges a postponement to 2015 of the attainment date for the NO<sub>2</sub> limit value for existing air quality problem areas. This is because costly and radical infrastructural measures are needed to meet the limit value at all locations in 2010, whereas technical improvements to vehicles would mean that the standard would in many cases be achieved anyway, some years later. The aim is to meet the standards for NO<sub>2</sub> at all locations in 2015.

- Greenhouse gas emissions (particularly CO<sub>2</sub>) from traffic are increasing more quickly than in other sectors. Partly due to this, indicative targets have been agreed in an EU directive for biofuel (fuels derived from a biological origin) use in road traffic. The EU countries must announce their plans in this respect by mid-2004. In addition, an EU directive sets out that sulphur-free fuels must be available in 2005 in order to allow, amongst other things, the introduction of certain types of energy-efficient cars. In 2010, CO<sub>2</sub> emissions from traffic may not exceed 38 Mton. In the long term, the Cabinet aims to achieve a substantial reduction in greenhouse gas emissions from traffic (40% to 60% CO<sub>2</sub> reduction in 2030) in accordance with the NMP4 (National Environmental Policy Plan 4). Climate-neutral fuels for transport are essential if we are to achieve the desired transition to sustainable mobility. Mixes with bio-components, synthetic diesel (GTL gas-to-liquid and BTL biomass-to-liquid) and hydrogen can play an important part in helping to develop these sustainable fuels.
- The amount of noise emitted from traffic must be reduced substantially. The objective is that road traffic should be at least 2 dB(A) quieter in 2010, and that in 2010 most trains will emit noise levels that are at least 7 dB(A) lower than those of rolling stock fitted with cast iron brake blocks. In the long term, the aim is that health will no longer be endangered by exposure to noise, and that noises which are typical for an area will not be drowned out. As a basic principle, no new problem areas will be created.

### Object of this policy document

The object of this policy document is to set out the Cabinet's chosen approach for these tasks. It has been decided to adopt an independent policy document since strategic choices are at issue and because no coherent policy has previously been presented for certain topics (noise source policy, biofuels). The timing of this document is such that the Netherlands can inform the EU of the plans for biofuels in good time, whilst leaving sufficient time to work on the measures that will be implemented in 2005.





Mobility-relevant policies, such as road charges and infrastructure policy, are not discussed in this policy document, but in the Mobility Policy. Spatial planning, partly in relation to mobility, is discussed in the National Spatial Strategy. Although mobility-relevant measures and spatial measures can have positive environmental effects, they do not lead to any absolute separation of the link between the development of mobility and pressure on the environment.

### Basic principles

The following basic principles underlie moves towards achieving the objects:

- In accordance with the Outline Agreement, the **separation** between economic growth and pressure on the environment, which has been established in recent years, is maintained.
- There are **no objections to mobility** as such from an environmental perspective. Mobility is essential for the performance of social functions. The aim is to achieve no-effect level emissions in order to eliminate negative environmental effects.
- The Cabinet prefers **international solutions** that encourage clean, energy-efficient, quiet and climate-neutral technologies. In accordance with the Outline Agreement, the Netherlands makes an active contribution to setting strict international standards and is an active player at European and international level.
- As a rule, the Cabinet does **not** opt for one particular technology (for example, fuel cells, the internal combustion engine), but targets objectives, standards and boundary conditions. This does not diminish the fact that the government nevertheless creates a positive climate for promising technologies. The market determines which technologies are eventually taken up.
- **National measures** concerning air pollutants and greenhouse gases are being taken where they are necessary to meet international agreements and international steps are not possible (any longer). With regard to noise, there are no international targets for the noise levels to which homes are exposed (although there are international standards for noise emissions from vehicles and tyres), and these have to be determined, therefore, at a national level.

- These national measures serve to give substance to the basic principle set out in the Outline Agreement that a further **greening of the tax system** is an important instrument for environmental policy, and to the motion tabled by Liesbeth Spies, which enjoyed support from all parties in the Dutch parliament (29200 XI, no.28), proposing that this should be pursued expeditiously. The aim is to pass on all the social costs arising from traffic, including the costs relating to infrastructure and the environment. This policy document sets out a number of steps that are intended to achieve a greening of the tax system (e.g. for a reduction of NO<sub>x</sub> and CO<sub>2</sub> emissions, biofuels and sulphur-free fuels). In the Tax Plan 2005 and elsewhere the measures are specified in greater detail.
- Environmental issues should be **viewed together**. Any reduction of CO<sub>2</sub> emissions, for example, should not be at the expense of health, and new environmental technologies should not lead to problems for external safety: new fuels, for example, must be safe enough for the spatial environment.

### Priority areas, targets and actions

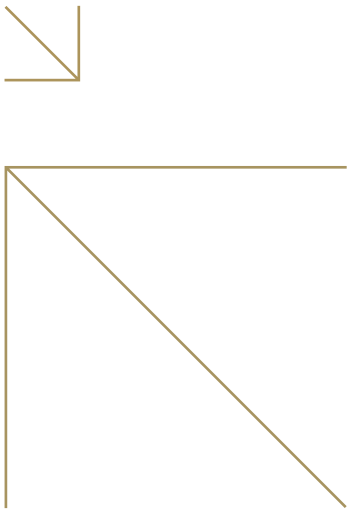
The Cabinet has formulated four priority areas in order to achieve these targets:

1. **reduced air pollution from road traffic;**
2. **reduced CO<sub>2</sub> emissions from road traffic;**
3. **reduced environmental burden from shipping and aviation;**
4. **quieter road and rail traffic.**

Further details on these priority areas, including a definition of targets and 36 actions to achieve them, are given below.

#### 1. Reduced air pollution from road traffic

At various roadside locations there are problem areas with respect to air quality. These problems relate specifically to NO<sub>x</sub> (nitrous oxide) and particulate (e.g. fine soot particle) emissions from heavy goods vehicles, diesel-driven cars and delivery vans.



Until about 2010, new diesel-driven cars will be more polluting than new petrol-driven cars<sup>2</sup>. Nevertheless, technologies which can, in time, make diesel-driven cars cleaner are in the pipeline. The Cabinet is therefore mainly targeting the introduction as soon as possible of these clean technologies for diesel-driven vehicles. This approach makes it possible to tackle air pollution by international, national and local measures.

#### International tightening up of exhaust emission standards for road vehicles

**Target:** in the long term (2030), to ensure that road vehicle emissions of air pollutants are at a level at which there is no longer any impact on public health and nature.

**Action 1:** The Netherlands will support in the EU a stringent tightening-up of the standards for NO<sub>x</sub> and particulate matter from cars (in particular diesel-driven cars), delivery vans and heavy goods vehicles. The intention is to ensure that the standards for NO<sub>x</sub> and particulate matter from diesel-driven cars and delivery vans are so stringent by 2010 (Euro 5) that every vehicle will have to be fitted with an NO<sub>x</sub> catalytic converter and soot filter. This would make Euro 5 diesel-driven cars as clean as today's Euro 4 petrol-driven cars. The Netherlands also advocates an improvement of testing methods since there is a huge difference between the emissions measured in tests and emissions under real world conditions.

#### National approach to air pollution from road vehicles

##### Target:

- to contribute to achieving the NO<sub>x</sub> emissions ceiling for traffic of 158 kiloton in 2010 in order to meet the EU's NEC Directive;
- in 2010, to meet the EU standards for air quality (NO<sub>2</sub> and particulate matter) at as many locations as possible, and in 2015 to meet the EU standards for NO<sub>2</sub> at all locations.

In the Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution 2003, the Cabinet set an NO<sub>x</sub> emissions ceiling for traffic of 158 kiloton in 2010. According to forecasts, NO<sub>x</sub> emissions from traffic in 2010 will be 185 kiloton, 27 kiloton higher than the ceiling. The NO<sub>x</sub> emissions from heavy goods vehicles in 2010 are now estimated to be 19 kiloton higher than was previously forecast. This is because the emissions from heavy goods vehicles appear in actual fact to be higher than was assumed on the basis of the emissions standards.

This is not a problem exclusive to the Netherlands, but one which encompasses the entire EU.

**Action 2:** The Cabinet will raise the issue of the additional 19 kiloton NO<sub>x</sub> emissions from heavy goods vehicles in the EU with the aim of ensuring the EU takes responsibility for this rather than the Netherlands having to solve it unilaterally with national measures.

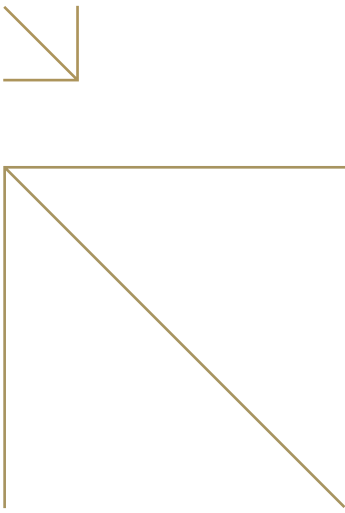
The above means that measures will need to be taken in traffic in order to achieve an NO<sub>x</sub> reduction of at least 8 kiloton in 2010. It is only viable to consider national measures in this respect since it is not possible to achieve a further reduction of NO<sub>x</sub> emissions in 2010 by tightening-up of the EU standards. The measures will be financial in nature; other instruments such as public information and covenants are either not effective or not possible for this purpose.

**Action 3:** The Tax Plan 2005 and, if financial cover can be found, the Tax Plan 2006, will include financial measures that will contribute to the total package of domestic measures (i.e. including subsidies) leading to a reduction of NO<sub>x</sub> emissions of at least 8 kiloton in 2010, and will also contribute to an improvement of the air quality.

The Cabinet intends to implement the following measures in order to stimulate clean technologies for diesel-driven road vehicles:

- tax incentives in 2005 for the earlier introduction of cleaner heavy goods vehicles (Euro 4 and Euro 5) by means of the Pollution Prevention Investment Tax Credit, if the necessary funds (€ 23 million) can be found in the budget of VROM;
- tax incentives, which have no effect on the budget, for soot filters in new diesel-driven cars by means of the purchase tax on passenger cars and motorcycles (BPM); the Cabinet will request European Commission support for this measure, which can be introduced from 1 January 2005.

<sup>2</sup> NO<sub>x</sub> and particulate emissions per kilometre of new diesel-driven cars (Euro 3) are currently in practice ten and seven times higher, respectively, than those of new petrol-driven cars. Even after the introduction of the Euro 4 standards in 2005, new diesel-driven cars will still be more polluting than new petrol-driven cars. However, new technologies which can, in time, make diesel-driven cars cleaner, such as the soot filter and NO<sub>x</sub> after-treatment devices, are in the pipeline. If the Euro 5 standard succeeds in tightening up the limit values for diesel-driven cars stringently enough, there will be little to separate emissions of petrol and diesel from 2010 at the earliest. The CO<sub>2</sub> emissions per kilometre (tank-to-wheel) from diesel-driven cars is approximately 15% lower than that of petrol-driven cars. However, this does not compensate for the higher NO<sub>x</sub> and particulate emissions.



The Cabinet aims to continue the incentive scheme for cleaner heavy goods vehicles (Euro 4 and Euro 5) after 2005, if the necessary financial cover can be found. In view of the objectives for the NEC Directive, the Cabinet also plans to provide tax incentives for new diesel-driven cars which meet the Euro 5 standard for NO<sub>x</sub> and/or particulate matter ahead of schedule as soon as this is advisable and appropriate in an EU context.

**Action 4:** The national standards that have been set for LPG units will be updated so that the standards set for cars that have been retrofitted to run on LPG keep pace with those for petrol-driven cars. Thanks to improvements in petrol-driven cars, cars that have undergone LPG conversion are no longer cleaner than new petrol-driven cars.

**Action 5:** In the event of setbacks in the coming years, so-called reserve measures will be taken. These are measures that should be ready in time for the evaluation of the NEC Directive in 2006 and which will be assessed in the coming years.

#### Local approach to improving roadside air quality

##### Target:

- to meet the EU standards for air quality (NO<sub>2</sub> and particulate matter) at as many locations as possible in 2010, and to meet the EU standards for NO<sub>2</sub> at all locations in 2015.

**Action 6:** The Cabinet is examining whether a reduction of the speed limit in combination with proper enforcement, such as the 80 kilometre per hour speed limit on the A13 at Overschie in Rotterdam, is also possible on other stretches of road. The Cabinet will inform the Lower House on this matter in mid-2004.

**Action 7:** Municipalities are being sent information outlining the possibilities for designating areas as exclusively for 'clean' vehicles. An example is excluding dirty heavy goods vehicles from city centres, such as currently happens in Amsterdam. At the same time it is important to ensure, however, that city centres remain accessible and that goods delivery is possible.

**Action 8:** The Cabinet is implementing an Air Quality Innovation Programme in order to develop solutions for air quality problem areas. A total of € 20 million has been reserved for this until 2010.

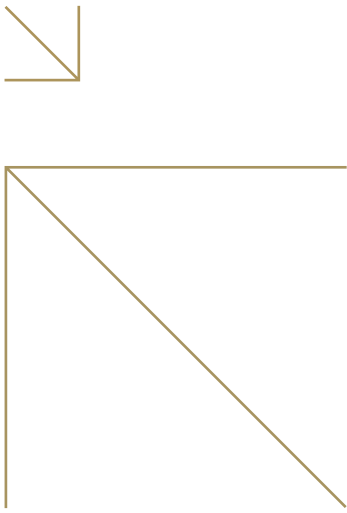
## 2. Reduced CO<sub>2</sub> emissions from road traffic

The European Commission has agreed covenants with the automotive industry to make new cars more energy-efficient. This strategy must be pursued vigorously, but is not enough by itself for a transition to sustainable mobility. This is because there are technical limits to the reduction in car fuel consumption, and the effects of any reduction in consumption are cancelled out by the growth in the number of vehicles on the road. Large-scale use of climate-neutral fuels, such as biofuels and/or sustainably produced hydrogen and electricity, is needed in the short to medium term in order to make traffic more sustainable. Of these fuels, only biofuels can be introduced, initially on a small scale, from 2006. The costs of biofuels are high at the moment. However, the introduction of second-generation biofuels is expected to bring down the costs by a factor of 3 to 5 in the short to medium term and increase the CO<sub>2</sub> reduction efficiency. By making biofuels available (throughout the transport chain), vehicle CO<sub>2</sub> emissions can be reduced and a market will be developed which should lead, as soon as possible, to the introduction of second generation biofuels. In this way, the biofuel policy will be implemented in such a way that optimum conditions are created for a speedy introduction of the second generation of biofuels. Incentive measures for biofuels should be linked in time to environmental performance. Finally, this sustainable energy technology also gives an impulse to research and development.

##### Target:

- CO<sub>2</sub> emissions from traffic may not exceed 38 megaton in 2010. This is excluding implementation of the EU Biofuels Directive;
- from 2006, there is a target percentage for biofuels of 2% of the energy content of diesel and petrol, which is to be provided as much as possible by second generation biofuels where feasible and in such a way that lock-in effects are avoided;
- in the long-term, a reduction of vehicle CO<sub>2</sub> emissions by 40% to 60% in 2030.

**Action 9:** With the target percentage of 2% in mind, the Cabinet is doing its utmost to introduce an incentive scheme for biofuels from 2006. The necessary research and preparation which is required, including the necessary funding, will be undertaken now. In 2005, the Cabinet will announce the results that have



been achieved in respect of research, preparation and funding. The 2% biofuel target includes niche markets. In addition to reducing CO<sub>2</sub> emissions, there is a further important objective of setting in train innovations targeting second generation fuels. The preparation will be worked out in cooperation with the market (oil companies, chemicals companies, etc.) and non-governmental organisations, and in such a way that lock-in effects (holding on to first generation biofuels for too long) are avoided.

**Action 10:** The Netherlands will argue for an extension of the covenants on car CO<sub>2</sub> emissions which the EU has concluded with the automotive industry. The Netherlands believes that this new covenant should set an objective of 120 gram/km in 2012. If the industry declines any further covenants as a means of tackling this issue, or if covenants turn out not to be effective enough, EU standards will have to be imposed. The Netherlands proposes setting a standard for the average CO<sub>2</sub> emission from new cars per manufacturer, with trading between car manufacturers being permissible. The Netherlands is also in favour of an EU-wide approach to reducing the fuel consumption of delivery vans.

**Action 11:** The Cabinet will examine how the amount of purchase tax levied on passenger cars and motorcycles (BPM) can be partly linked to the fuel efficiency of cars, with a view to introducing this measure from 1 January 2006. A precondition is that this measure should have no effect on the budget. The possibility of exempting hybrid cars and hydrogen-powered cars which meet certain requirements from BPM for a long period is currently being examined.

**Action 12:** The Cabinet will do its best to ensure that all new cars in the EU are fitted with fuel-saving in-car devices, such as on-board computers with econometers which provide drivers with information on fuel flow.

**Action 13:** A driving style that reduces fuel consumption (ECO-DRIVING) will become a compulsory part of the practical driving test for passenger cars. A media campaign will be launched in 2004 with the aim of promoting awareness of ECO-DRIVING as a means of reducing fuel consumption.

**Action 14:** In order to meet the EU directive on sulphur-free fuels, the Cabinet will, through the introduction of a differential excise duty structure, ensure that sulphur-free diesel is available in 2005. The market has already taken steps to introduce sulphur-free petrol to the motorist. Sulphur-free fuels are necessary to make the development of certain types of energy-efficient and clean cars possible.

**Action 15:** In consultation with the European Commission, the Cabinet is examining whether, with regard to long-term CO<sub>2</sub> reduction, it is possible for the traffic sector to take part in the EU's CO<sub>2</sub> emission trading system. This might take the form of an emissions trading scheme with a CO<sub>2</sub> ceiling for fuel suppliers.

### 3. Reduced environmental burden from shipping and aviation

In addition to road transport, inland navigation and maritime shipping are also major sources of air pollution. With road vehicles becoming cleaner, the proportion of air pollution caused by these methods<sup>3</sup> of transport is increasing. International maritime shipping and aviation are also responsible for a lot of CO<sub>2</sub> emissions, although these emissions do not fall within the reduction targets set under the Kyoto protocol.

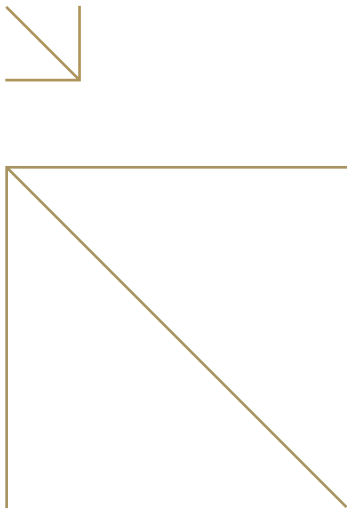
#### Reduced air pollution from shipping

##### Target:

- in the long-term (2030), to ensure that air emissions from shipping are at a level at which there is no further negative impact on public health and nature;
- through cleaner inland navigation, to contribute to achieving the NO<sub>x</sub> emissions ceiling for traffic of 158 kiloton in 2010, so as to meet the EU's NEC Directive;
- in 2010, to meet the EU standards for air quality (NO<sub>2</sub> and particulate matter) at as many locations as possible, and in 2015 to meet the EU standards for NO<sub>2</sub> at all locations.

**Action 16:** In order to reduce emissions from inland shipping, a subsidy scheme for cleaner inland shipping engines will be introduced (NO<sub>x</sub> reduction: approx. 1.5 kiloton).

<sup>3</sup> In 2010, for example, the proportion of NO<sub>x</sub> emissions from the traffic and transport sector caused by heavy goods vehicles is forecast to be 26%, by inland navigation 17%, by maritime shipping 14% and by cars also 14% (of which 75% will be caused by diesel-driven cars).



**Action 17:** The Netherlands firmly believes that the international standards for inland shipping engines should be tightened up as soon as possible to the level of the most stringent standards for heavy goods vehicles and non-road mobile machinery, and that fuel should be made cleaner on an international scale.

**Action 18:** The Netherlands supports the European Commission's proposals to reduce the sulphur content of fuels for maritime shipping. The Netherlands also supports the member states' request to the European Commission to present proposals in 2006 for EU measures for NO<sub>x</sub> reduction if the IMO (International Maritime Organisation) fails to come up with proposals to tighten up standards in this respect under MARPOL Annex VI.

**Action 19:** The Cabinet will recommend as soon as possible that the Lower House should ratify the UN Convention for the Prevention of Air Pollution from Ships (MARPOL Annex VI) dating from 1997.

**Action 20:** As soon as MARPOL Annex VI has entered into force, the Netherlands will support in the UN (IMO) a tightening-up of the NO<sub>x</sub> standards for maritime engines and a further reduction of the sulphur content of fuels.

#### **Tackling greenhouse gas emissions from maritime shipping and aviation**

**Target:** to include the greenhouse gas emissions from international aviation and maritime shipping in a regime of reduction measures (in particular CO<sub>2</sub>).

**Action 21:** The Netherlands supports, with reference to the 1994 UN Framework Convention on Climate Change, the creation of an emissions reduction regime for maritime shipping and aviation.

**Action 22:** The Netherlands seeks to achieve at UN level (ICAO: International Civil Aviation Organisation) market-compatible instruments for international aviation, such as emission charges and emissions trading. Efforts within the ICAO are also aimed at ensuring that sufficient flexibility is maintained to take EU measures.

**Action 23:** The Netherlands is committed to the adoption at UN level (IMO) of mandatory and possibly market-compatible

instruments to reduce greenhouse gas emissions from maritime shipping.

**Action 24:** In view of the ICAO Assembly to be held at the end of 2004, the Netherlands would like to see the EU determine its position with regard to progress on CO<sub>2</sub> measures for air traffic in good time.

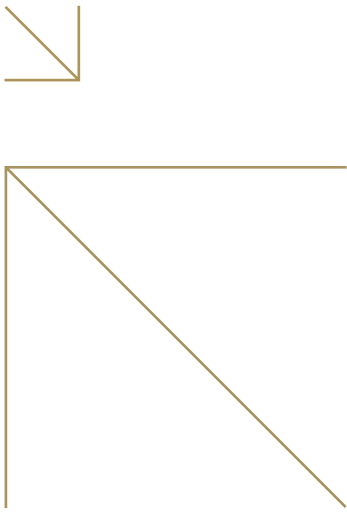
**Action 25:** As little progress is being made in the ICAO, the Netherlands is in favour of the EU introducing market-compatible measures for aviation, such as charges (e.g. the en route charge) and emissions trading, and hopes that the European Commission will make proposals in this respect by 2005 at the latest.

**Action 26:** As little progress is being made in the IMO, the Netherlands supports the EU member states' request to the European Commission to come up with proposals by 2005 at the latest for EU measures to reduce greenhouse gas emissions from maritime shipping.

**Action 27:** At ICAO level, the Netherlands is in favour of a tightening-up of NO<sub>x</sub> emission requirements (as such emissions also contribute to the greenhouse effect) for aircraft.

#### **4. Quieter road and rail traffic**

An effective noise source policy is needed to reduce health effects and nuisance, save money on acoustic baffles, and to create more possibilities for housebuilding or increasing the capacity of infrastructure, for example. The financial savings can be considerable: if all trains were fitted with quiet braking systems, for example, this would save society hundreds of millions of euros in the cost of constructing acoustic baffles. However, it has still not proven possible to develop an effective noise source policy in the EU despite the existence for more than 30 years of vehicle noise requirements. The standards for cars and delivery vans have been tightened up on various occasions, but each time such moves have been cancelled out by changes in the measuring method. The noise requirements for tyres are also very loose and trail a long way behind the technical possibilities. Alongside international strategies to achieve quieter vehicles, national measures are also needed since standards set at EU level are not expected to be effective in the short to medium term.



### International noise source policy

**Target:** in the long term, a sharp reduction of noise levels from road and rail traffic.

**Action 28:** The Cabinet is putting the importance of stringent noise requirements for road and rail traffic in the EU on the political agenda, for example during the Dutch Presidency of the EU.

**Action 29:** At EU and UN level, the Cabinet is in favour of a tightening-up of the noise standards for cars, delivery vans, heavy goods vehicles, trains and tyres.

**Action 30:** At EU level – for example regarding the amendment of the Interoperability Directive in 2004 –, the Cabinet is in favour of a tightening-up of the noise standards for new trains.

### National approach to achieving quieter road traffic

**Target:** a reduction of at least 2 dB(A) in road traffic noise in 2010.

**Action 31:** The Cabinet is holding talks with the transport, automotive and tyre sectors with the aim of reaching agreements concerning the wide-scale introduction of low-noise tyres in the Netherlands.

**Action 32:** From 2006/2007, low-noise road surfaces – with the acoustic quality of what is known as twin-course pervious coated macadam (ZOAB) – will be used on motorways where they run through populated areas and possibly also in the National Ecological Network, unless it becomes apparent in 2005 that this is not cost-effective.

**Action 33:** Within the framework of the Noise Innovation Programme, a sum of € 70 million is available until 2007 for innovations that will lead to a reduction of road traffic noise. A further € 200 million has been reserved until 2010 for implementing innovative measures in respect of road infrastructure (for example, the Road Widening Emergency Act).

### National approach to achieving quieter trains

**Target:** to ensure that in 2010, most trains will produce noise

levels that are at least 7 dB(A) lower than those of rolling stock fitted with cast iron brake blocks. In any event, only quiet trains will operate at night on all sections of track in 2015.

**Action 34:** The precise way or ways in which the noise from goods and passenger trains can be linked to the usage fee will be examined this year so that this can be introduced as soon as possible (target is 2008).

**Action 35:** From 2008, the first steps will be taken to ban noisy trains from noise-sensitive sections of track during the night and/or evening (as has already been done for the HST Eastern line) if this is necessary in order to meet noise regulations or the government's noise targets.

**Action 36:** The Cabinet has reserved € 25 million<sup>4</sup> in the period 2004-2010 to implement the Noise Innovation Programme for source measures on the railways.

<sup>4</sup> Of the € 40 million originally reserved for railway noise reduction from the Noise Innovation Programme, € 15 million will be spent on noise reduction measures in the Sloelijn project.

# 1. Introduction

Our society cannot function without mobility. However, the current traffic and transport system is not sustainable. Traffic and transport – by road, water, rail and air – are major contributors to a range of environmental problems. Firstly, traffic and transport are major sources of emissions of air pollutants which cause health problems along roads running through densely populated areas. These include emissions of nitrous oxides (NO<sub>x</sub>), two thirds of which are produced by traffic. Air pollution from traffic also leads to environmental degradation. Secondly, CO<sub>2</sub> emissions (which cause climate change) from traffic and transport are increasingly relatively steeply in comparison with other sectors<sup>5</sup>. Finally, traffic is the largest single source of noise, which leads to health problems and nuisance.

It is necessary and fair that traffic should make a greater contribution to achieving environmental objectives. In order not to undermine the competitive position of Dutch industry, environmental efforts should not be targeted solely at industry. Naturally, the fact that a proportion of goods transport competes internationally must be taken into account.

Since the policy on traffic emissions affects many people, it is not surprising that it often gives rise to many questions, such as:

- Why should traffic be even cleaner, quieter and more energy-efficient? Haven't the environmental problems caused by traffic been solved yet?
- What does the EU say we have to do?
- Is it only road traffic that has to clean up its act, or other modes of transport as well, such as aviation, railways, inland shipping and maritime shipping?
- Why do we need biofuels?
- Can't we use hydrogen-powered vehicles or hybrid cars?
- Which fuel is least damaging to the environment: petrol, diesel, LPG or natural gas? What is the Cabinet doing to make the best type of fuel as attractive as possible?
- Can the Cabinet do anything about the health problems caused by traffic in densely populated areas?
- What can be done to ensure that traffic contributes less to the greenhouse effect?
- What is the Cabinet going to do to reduce the noise pollution from traffic? Are there alternatives to acoustic baffles and sound insulation in homes?

Questions like these are dealt with systematically in this policy document.

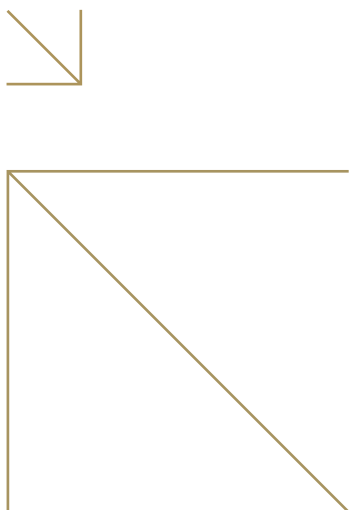
Thirty years ago, policy-makers first introduced measures to reduce environmental burden at the source by what is known as the source policy. This mainly international strategy has achieved a great deal in a number of areas. The introduction of the catalytic converter, for example, has helped reduce the air pollution caused by petrol-driven cars considerably. Despite these successes the following policy tasks remain for the period leading up to 2010, however:

- The Netherlands must reduce nitrous oxide (NO<sub>x</sub>) emissions from traffic by 27 kiloton in order to meet European agreements (the so-called NEC (National Emissions Ceiling) Directive) in 2010. Without extra measures, the Netherlands will exceed the agreed maximum emission level and risk a penalty.
- The Netherlands cannot meet the EU directives on air quality at all locations without extra measures. This relates, amongst other things, to particulate (fine soot particle) and NO<sub>x</sub> emissions from diesel engines which have a negative impact on health.
- Greenhouse gas emissions (particularly CO<sub>2</sub>) from traffic are increasing more quickly than in other sectors. Partly due to this, indicative targets have been agreed in the EU for the use of biofuels (fuels derived from a biological origin) in road traffic. The EU countries must announce their plans in this respect by mid-2004.
- The growth of traffic threatens to lead to increased noise levels. Without extra measures at the source, this would lead to greater noise nuisance and detrimental health effects as well as extra costs for acoustic baffles.

The object of this policy document is to set out the Cabinet's chosen approach for these tasks. An outline is also given of the strategy for the period after 2010. It has been decided to adopt an independent policy document since strategic choices are at issue and because no coherent policy has previously been presented for certain topics (noise source policy, biofuels).

The timing of this document is such that the Netherlands can inform the EU of the plans for biofuels in good time, whilst leaving sufficient time to work on the measures that will be implemented in 2005.

<sup>5</sup> CO<sub>2</sub> emissions from traffic and transport will rise by 31% in the period 1990-2010, for example, as against 12% for the Netherlands as a whole.



### Definition of this policy document

This policy document deals with the strategy for reducing traffic emissions by tackling the issue at the source – the so-called source policy. This document deals with three topics:

- Air pollutant emissions;
- Greenhouse gas emissions;
- Noise emissions.

With regard to air pollutants, the Traffic Emissions Policy Document discusses in detail the issues set out in the Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution 2003. There is also a correlation with the Transition to Sustainable Mobility set out in the NMP4 (National Environmental Policy Plan 4). In addition to environmental aspects, this transition also includes spatial and accessibility aspects. A separate report will be prepared on the Transition to Sustainable Mobility.

Mobility-relevant policies, such as road charges and infrastructure policy, are not discussed in this policy document, but in the Mobility Policy. The Traffic Emissions Policy Document does, however, deal with financial instruments that can be used to make the various means of transport cleaner, more energy-efficient or quieter. Spatial planning, partly in relation to mobility, is discussed in the National Spatial Strategy. Although mobility-relevant measures and spatial measures can have positive environmental effects, they do not lead to any absolute separation of the link between the development of mobility and pressure on the environment.

This policy document also does not address the issue of the transport of hazardous substances. On the basis of the Comprehensive chain studies concerning LPG, ammonia and chlorine, the Cabinet will present a position dealing with this issue in mid-2004.

### Structure of this document

This policy document contains the following chapters:

- Chapter 2 describes the short-term (2010) targets and long-term (2030) ambitions. The difference between the targets and ambitions, on the one hand, and the forecasts, on the other, reveals the **policy tasks** at hand.

- Chapter 3 deals with the **basic principles** of policy.
- Chapter 4 takes a close look at the **measures** which the Cabinet intends to take or supports at an international level in order to achieve the targets and ambitions.



## 2. Targets, ambitions and forecasts

### 2.1 Introduction

This chapter looks at the short-term (2010) and long-term (2030) policy tasks. The policy tasks are defined as the difference between the forecasts (what will happen if we do nothing?), on the one hand, and the targets and ambitions (what do we want?), on the other.

Generally speaking, the long-term objective is to achieve sustainable mobility. Mobility is sustainable when it meets the needs of the present generation without limiting the possibilities for future generations by polluting the environment and exhausting resources. Sustainability means that the mobility system meets peoples' needs, does not damage the living environment and the climate, is safe for people and animals and offers trade and industry the chance to operate on a commercial footing. Sustainability also means that the energy supply for traffic and transport continues to be guaranteed in the short and medium-term.

#### Quiet, clean and energy-efficient

The environmental burden caused by vehicles can be expressed through the terms quiet, clean and energy-efficient. The extent to which a vehicle can be said to be quiet is determined by the noise from engines, tyres and the characteristics of the infrastructure. The emissions of air pollutants, such as NO<sub>x</sub>, VOC, SO<sub>2</sub> and PM<sub>10</sub> determine how clean a vehicle is. The energy-efficiency of a vehicle is related to its CO<sub>2</sub> emissions. The terms clean and energy-efficient are often confused. Clean vehicles are not necessarily energy-efficient, however, just as energy-efficient vehicles are not necessarily clean. Also, the feature 'quiet' is not dependent on the features 'clean' or 'energy-efficient'.

### 2.2 Air pollutant emissions

#### 2.2.1 Remaining policy task with regard to air pollutants in the period until 2010

With regard to air pollution, a distinction should be made between the background concentration of polluting substances, to which various sources (including other countries) contribute, and local peak concentrations, in particular roadside locations in towns and cities. The reduction of the background concentration means that local air pollution is increasingly

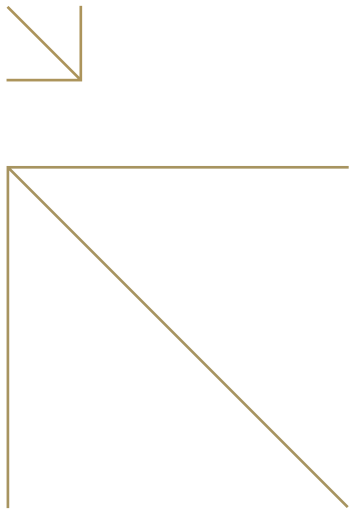
determined by particulate matter and NO<sub>2</sub> from traffic. Traffic accounts for a substantial proportion of air pollutant emissions (see figure 2.1). For example, two thirds of all nitrous oxide (NO<sub>x</sub>) emissions in the Netherlands originates from traffic (road vehicles, shipping and non-road mobile machinery). NO<sub>x</sub> and particulate emissions from diesel engines contribute to health problems, particularly in densely-populated urban areas. Air pollutant emissions also damage farm crops and buildings, are harmful to nature and decrease biodiversity.

Two EU commitments are particularly significant with regard to air pollutants:

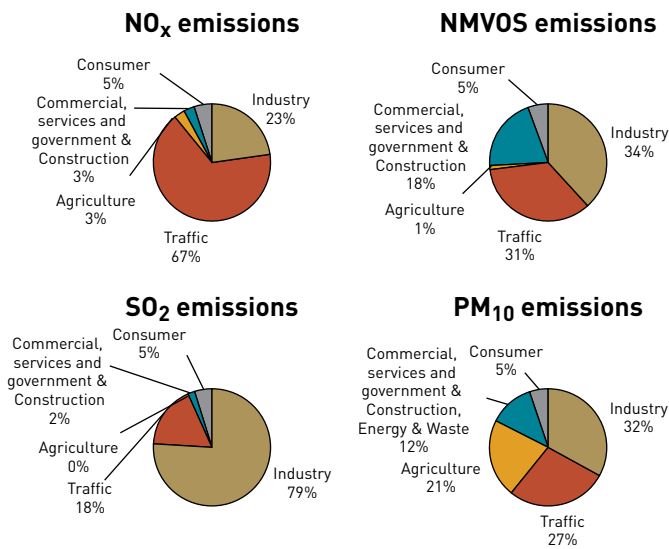
- The so-called NEC (National Emissions Ceiling) Directive;
- The directives concerning air quality.

#### NEC Directive

The NEC Directive assigns ceilings for total emissions of SO<sub>2</sub>, NO<sub>x</sub>, NMVOC and NH<sub>3</sub> for each EU member state in 2010. These ceilings are obligations to produce a certain result. If emissions in the Netherlands in 2010 exceed the values laid down, the European Commission will issue the Netherlands with a notice of default and may impose a heavy penalty.



**Figure 2.1 Expected contribution of the various sectors to national air pollutant emissions in 2010.**



Source: RIVM

In the Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution 2003, the Cabinet has divided the emission ceilings of the NEC Directive into separate ceilings for each sector. According to the definition of the NEC Directive (see box), the ceiling for NO<sub>x</sub> emissions from traffic will be exceeded by 27 kiloton in 2010 (see table 2.1). The forecasts for SO<sub>2</sub>, NH<sub>3</sub> and NMVOC match the respective ceilings precisely. It is clear, therefore, that the problem with regard to traffic relates primarily to NO<sub>x</sub> emissions.

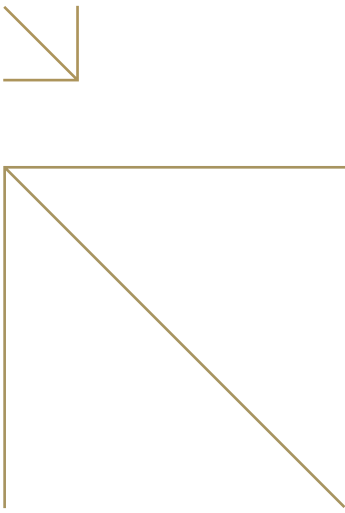
**Health effects of air pollutants**

The RIVM estimates that in 2001, between 1,700 and 5,000 people died prematurely in the Netherlands due to air pollution caused by particulate matter (PM<sub>10</sub>) and ozone (1 to 3% of all premature deaths). People who live next to a road for a large part of their life have twice as much risk of dying prematurely from heart or lung conditions. Diesel soot from the transport sector is one of the main hazardous substances (RIVM, 2003). Although the overall extent of atmospheric pollution is decreasing, air pollution is increasingly being caused by road traffic and inland and maritime shipping. Ozone, which is created when NO<sub>x</sub> and VOC react with sunlight, is also responsible for premature deaths. Ozone and PM<sub>10</sub> are major causes of respiratory complaints, bronchial infections, declining lung function and emergency hospital admissions.

**Table 2.1 Traffic air pollutant emissions in kiloton according to the EU NEC definition**

	Emis- sions 1990	Emis- sions 2000	Forecast 2010	NEC- ceiling traffic	Exceeded by
SO <sub>2</sub> (NEC)	18	10	4	4	0
NO <sub>x</sub> (NEC)	355	280	185	158	27
NH <sub>3</sub> (NEC)	1	3	3	3	0
NMVOS (NEC)	198	114	55	55	0
PM <sub>10</sub>	26	20	14		
NO <sub>x</sub> maritime shipping	20	24	30		
SO <sub>2</sub> maritime shipping	12	14	9		

Source: RIVM



### New definition of national emissions

The NEC Directive gives a different definition of the emissions to be included in figures than the NMP4. According to the NEC Directive, SO<sub>2</sub>, NO<sub>x</sub>, NMVOC and NH<sub>3</sub> emissions from international maritime shipping should not be included in national emission figures. Under the NMP4, however, these emissions were included in national figures in so far as they related to emissions in Dutch territorial waters. By contrast, emissions from offshore and coastal fishing, recreational craft and national military vessels on the Dutch Continental Shelf are considered national emissions under the NEC Directive, even though they were not taken into account in the NMP4. Whilst this change in definitions is important for international settlements, it does little to alter actual emissions, of course.

The figures for NMVOC may have to be adjusted by adding 15 to 20 kiloton to the figures in the table, however, since estimates for 'real world' emissions from cars at ambient temperature were too low in the past. There may also be further setbacks with regard to NMVOC as well as NO<sub>x</sub> since previous forecasts have failed to take sufficient account of extra emissions from car air-conditioning systems.

### EU Air Quality Directives

The EU Air Quality Directives establish standards for, amongst other things, concentrations of NO<sub>2</sub> (nitrogen dioxide) and PM<sub>10</sub> (particulate matter). Without extra policies, it will not be possible to achieve the standards for the concentration of NO<sub>2</sub> in 2010 and the concentration of PM<sub>10</sub> in 2005 at all locations (see annex 1). Nevertheless, there will be a continued reduction of concentrations, as in previous years.

With regard to NO<sub>2</sub>, the Cabinet has set a target of meeting the EU limit value at as many locations as possible in 2010. Within the EU, the Cabinet urges a postponement to 2015 of the attainment date for the NO<sub>2</sub> limit value, however. This is because costly and radical infrastructural measures are needed to meet the limit value at all locations in 2010, whereas technical improvements to vehicles would mean that the standard for air quality would in many cases be achieved some years later anyway. The aim is to meet the EU standards at all locations in 2015.

PM<sub>10</sub> (fine particulate matter) is also a major problem. The EU average daily limit value will be exceeded across virtually the

whole of the southern part of the Netherlands and in certain hot spots in 2005. There is considerable variation in the size and physical-chemical composition of particles. Not all particles are equally hazardous. Nevertheless, there is scientific consensus that fine soot particles produced by the combustion processes in diesel engines have hazardous properties. The Cabinet believes that the member states should be given more time to meet the very stringent limit values for PM<sub>10</sub>. The aim remains, however, to meet the limit values at as many locations as possible in 2010.

The Cabinet's efforts to postpone attainment dates does not diminish that fact that additional national measures are necessary. It is an established fact that the air quality problems are urgent and are primarily caused by traffic. In addition, RIVM calculations show that without extra policies, there will continue to be situations in 2015 in which there is a risk of standards for NO<sub>2</sub> being exceeded.

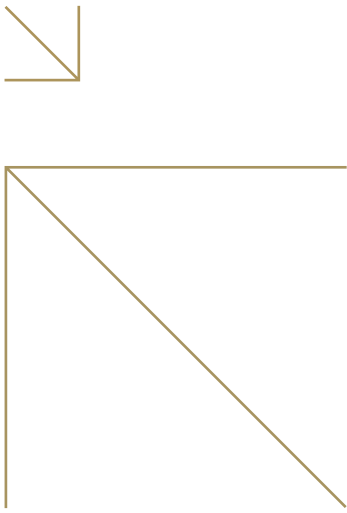
### EU evaluation of air quality standards

The limit values for NO<sub>2</sub> and particulate matter (PM<sub>10</sub>) are currently being evaluated in the EU. The World Health Organisation (WHO) updated the scientific assessment of the health effects of NO<sub>2</sub> and PM<sub>10</sub> dating from 1996, on which the EU based the limit values, in early 2003. Following the update, the WHO concluded that there was no reason to review the current limit value for NO<sub>2</sub>. It is recommended that the limit values for PM<sub>10</sub> (fine particles smaller than 10 microns) be adjusted. As the smaller particles in particular are relevant to health issues, the WHO recommends that standards be developed for PM<sub>2.5</sub> (particles smaller than 2.5 microns). All research results also indicate that there is no threshold concentration below which there are no health effects; even at low concentrations of particulate matter there are risks to health. These results underline the need to combat vehicle particulate matter emissions, including the smaller particles; this is technically possible through the use of soot filters (see Chapter 4).

### 2.2.2 Long-term policy task with regard to air pollutants

The long-term ambitions with regard to air pollutants are based on the following basic principles set out in the NMP4 National Environmental Policy Plan:

- acidification and large-scale air pollution may not affect the nature objectives contained in the National Ecological Network;



- the health risks from air pollution should be reduced to a negligible risk;

From these basic principles, the NMP4 produces the following objectives for the Netherlands in the period until 2030:

- NO<sub>x</sub> and SO<sub>2</sub> emissions to be reduced by 80% to 90% relative to 1990;
- NMVOC emissions to be reduced by 75% to 90% relative to 1990;
- PM<sub>10</sub> emissions to be reduced by 85% to 95% relative to 1990.

The Cabinet feels that the traffic sector should make a proportionate contribution to the above reductions. The aspirational target must be to achieve what is known as the no-effect level, that is a level at which there are no negative effects for health and nature. Given the current trends for NO<sub>x</sub>, NMVOC, SO<sub>2</sub> and PM<sub>10</sub>, it should be possible, in principle, to reach a sustainable level in the long term (2030-2050). However, it will still be a major task to realise this.

## 2.3 Greenhouse gas emissions

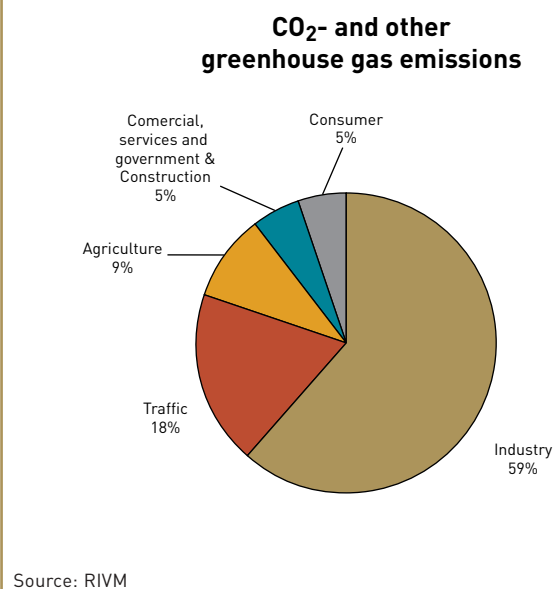
### 2.3.1 Remaining policy task with regard to greenhouse gas emissions in the period until 2010

The principal greenhouse gas emitted by traffic is CO<sub>2</sub>. Two other greenhouse gases emitted by traffic are the fluorocarbon HFC-134a, a coolant used in car air-conditioning systems and which escapes when a leak develops, and laughing gas (N<sub>2</sub>O), which is one of the exhaust gases.

N<sub>2</sub>O was emitted in moderate quantities by the first generation of petrol-driven cars to be fitted with a fully controlled three-way catalytic converter (built at the end of the 1980s/early 1990s). Improvements to the catalytic converter have led to a further reduction of N<sub>2</sub>O emissions from new petrol-driven cars. N<sub>2</sub>O emissions from diesel-driven cars are very small. As a result, there is no specific policy to limit N<sub>2</sub>O emissions from cars.

The traffic sector will be responsible for approximately 18% of greenhouse gas emissions in 2010 (figure 2.2). With significant emission reductions already being achieved in many other sectors, the proportion of greenhouse gas emissions from traffic is increasing.

**Figure 2.2 Contribution of each sector to greenhouse gas emissions in 2010**

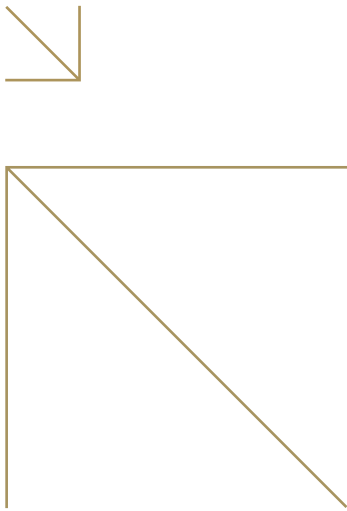


The Kyoto Protocol issued as part of the Framework Convention on Climate Change (1997) requires the Netherlands to reduce its annual greenhouse gas emissions in the period 2008-2012 by an average of 6% relative to 1990.

The Cabinet has translated the Kyoto objectives into CO<sub>2</sub> target values for each sector<sup>6</sup>. A CO<sub>2</sub> target value of 38 megaton has been established for the traffic sector. This is excluding implementation of the EU Biofuels Directive. According to the most recent calculations, which incorporate the effect of the package of car measures from the Tax Plan 2004, CO<sub>2</sub> emissions in 2010 will be 38.3 Mton.

The Kyoto objectives would appear to be within reach for the traffic sector. This does not diminish the fact that the long-term trend is alarming. Unlike air pollutant emissions, CO<sub>2</sub> emissions from traffic are increasing (see table 2.2).

<sup>6</sup> Lower House, parliamentary year 2003-2004, 28240, no.4



**Table 2.2 Greenhouse gas emissions from traffic in Mton (CO<sub>2</sub> equivalent)**

	1990	2000	Forecast 2010	Forecast 2020
CO <sub>2</sub> road traffic	25,4	31,5	34,3	41,3
CO <sub>2</sub> non-road traffic	3,7	3,7	4,0	4,5
Total CO <sub>2</sub> (IPCC)	29,1	35,2	38,3	45,8
N <sub>2</sub> O		2,2	0,9	1,0
HFK-134a		0,1	0,5	0,9
Total greenhouse gases		37,5	39,7	47,7

Source: RIVM

The table does not include the sizeable CO<sub>2</sub> emissions from international maritime shipping and aviation, which, under the Kyoto protocol, are not considered to be national emissions. The CO<sub>2</sub> emissions from fuel bunkered in the Netherlands by maritime shipping was 43 Mton in 2000, and 10 Mton in the case of aviation.

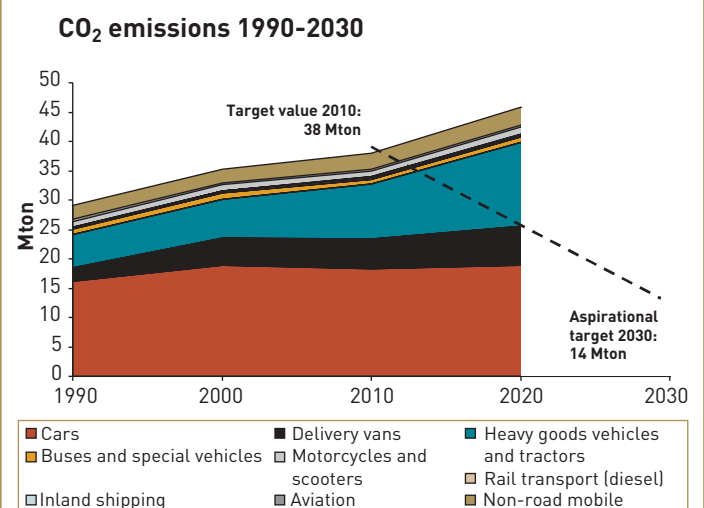
A second international obligation is the EU Biofuels Directive concerning road traffic. This initiative was launched in the EU with the important aim not just of achieving a reduction of CO<sub>2</sub> emissions, but also of ensuring energy supplies and providing support to agriculture. The Directive requires member states to ensure that an indicative percentage of their engine fuels is made up of biofuels. There are two points in time for which member states must determine a target value – 2005 and 2010. The Directive mentions a figure of 2% in 2005 and a figure of 5.75% in 2010 as guide values. Members states are not obliged to accept these guide values, but must give valid reasons if they choose to deviate from them. Such reasons may include the fact that there is insufficient national potential to convert biomass into biofuels, for example, or that considerable

quantities of biomass are already being used for other forms of energy use (e.g. electricity generation). Member states may elect either to mix biofuels with fossil fuels or to make 100% biofuels available, or both. The advantage of the first approach is that such mixes can be used in ordinary petrol and diesel-driven cars. Most EU countries have already begun to introduce biofuels, or are preparing to do so.

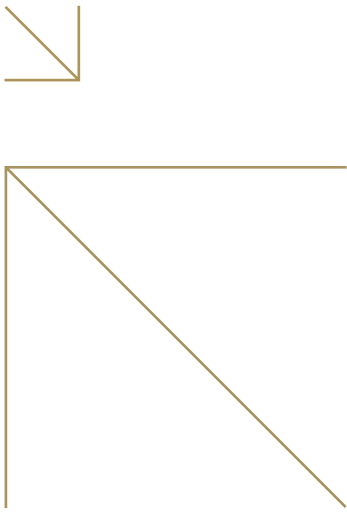
**2.3.2 Long-term policy task with regard to greenhouse gases**

The NMP4 includes a target for 2030 of a 40% to 60% reduction in CO<sub>2</sub> and other greenhouse gas emissions relative to 1990 levels. This is necessary in order to avoid dangerous global climate changes as a result of human activity. Such a cross-sector reduction means that significant reductions will eventually have to be realised in the traffic sector also. Accordingly, the necessary percentages of reduction are, broadly speaking, applicable to traffic. Since 1990, CO<sub>2</sub> emissions from traffic have increased by 20%, however. Evidently, what is needed is a clear break in the trend (see figure 2.3)

**Figure 2.3 CO<sub>2</sub>: ‘real world’ emissions, forecasts, objectives and ambitions**



Source: RIVM



## 2.4 Noise emissions

### 2.4.1 Policy task with regard to noise in the period until 2010

Traffic is responsible for a large proportion of noise pollution. Figures show that 27% of the population say that they experience serious levels of noise pollution from road traffic<sup>7</sup>. Based on the noise measures established in the MIT (Multi-year Programme for Infrastructure and Transport) and noise pollution control, in 2010 there will be 22,000 houses along motorways that will be exposed to noise levels of more than 65 dB(A) (see box). More than 50,000 homes will be exposed to noise levels of more than 65 dB(A) near to railway lines. It should be noted, however, that the figures are not entirely comparable since railway noise is perceived to be less bothersome than road traffic noise. The strong growth in traffic means that established maximum permissible noise levels along the motorway network and the railway network are being exceeded. Road alterations always involve high costs for measures to ensure the previously established limits are once again met. There are also high costs involved in integrating alterations made to the railway infrastructure into the surroundings.

In the Memorandum entitled 'Vaste waarden, nieuwe vormen (Established values, new approaches)' (2002), it was noted that it would not be possible to achieve all the noise objectives in the NMP4 in 2010 unless more money is made available. The new objectives for the noise levels to which homes and NEN areas are exposed will be set out in the National Spatial Strategy and the Mobility Policy.

The limited financial resources underline the need to approach the issue of noise at the source. If vehicles, tyres and infrastructure were to become quieter, less money would be needed for acoustic baffles and sound proofing homes. A further benefit is that improvements to vehicles have an effect everywhere, whereas acoustic baffles are only effective locally.

The objective with regard to road traffic is to achieve a generic reduction of noise output of 2 dB(A) in 2010 (relative to forecasts) through quieter tyres. With regard to rail traffic, the goal is that in 2010 most trains will have a noise output that is at least 7 dB(A) lower than that of rolling stock fitted with cast iron brake blocks. In any event, only quiet trains will operate at night on all sections of track in 2015. As a general principle, there are also to be no new problem areas.

### Health effects of noise

Noise is more than just a source of nuisance – it also causes other forms of health damage. The generally accepted definition of health is that it is not merely the absence of illness, but a state of physical, psychological and social wellness. Although this has proved somewhat difficult to apply in practice, it clearly involves more than just clinical syndromes. There are no significant health effects at noise levels up to roughly 40 dB(A) during the day and roughly 20 dB(A) at night. As noise levels rise, we start to see increasingly serious effects in larger and larger parts of the population. At 50 dB(A) (24-hour period) these effects are still limited (10% suffer nuisance, several per cent suffer serious disruption and several per cent are regularly woken up). The effects increase gradually in line with noise levels. At 65 dB(A), for example, the health of one fifth of the population is seriously affected. Above this figure clinical syndromes also begin to appear. As the number of people exposed to elevated noise levels is very large, even relatively small increases in noise levels have a significant effect on public health, placing an extra burden on health care.

### 2.4.2 Long-term policy task with regard to noise

The long-term goal is that health will no longer be threatened by exposure to noise, and that noises which are typical for an area will not be drowned out. An example of noise which is not typical for an area is the noise from a motorway that runs through a residential area.

With road and rail traffic expected to grow further, these goals can only be achieved through a major reduction of the noise output from vehicles and infrastructure. Technical modifications can be made to vehicles and infrastructure to make them significantly quieter than at present.

In the case of road traffic, the medium to long-term aim is to achieve a generic reduction of 6 to 8 dB(A). In the case of rail traffic, the aspirational target is a reduction of 10 to 12 dB(A) with respect to conventional rolling stock fitted with cast iron brake blocks.

<sup>7</sup> TNO (2000), Nuisance and other voluntarily reported effects of environmental pollution in the Netherlands; 1998 survey of disturbances.

## 3. Basic principles

### 3.1 Introduction

This chapter deals with the basic principles of policy and underpins the measures detailed in Chapter 4. It will examine, successively, the overall basic principles, air pollutants, greenhouse gases and noise.

### 3.2 Overall basic principles

The Cabinet's overall basic principles are as follows:

- In accordance with the Outline Agreement, the **separation** between economic growth and the pressure on the environment, which has been established in recent years, should be maintained.
- There are **no objections in principle to mobility** as such from an environmental perspective. Mobility is essential for the performance of social functions. The aim is to eliminate the negative environmental effects.
- The Cabinet prefers **international solutions** that encourage clean, energy-efficient, quiet and climate-neutral technologies. In accordance with the Outline Agreement, the Netherlands makes an active contribution to setting strict international standards and is an active player at European and international level.
- As a rule, the Cabinet does **not** opt for one particular technology (for example, fuel cells, the internal combustion engine), but targets objectives, standards and boundary conditions. This does not diminish the fact that the government nevertheless creates a positive climate for promising technologies. The market determines which technologies are eventually taken up.
- **National measures** concerning air pollutants and greenhouse gases are being taken where they are necessary to meet international agreements and international steps are not possible (any longer). With regard to noise, there are no international targets for the noise levels to which homes are exposed (although there are international standards for noise emissions from vehicles and tyres), and these have to be determined, therefore, at a national level.
- These national measures serve to give substance to the basic principle set out in the Outline Agreement that a further **greening of the tax system** is an important instrument for environmental policy, and to the motion

tabled by Liesbeth Spies, which enjoyed support from all parties in the Dutch parliament (29200 XI, no.28), proposing that this should be pursued expeditiously. The aim is to pass on all the social costs arising from traffic, including the costs relating to infrastructure and the environment. Measures aimed at greening the tax system will be included in the Tax Plan 2005.

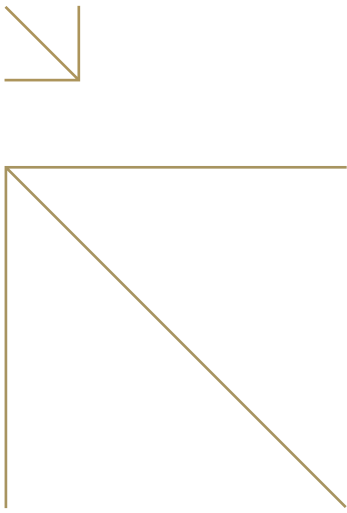
- Environmental issues should be **viewed together**. A reduction of CO<sub>2</sub> emissions, for example, should not be at the expense of health, and new environmental technologies should not lead to problems for external safety: new fuels, for example, must be safe.

### 3.3 Policy with regard to air pollutants

In the case of air pollutants, the long-term objective is to achieve no-effect emission levels (also referred to as near zero emission levels). In other words, emissions of air pollutants at a level that does not endanger public health and nature. No-effect emission levels for air pollutants can be achieved by optimising the efficiency of the internal combustion engine, making both a technology leap and transition unnecessary.

#### 3.3.1 Establishment of standards

The Cabinet sees the establishment of **international standards** – for engines, vehicles and fuels – as the principal means of reducing air pollution from traffic. This approach has been most effective to date. Establishing standards involves more than just tightening up limit values. It also means improving testing methods, introducing additional sustainability requirements and making systems that monitor on-road emissions, so-called on-board diagnostic ("OBD") systems, mandatory. It is important that testing methods are improved in view of the increasing importance of the emissions produced from driving styles which are not a test component (off-cycle emissions) as we move towards lower limit values. The increasing use of electronics in cars to optimise emissions for the driving styles used during testing is also significant. Although establishing standards essentially involves a continuation and expansion of existing policy, it nevertheless requires a major commitment.



It is necessary to tighten up the standards for all modes of transport. Cars, delivery vans and heavy goods vehicles have a long history of having to meet standards (see annex 2) and lead the way as regards emission levels. Although non-road mobile machinery have been subject to such standards for a far shorter time, very stringent NO<sub>x</sub> emission requirements have recently been agreed for this category also. Standards for inland shipping, maritime shipping, (diesel) rail transport, motorcycles and scooters are less advanced. Inland and maritime shipping will be amongst the dominant sources of air pollution in 2010, even though they represent a large and relatively cheap potential for reduction.

Where international standards are not adequate to meet internationally agreed targets, it is necessary to implement **national strategies**. This is the case with regard to NO<sub>x</sub> since the EU standards for NO<sub>x</sub> until 2010 have already been established. As a result, reductions aimed at meeting the ceiling for NO<sub>x</sub> emissions (see Chapter 2) can only be achieved by national strategies. A major component of such strategies is the policy concerning fuel mix (the tax treatment of petrol, diesel and LPG).

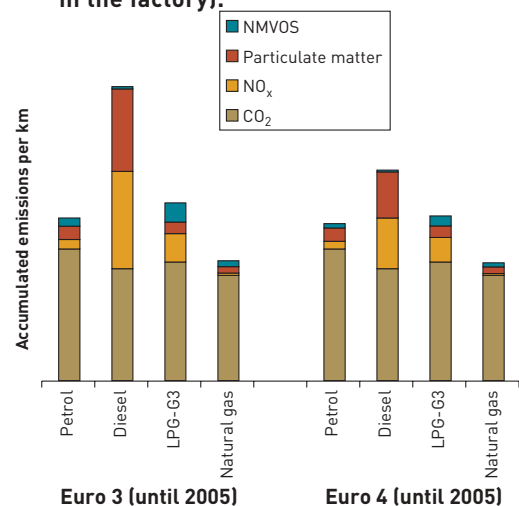
### 3.3.2 Fuel mix policy

The fuel mix policy aims to influence the proportion of each fuel type used to power vehicles so that there are as many clean cars and as few 'dirty' cars as possible on the road in the Netherlands. The fuel mix policy only applies to cars. In the case of other vehicles, the costs of the various fuels are (partly as a result of tax policy) such that the market chooses to use mainly a single type of fuel (diesel). The fuel mix policy is targeted chiefly at new car sales. In 2003, 75.8% of new cars were petrol-driven, 22.6% were diesel-driven and 1.6% were LPG powered.

#### Environmental performance of cars using different fuel types

Figure 3.1 shows the tank-to-wheel environmental performance of new cars powered by petrol, diesel, LPG and natural gas today (Euro 3, to 2005) and in the future (Euro 4, from 2005). Reference should be made to annex 3 for the assumptions underlying this figure. This annex also looks at the effect of well-to-tank emissions as well as other greenhouse gas (N<sub>2</sub>O and methane) emissions.

**Figure 3.1 Accumulated environmental burden (tank-to-wheel), according to shadow prices, of new cars (Euro 3 and Euro 4) powered by petrol, diesel, LPG (G3 retrofit unit) and natural gas (unit fitted in the factory).**

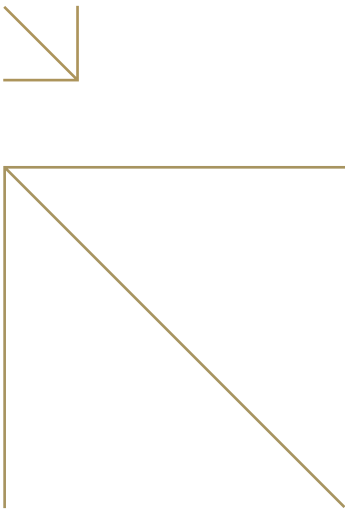


Source: RIVM/TNO

This figure allows the following conclusions to be drawn:

- **The environmental performance of new diesel-driven cars is far worse than that of cars powered by petrol, LPG or natural gas.** Diesel's better score in respect of CO<sub>2</sub> (approx. 15% lower emissions per kilometre than petrol) is overshadowed by its higher emissions of NO<sub>x</sub> and particulate matter (ten times higher and seven times higher, respectively, per kilometre than petrol).
- **The environmental performance of new cars that have been retrofitted with an LPG-G3 unit virtually matches that of petrol-driven cars.** NO<sub>x</sub> emissions from cars fitted with an LPG-G3 unit are higher than those from petrol-driven cars; by contrast, CO<sub>2</sub> emissions per kilometre from LPG are lower. On balance, there is little difference in environmental performance.
- **Cars that run on natural gas have the best environmental performance.** Natural gas has the lowest level of polluting emissions. This benefit is being eroded, however, as other fuels become increasingly cleaner. Natural gas has 5% lower CO<sub>2</sub> emissions per kilometre than diesel.





The environmental performance of LPG-G3 shown in figure 3.1 only applies to cars that have been retrofitted with an LPG-G3 unit and not for cars with a LPG unit built in by the manufacturer. The environmental performance of cars with a from factory LPG unit is better than that of cars that have been retrofitted for LPG, although there is little difference in performance relative to new petrol-driven cars. Most LPG powered cars that are currently sold in the Netherlands have been retrofitted to run on LPG. Because there are only few models available with a from factory LPG unit and because few of these models are exported to the Netherlands, the share of LPG powered cars with a unit build in by the manufacturer is not expected to rise markedly in the coming years.

There are various technical developments that are designed to improve the environmental performance of diesel. Examples are direct fuel injection, electronic fuel injection and soot filters. These developments still fail to make up adequately for the negative environmental effects of diesel, however. Although soot filters are effective at reducing emissions of particulate matter, they are only available on a limited number of models at present. In order to make diesel as clean as petrol it is necessary to fit all new diesel-driven cars with both an  $\text{NO}_x$  catalytic converter and a soot filter in order to clean up their exhaust gases.

The introduction of the Euro 4 standard in 2005 will enable diesel to close the gap a little with petrol. Nevertheless, Euro 4 diesel-driven cars will continue to pollute more than Euro 4 petrol-driven cars. Negotiations are currently being held in the EU concerning the standard for  $\text{NO}_x$  and particulate matter for new cars. This so-called Euro 5 standard is to be implemented around 2010. The Netherlands' position is that this standard should be so stringent that diesel-driven cars can only meet it if they are fitted with an  $\text{NO}_x$  catalytic converter and a soot filter. Until such time, diesel will continue to have an environmental drawback and it will only be possible to reduce  $\text{NO}_x$  and particulate matter emissions by restricting the share of diesel-driven cars in new car sales.

#### Set of instruments for fuel mix policy

New car buyers base their choice of either, petrol or LPG to a large extent on the costs of each type of fuel. These costs are largely determined by the tax burden on the cars and fuels.

The duty on petrol, for example, is higher than that on diesel and LPG<sup>8</sup>. The reason is that petrol is used for cars whereas diesel is traditionally only used for heavy goods vehicles. LPG also enjoys a low rate of duty because LPG is traditionally used as a heating fuel. Natural gas is not subject to duty, but is subject to energy tax. In order to offset the lower fuel duty for diesel-driven and LPG powered cars, fuel supplements have been included in the road tax for these vehicles. The purchase tax on passenger cars and motorcycles (BPM) is also higher for diesel than for petrol. The government can influence the shares of the various fuels by adjusting the car taxes.

Figure 3.2 shows the tax burden per kilometre of various fuel types. The structure of fixed and variable car taxes means that the tax burden per kilometre depends greatly on the number of kilometres driven per year. Above approximately 15,000 kilometres a year, diesel-driven cars are taxed less heavily than petrol-driven cars. Above 15,000 kilometres, the benefit of lower diesel duty outweighs the burden of higher fixed taxes<sup>9</sup>. LPG powered cars also offer considerable tax benefits. Natural gas is also taxed at very favourable rates. A comparison of the environmental burden with the tax burden (figure 3.2) shows that there is no direct relationship between the two. But this is logical when we consider that the current level of taxation for vehicle fuels is chiefly the result of historical developments.

#### Development of the fuel mix

A surprising development in the fuel mix of cars is the increase in the share of diesel. In 1990, the share of diesel in new car sales was 11%. Throughout the nineties this figure increased steadily and stabilised at 22% to 23% in 2000, 2001, 2002 and 2003, due (in part) to the BPM increase of NLG 2000 introduced in 2000. In the first quarter of 2004, diesel's share in new car sales was 25%.

<sup>8</sup> In 2003, petrol duty was € 0.631 per litre, diesel duty was € 0.323 per litre and LPG duty was € 0.05 per litre.

<sup>9</sup> The number of kilometres driven per year above which the higher fixed taxes on diesel offset the lower variable taxes should not be confused with the so-called petrol/diesel break-even point. The petrol/diesel break-even point is the annual number of kilometres driven above which it is cheaper, on average, to buy a diesel-driven car than a petrol-driven car. The break-even point is determined by all the costs of a vehicle, so not just the car taxes, but also the higher purchase price, and the lower net fuel costs (i.e. without duty) of diesel, for example. Also, the return time for the break-even point is roughly 4 years, whereas the higher purchase tax on passenger cars and motorcycles (BPM) of diesel is intended to compensate for the entire useful life of roughly 13 years.

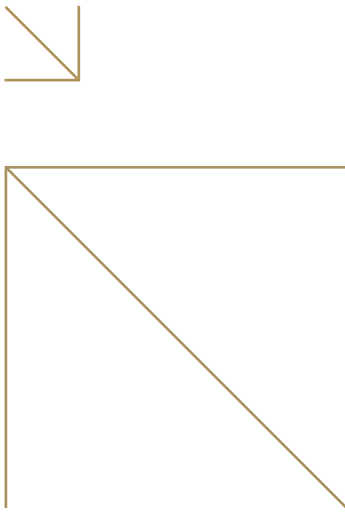
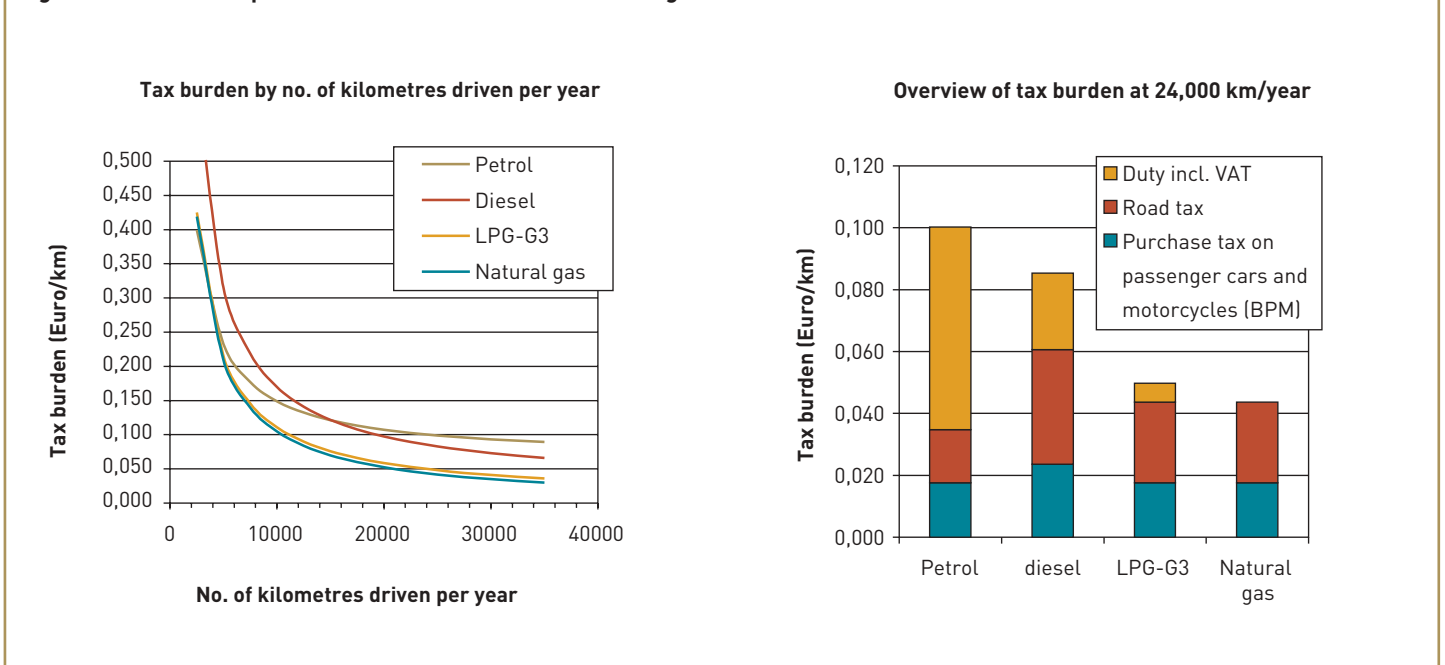


Figure 3.2 Car taxes per kilometre for a middle of the range car<sup>10</sup>



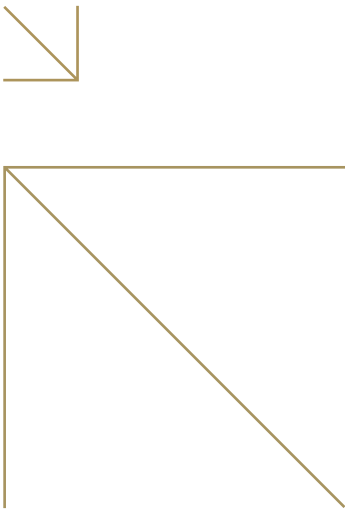
Diesel has become an attractive alternative for high kilometrage drivers. The engine performance of diesel-driven cars has improved dramatically, fuel consumption has been reduced further, engine noise has been cut and vehicle exhausts no longer belch out choking diesel fumes. Technical improvements to diesel-driven cars mean that there are now no longer any objections to buying a diesel-engined car (as was the case in the past). In addition, almost every model is available nowadays with a diesel engine. Nevertheless, the decisive factor in the decision to buy a diesel-driven car is the low variable costs due to the low level of diesel duty.

The proportion of diesel-driven cars on the road is expected to increase again in the coming years. The RIVM (National Institute for Public Health and the Environment) bases its forecast for emissions on the assumption that roughly 30% of all new cars sold in 2010 will be diesel-engined. An increase in the share of diesel is in line with the EU development towards more diesel-driven cars. In several countries, including Belgium, Luxembourg, France, Spain and Austria, this share is already as high as 60% to 70%. As the BPM rise of May 2000 will only have a temporary stabilising

effect on the proportion of diesel-driven cars on the road, the share of diesel in the Netherlands is expected to increase again in the next few years. Also of importance in this respect is the fact that the indexation of duty means that the tax burden on petrol rises more quickly than that on diesel.<sup>11</sup> The RIVM estimates that an increase in the share of diesel to 30% of all cars on the road in 2010 will lead to 3.3 kiloton more NO<sub>x</sub> emissions, 0.2 kiloton more particulate emissions, a reduction in NMVOC emissions of 1.1 kiloton, and will have a roughly neutral effect on CO<sub>2</sub>.

<sup>10</sup> The right-hand figure is based on 24,000 kilometres driven per year because this annual amount represents the petrol/diesel break-even point. This is the most representative figure for someone with a choice between petrol and diesel.

<sup>11</sup> Since 1996, petrol and diesel duty has been index-linked on an annual basis, in other words adjusted for inflation. As a result, the fuel with the highest duty, petrol, is taxed more and more heavily whilst the tax burden on diesel and LPG increases at a lower rate. In terms of the tax burden per kilometre, diesel duty has decreased by approximately € 0.07 per litre relative to petrol duty since 1996 due to indexation. This represents a saving of € 1840, or more than double the BPM increase of 2000, for the average diesel-driven car. The Tax Plan 2004 includes a plan to make road tax, including the fuel surcharges for diesel and LPG, index-linked. This should slow down the increase in the tax benefit of diesel relative to petrol since the annual increase is approximately halved.



Another surprising development in the fuel mix of cars is the declining share of LPG in the Netherlands over the last few years. This applies in particular to 2003, when only 1.6% of new cars were fitted with an LPG unit. This compares with approximately 6% in 2000, 2001 and 2002. The causes of this are to be found in the technical improvements to diesel-driven cars, the lower reliability of LPG relative to diesel and the fact that several makes in the Netherlands no longer support LPG retrofitting of their models. Negative media coverage of LPG as a car fuel in relation to external safety have also not helped the LPG retrofitting market.

The share of natural gas is small enough to be negligible at the present time. Only a few hundred vehicles run on this fuel in the country. As natural gas is not currently taxed as a motor fuel, it benefits from a very low tax burden. The low fuel costs of natural gas should make it an interesting option for many motorists. With this in mind, several investors are examining the possibility of building a tank infrastructure for natural gas to make natural gas available as a fuel for road vehicles.

It is expected to be several years before construction of a tank infrastructure for natural gas can be completed. A fully operational, national tank infrastructure, which is a condition for natural gas gaining a certain percentage of the market (given that there are sufficient cars able to run on this fuel) would not be in place until the end of the decade. However, with other fuels becoming increasingly clean, the environmental benefit of natural gas relative to other fuels will be limited after 2010. The introduction of the Euro 5 standard, for example, will ensure that there is not much to separate the environmental performance of natural gas from diesel.

The introduction of natural gas as a transport fuel can help to ensure that vehicles will continue to have a supply of energy. The availability of this energy is vulnerable to a possible disruption in petroleum supplies. Natural gas can also be a transition fuel, helping to pave the way to sustainable fuels such as hydrogen and biogas. An interesting example of just such a use is in the municipality of Haarlem, where there are plans to mix natural gas with biogas and market the resulting fuel to motorists. It should also be possible to use hydrogen in the mix.

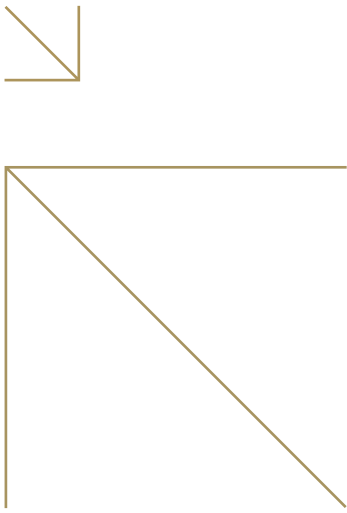
Finally, the development of diesel/water emulsion fuel deserves a mention. The fuel emulsion is produced by blending diesel and water with the aid of an emulgator. This fuel can reduce particulate emissions per kilometre from heavy goods vehicles and buses by between 20% and 65% and NO<sub>x</sub> emissions by 10% to 15%. Diesel/water emulsion fuel with 10 to 15% water content can be used in today's engines without the need for radical modifications. Its use in future generations of engines (Euro 4 and Euro 5) is less obvious since these engines will be cleaner anyway. Diesel/water emulsion fuel is more expensive than ordinary diesel due to the extra costs of mixing, storage and the emulgator and because duty also has to be paid on the water content. Diesel/water emulsion fuel is an ideal solution for public transport fleets of buses, where its use will also help improve air quality.

#### **Consequences for policy**

Changes in the fuel mix should not lead to extra NO<sub>x</sub> and particulate emissions. Extra CO<sub>2</sub> emissions should also be avoided. Both NO<sub>x</sub> and particulates are critical because of the danger that the NO<sub>x</sub> ceiling for the transport sector as well as standards for air quality will not be met in 2010. For this reason, the Cabinet aims to control the share of diesel in new car sales until 2010.

A further reason to wish to control the share of diesel on the road is the increased mobility that arises from an increase in the share of diesel as a consequence of the current tax system with high fixed taxes and low variable taxes for diesel. From a tax perspective, it should be noted that an increase in the share of diesel will possibly lead to a loss of tax revenues.

If the Euro 5 standard to be introduced (presumably around 2010) is sufficiently tough, there are no reasons from an environmental perspective for any continued restriction on the share of diesel in new car sales, since there will then be little to separate the environmental performance of diesel and petrol-driven cars. Taking the current structure of car taxes as a starting point, the mobility and tax considerations with regard to the fuel mix mentioned above will still be valid after 2010.



With regard to LPG, the Cabinet is not considering any further easing of the tax burden in order to combat the falling number of LPG conversions. The tax incentive offered to LPG users is already considerable, and the environmental performance of modern cars that have been retrofitted with an LPG-G3 unit is now no better than that of modern petrol-driven cars. On the basis of the chain studies concerning external safety, the Cabinet will take a position on the future of LPG in the Netherlands in mid-2004.

As it is expected to be several years before construction of a tank infrastructure for natural gas can be completed, and as there will be little to separate the environmental performance of petrol, diesel and LPG powered cars if the Euro 5 standard to be introduced is sufficiently tough, there are no strong environmental arguments for wanting to have a particular share of natural gas in the market after 2010. At the same time, however, the Cabinet recognises the potential of natural gas as a transport fuel, particularly as an intermediate option in a gradual transition to sustainable fuels. The Cabinet would therefore like to challenge the market to produce concrete, cost-effective proposals for unleashing this potential and ensure that natural gas has a role to play in the transition to sustainability.

### 3.4 Greenhouse gas policy

The largest sources of CO<sub>2</sub> emissions (the main greenhouse gas) are road traffic, maritime shipping and aviation. No international objectives have yet been formulated for maritime shipping and aviation. The following section looks at road traffic since more work has been done to define an approach to this sector.

The Cabinet is following three policy lines to reduce CO<sub>2</sub> emissions from road traffic:

- an efficiency strategy, to achieve a reduction in vehicle fuel consumption;
- influencing vehicle use;
- a policy for climate-neutral fuels.

Climate-neutral fuels are significantly more expensive and are generally not ready to be marketed just yet. Accordingly, the

Cabinet has chosen to concentrate its efforts in the coming years (mainly in an international context) on adopting an efficiency strategy and at the same time to start using climate-neutral fuels. In the medium term, the emphasis will shift to a broader use of climate-neutral fuels.

#### 3.4.1 Efficiency strategy

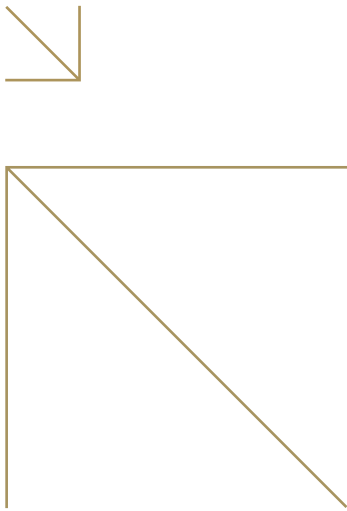
At the present time, efficiency policy is conducted in the EU through covenants which the European Commission has agreed with the automotive industry to reduce average CO<sub>2</sub> emissions per kilometre from new cars, chiefly through technological improvements in engine fuel efficiency. Hybrid cars offer many prospects in this respect. No standards have yet been set for CO<sub>2</sub> emissions per kilometre for any single vehicle type.

#### Hybrid cars

Hybrid electric vehicles (HEVs) are powered by a combustion engine and an electric motor. In essence, hybrid powertrains ensure that the energy wastage of combustion engines not running under ideal load conditions is avoided by switching over from the petrol-burning engine, and that braking energy is recovered via the electric motor during braking. These two features bring down fuel consumption. The fuel economy of hybrid electric vehicles can be 20% to 40% higher than conventional vehicles without compromising driving characteristics and performance.

Several types of hybrid car and buses are currently on sale around the world. They are significantly more expensive than comparable conventional vehicles. In order to stimulate sales of hybrid cars in the Netherlands, they are under certain circumstances (A energy rating label or zero emission) exempt from the purchase tax on passenger cars and motorcycles (BPM) and partially from road tax. The additional expense of buying a hybrid car is expected to fall as the popularity of these vehicles increases.

At UN/ECE level, the testing methods for measuring emissions and fuel consumption were recently altered (with Dutch input) for hybrid cars. As a result, it is now possible to determine the environmental performance of these cars objectively.



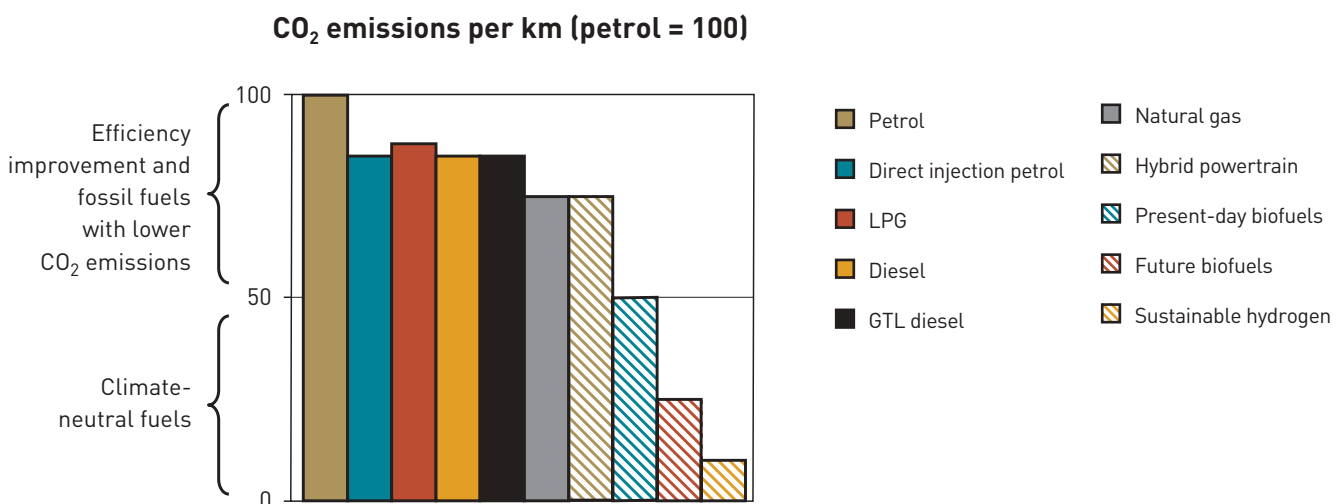
As there are technical limits to just how far the fuel efficiency of combustion engines can be improved, it is not possible to achieve any substantial separation of the link between the growth in mobility and CO<sub>2</sub> emissions through an efficiency policy, however valuable and necessary this may be. This also applies to the use of fossil fuels with lower CO<sub>2</sub> emissions per kilometre, such as diesel, LPG, natural gas or GTL (gas to liquid) diesel (see figure 3.3).

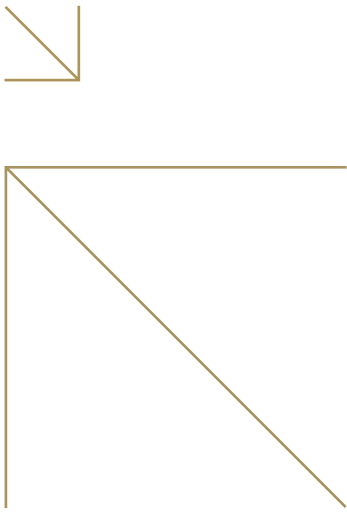
The effects of the improvement in fuel efficiency are expected to be cancelled out by the growth in mobility by a further 40% (car mobility) to 100% (goods transport by road) until 2020. As a consequence, far-reaching CO<sub>2</sub> reductions can only be achieved by a transition to so-called climate-neutral fuels (see box).

**Transition to sustainable mobility**

The transition to climate-neutral fuels is part of a broader transition to sustainable mobility, which also addresses behaviour, mobility services and the spatial integration of mobility. Under the transition strategy, which is being led by the Ministry of Transport, Public Works and Water Management, the government, civilians, businesses and science work together to achieve system innovations at a technical, organisational and social level. The transition can only take place at an international level. For this reason, the Netherlands is cooperating with European and other international partners in research and development programmes, to take part in know-how and learning experiments, and to identify and remove institutional barriers. The transition strategy is new and will be put to a practical test this year. In order to implement such transition in the Netherlands, an Innovation Forum on Sustainable Mobility has been set up comprising representatives of citizens and consumer groups, the (international) business community, science and the three ministries involved (Transport, Public Works and Water Management, Housing, Spatial Planning and the Environment and Economic Affairs). The Innovation Forum helps to realise innovations which can bring about a turnaround at systems level that will lead to sustainable mobility.

**Figure 3.3 Potential CO<sub>2</sub> reductions (per km) of different fuel types (well-to-wheel)**





### 3.4.2 Influencing vehicle use

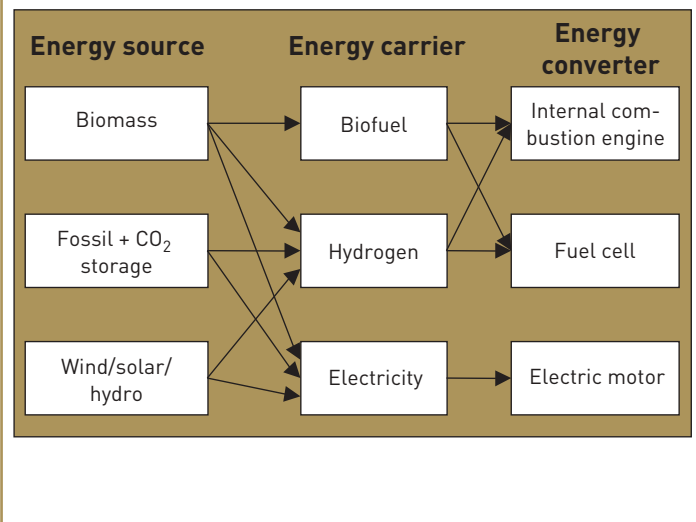
In addition to making improvements in vehicle fuel efficiency, it is also possible to reduce CO<sub>2</sub> emissions by getting motorists to change their (driving) behaviour. The Dutch ECO-DRIVING long-term programme brings together a number of projects that are designed to influence motorists' behaviour:

- **ECO-DRIVING:** by changing one's driving style (for example, by shifting into a higher gear as soon as possible), it is possible to reduce fuel consumption and CO<sub>2</sub> emissions by 10% as well as improve road safety without increasing travel time.
- **Fuel-saving in-car devices:** in-car devices, such as on-board computers, econometers, speed limiters and cruise control, help motorists to adopt a fuel-saving driving style. Such devices are to be found in a surprisingly high number of new cars in the Netherlands, particularly in comparison with neighbouring countries. The aim is to see such devices in an even higher percentage of all cars.
- **Tyre pressure and other maintenance aspects:** tyres which are underinflated not only increase wear and tear and possibly lead to hazardous situations, but also raise fuel consumption by 2% to 3%.

### 3.4.3 Climate-neutral fuels

Climate-neutral fuels – fuels which, viewed throughout the transport chain, do not lead to CO<sub>2</sub> emissions into the atmosphere – have the potential to reduce CO<sub>2</sub> emissions to a sustainable level. Implementing the transition to climate-neutral fuels requires us to think in terms of energy chains. An energy chain is a sequence consisting of an energy source, a fuel produced from this source and an energy converter (engine or motor) (see figure 3.4). Policy should focus on making chains as a whole sustainable. Making a particular type of fuel (for example, hydrogen) or a particular engine technology (for example, fuel cells) available does not, by definition, lead to sustainable mobility.

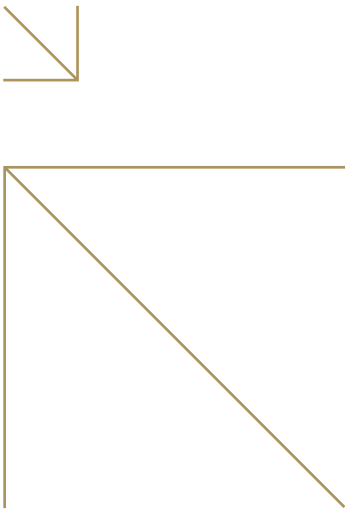
**Figure 3.4 Potential sustainable energy chains for traffic**



A sustainable level of CO<sub>2</sub> emissions can only be achieved by a combination of several energy chains. A scenario study conducted by the RIVM<sup>12</sup> shows that there is no single, individual route offering a total solution. The Cabinet has therefore not chosen one particular energy chain as its ultimate ideal, but wishes to work towards ultimate goals (such as CO<sub>2</sub> emissions throughout the transport chain) and put forward instruments for achieving this. After all, it is not yet clear which energy chains will eventually prove to be the most effective. This will depend on future costs, the availability of energy sources and developments in engine technology.

Most likely, both biofuels and sustainably produced hydrogen and electricity will form part of the future energy supply of road vehicles. The changeover to new energy chains will entail radical changes and require enormous investments in money and time. There is therefore a need for intermediate technologies which do not need to be climate-neutral in

<sup>12</sup>R.M.M. van den Brink (2203), Scenarios for sustainable energy in traffic and transport. An assessment of various criteria for sustainability. Bilthoven: National Institute for Public Health and the Environment.



themselves, but which do facilitate a gradual growth towards climate-neutral technologies. Examples are hybrid cars, natural gas mixed with biogas or hydrogen and GTL diesel. GTL (gas-to-liquid) diesel, or synfuel, is a synthetic diesel made from natural gas by means of a chemical process (Fischer-Tropsch synthesis). GTL diesel is seen as an intermediate step on the way to climate-neutral BTL (biomass to liquid) diesel, or sunfuel, which is made from biomass. The Cabinet supports further research into these developments.

#### Electric cars

Battery-driven electric cars have no significant market potential at present, except in very specific niches. Despite a number of positive developments in the mid-1990s and considerable investments, the market has turned its back on this technology, citing excessive costs, a disappointingly limited operating radius and lengthy battery recharge times as the principal reasons for its disinterest. The favourable tax regime for electric cars in the Netherlands has not been able to influence this. The technical development potential in the medium-term also appears to be limited. In the long term, though, electric-driven cars may yet break through since this form of power is the most efficient route to implement sustainably generated electricity in the transport sector.

#### Fuel cell-powered cars and hydrogen as an engine fuel

A vehicle fuel cell system operates by electrochemically combining the energy carrier hydrogen with oxygen taken from the air outside to produce water (vapour), and thereby generating electricity to power the vehicle. Fuel cells have a very high energy yield and produce virtually zero emissions. The hydrogen required can be sourced externally or can be produced on-board from methanol, diesel or biomass-based synthetic fuels, for example. However, the latter option does lead to a reduced energy yield. Hydrogen can also be used as a fuel for conventional combustion engines, but the energy yield of this application is lower. Fuel cell technology will probably not be implemented on a large scale any time in the near future. The largest problems for the time being are the high cost of fuel cells, storing the hydrogen on board the vehicle and the fact that the hydrogen itself will have to be produced in a sustainable manner if there is to be any environmental benefit. The costs of an infrastructure for the production and distribution of (sustainable) hydrogen are also high. In a

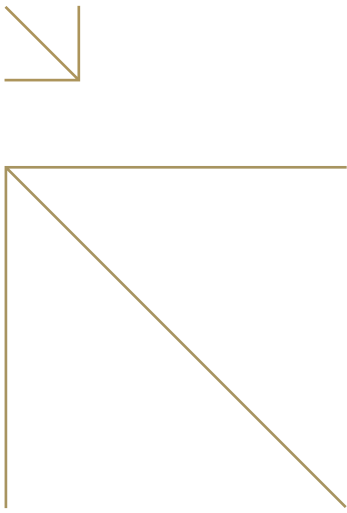
positive signal to the market, fuel cell-powered cars and cars with a conventional combustion engine that is fuelled by hydrogen have been exempted in the Netherlands from the purchase tax on passenger cars and motorcycles (BPM) and road tax. In Amsterdam, several local buses powered by fuel cells are currently being used on routes in the city as part of an EU-wide project in order to examine the practical deployment of these vehicles.

For one type of climate-neutral fuel – biofuels – the near-term market potential looks promising. Biofuels are all fuels derived from a biological origin, such as bio-ethanol for petrol-driven cars and biodiesel for diesel-driven cars. The use of biofuels represents an important step towards climate-neutral fuels. It will not be possible to introduce other climate-neutral energy carriers, such as sustainably produced hydrogen and electricity, on a large scale in the near future.

The introduction of biofuels in the Netherlands can be traced back to an EU directive from 2003 requiring member states to use their best efforts to make biofuels available to road traffic (see Chapter 2).

Biofuels have the potential to achieve a major reduction in CO<sub>2</sub> emissions from traffic. The CO<sub>2</sub> reduction achievable with the current generation of biofuels varies from 50% to 70%<sup>13</sup>. It is expected that, in time, by applying new technologies it will be possible to increase the CO<sub>2</sub> efficiency of the so-called second generation of biofuels. At the present time, the costs of biofuels are high. Nevertheless, investments are needed in biofuels so that we can take an important step in the transition to sustainable mobility. Furthermore, the Netherlands is obliged to take action to develop and implement the EU directive referred to above. It is also expected that the costs for the second generation of biofuels can be brought down.

<sup>13</sup> In a well-to-wheel comparison of the CO<sub>2</sub> emissions from a fossil-fuel energy chain with a biomass-based energy chain (see Ecofys, 2003; Biofuels in the Dutch market: a fact-finding study). Well-to-wheel studies identify all emissions in an energy chain, including emissions from extraction, agriculture, fertilizers, distribution, refining, tank storage and exhaust.



The Cabinet intends to adopt the following basic principles for the introduction of biofuels:

1. The objective is to achieve a substantial CO<sub>2</sub> reduction (from well-to-wheel) in the traffic sector. The Cabinet is considering an initial well-to-wheel CO<sub>2</sub> reduction target of 50%. In the short to medium term, the CO<sub>2</sub> efficiency must improve further.
2. In order to make investments possible, it will be necessary to give the market guarantees that the government will stick to its chosen policy for a long time. The biofuel strategy will be designed in such a way that optimum support is given for a speedy introduction of second generation biofuels and that lock-in effects (holding on to less efficient biofuels for too long) are avoided. These lock-in effects do not apply to bio-ethanol since bio-ethanol in the form of ethylene, etc. is also an excellent raw material for the chemicals industry.
3. The biofuels should preferably be produced subject to the following preconditions:
  - there should be no negative effects in respect of biodiversity;
  - there is to be no competition with food production in areas where land for food is limited;
  - there are to be no technical problems with vehicle engines.
4. Biofuels are to be introduced as far as possible in line with other EU member states, making exports from the Netherlands possible.
5. All planning must take account of the time needed to build the production capacity for biofuels. The target values should be set after an assessment has been made of what is feasible in the Netherlands and what the market parties consider desirable.

The large-scale introduction of biofuels is something quite new in Europe. It will undoubtedly raise problems and opportunities which cannot be foreseen at the present time. The introduction process should therefore be seen as a learning process for all participants. This learning process needs to be well constructed both in the Netherlands and in the EU. The introduction will be followed by a national evaluation, after which adjustments can be made if necessary.

### 3.5 Noise policy

The basic principle of the noise policy is that there should be a greater emphasis than ever on tackling the issue at the source. The costs of acoustic baffles can be slashed if quieter tyres, engines and infrastructure (road surfaces and rails) are used. As is the case with air pollution, the emphasis is on setting international standards (particularly in the EU).

A major effort is needed to get the noise source policy on the EU political agenda. The existence for 30 years of vehicle noise requirements in the EU has still not resulted in quieter cars. The standards for cars and delivery vans have been tightened up on various occasions, but each time any useful effects have been cancelled out by changes in the measuring method (see annex 4). The reason for this is that the standards have not been set against the background of a desire to improve the environment, but a wish to harmonise production requirements and the free movement of goods. Decisions are taken in specialised, technical committees in which the automotive industry is also represented.

The EU policy on railway noise presents the same picture. There is a separate legal methodology for railway noise under which there are no separate directives, but which consists instead of a Committee, which acts pursuant to the Interoperability Directive, drawing up technical specifications. As a consequence, the European Parliament is not a joint legislator.

The Cabinet believes that more balanced decision-making – at political level – is needed in the EU, with greater consideration being given to environmental interests. This should be expressed in the instructions given to the Dutch representatives in the committees and working parties.

EU standards are only effective in the medium to long term. This is because decision-making is a lengthy process, and because it will take a long time before all the vehicles on the road are replaced by newer, quieter vehicles. It will be decades before standards that are set for new heavy goods vehicles have a substantial effect, for example. A national approach is needed, therefore, if results are to be achieved more quickly.



## 4. Measures

### 4.1 Introduction

This chapter looks at the measures which the Cabinet intends to take or to support at an international level. It deals successively with air pollutants, greenhouse gases and noise, and draws a distinction between:

- measures to achieve reductions in the period until 2010 (and which must, therefore, be **effective** in 2010);
- measures which will be **implemented or prepared** in the short term, but which will not have a substantial **effect** until after 2010.

The effect of the measures in this chapter will be evaluated, with a particular focus on the measures to achieve the environmental targets for 2010. Monitoring will take place as much as possible within existing evaluation programmes for the NEC Directive, the Kyoto protocol and the Noise Innovation Programme. In special cases, for example at the request of the Lower House, evaluations of specific measures can be carried out.

### 4.2 Measures for air pollutants

#### 4.2.1 Measures to reduce air pollutants in the period until 2010

A distinction is made between<sup>14</sup>:

- a **basic package** of measures which the Cabinet intends to take to meet the NEC Directive (see chapter 2);
- a **reserve package** of measures for the NEC Directive which will be prepared in case of setbacks;
- a package of measures which will be **implemented for reasons other than the NEC Directive**, such as other EU commitments.

The packages are based on an extensive examination of possible measures in terms of legal and regulatory requirements, covenants, tax measures, subsidies, communication, spatial planning and infrastructure. The RIVM and the CE research consultancy have calculated the effects of these options<sup>15</sup>. This analysis reveals that the number of options with a noticeable effect in 2010 is limited. The Cabinet therefore only had a limited number of options to choose from.

In order to determine which measures were necessary, the emissions from the different methods of transport were also examined (see figure 4.1).

The largest sources of NO<sub>x</sub> in 2010 will be heavy goods vehicles, inland shipping, maritime shipping, non-road mobile machinery and diesel delivery vans and cars<sup>16</sup>. NO<sub>x</sub> reductions will therefore have to be primarily achieved for these methods of transport. Reductions of SO<sub>2</sub> emissions will have to come mainly from maritime shipping, inland shipping and non-road mobile machinery. Reductions in particulate emission require measures for road traffic, although other sources, such as non-road mobile machinery and inland shipping, also cause fine particulate emissions. The measures aimed at achieving NO<sub>x</sub> reductions generally also lead to lower particulate emissions. Particulates are therefore not dealt with separately in this chapter.

#### The basic package for meeting the NEC Directive

In the Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution 2003, the Cabinet set an emissions ceiling for traffic of 158 kiloton in 2010. As stated in Chapter 2, it is predicted that this emissions ceiling will be exceeded in 2010 by 27 kiloton. The approach to solving this problem consists of:

- a package of domestic measures to reduce NO<sub>x</sub> emissions from traffic by 8 kiloton, comprising:
  - a subsidy scheme for cleaner engines in inland shipping vessels (1.5 kiloton);
  - national measures to tackle air pollution from road vehicles (6.5 kiloton)
- raising the matter of the EU testing method for heavy goods vehicles in the EU (19 kiloton).

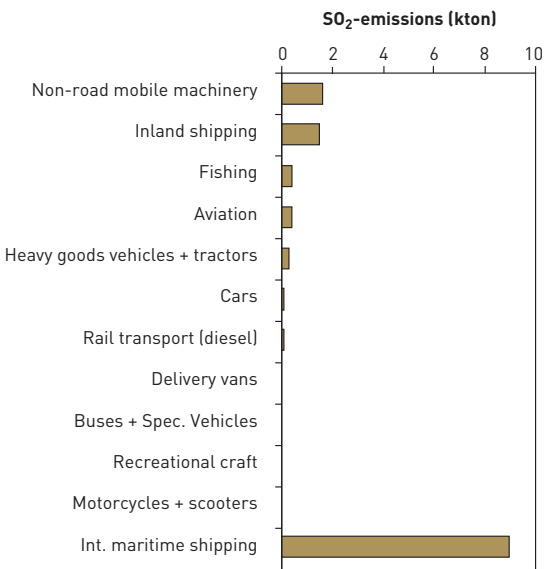
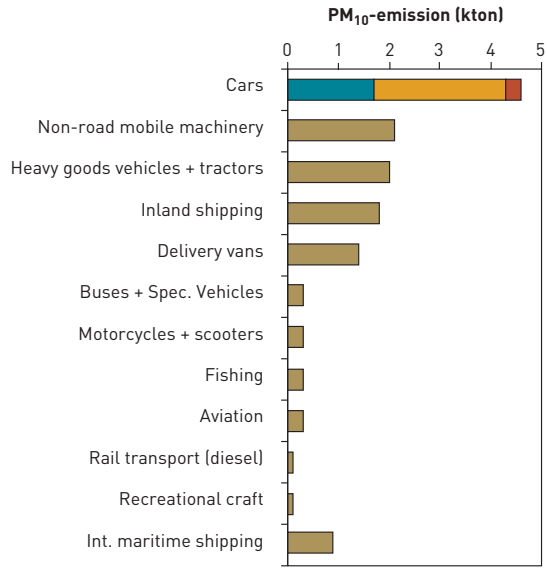
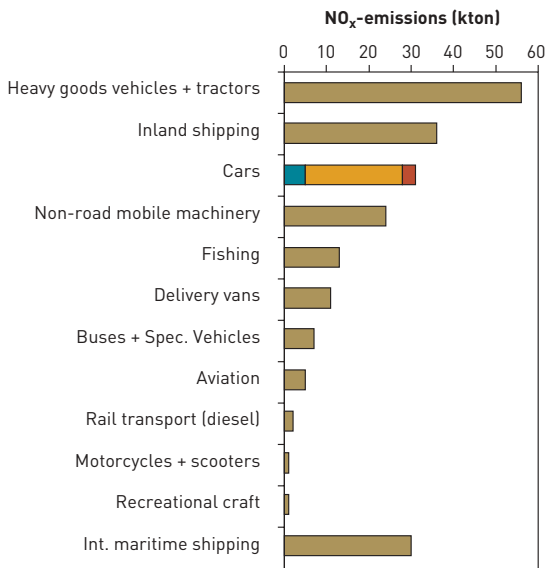
These measures will also contribute to achieving the targets for air quality.

<sup>14</sup> The Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution contains a separate mention of the category 'pipeline measures'. Pipeline measures are measures which are virtually certain to be taken, but which have not yet officially been adopted. The emissions forecast presumes that these measures will be adopted. In the case of NO<sub>x</sub>, this related to the directive with emission standards for non-road mobile machinery, inland craft and diesel locomotives. This directive has since been adopted.

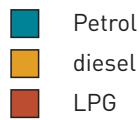
<sup>15</sup> R.M.M. van den Brink et al. (2003). Traffic emissions option document, Effects of measures on acidification and climate change. Bilthoven: RIVM.

<sup>16</sup> Until roughly 2010, new diesel-driven cars will emit about 10 times more NO<sub>x</sub> and fine particulates than new petrol and LPG powered cars. Without extra policy measures, the share of diesel will rise, just like in other EU countries. On average, diesel cars are less heavily taxed than petrol cars.

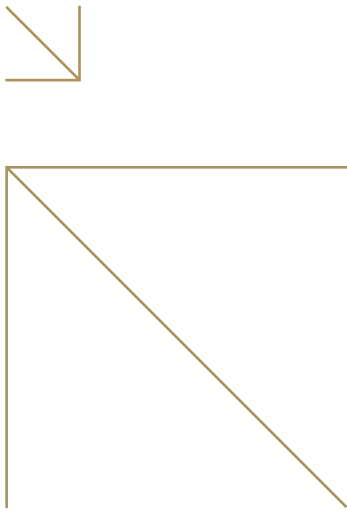
**Fig. 4.1 Contribution of the various modes of transport to NO<sub>x</sub>, SO<sub>2</sub> and particulate emissions in 2010.**



**In the case of cars**



Source: RIVM



### **National measures for tackling air pollution from road vehicles and non-road mobile machinery**

The Tax Plan 2005, and, if financial cover can be found, the Tax Plan 2006, will include financial measures that will contribute to the total package of domestic measures (i.e. including subsidies) leading to a reduction of NO<sub>x</sub> emissions of at least 8 kiloton, and will also contribute to an improvement of the air quality.

The Cabinet intends to introduce the following measures to stimulate clean technologies for diesel-driven road vehicles:

- tax incentives in 2005 for the earlier introduction of cleaner heavy goods vehicles (Euro 4 and Euro 5) by means of the Pollution Prevention Investment Tax Credit, if the necessary funds (€ 23 million) can be found in the budget of VROM;
- tax incentives, which have no effect on the budget, for soot filters in new diesel-driven cars by means of the purchase tax on passenger cars and motorcycles (BPM); the Cabinet will request European Commission support for this measure.

The Cabinet aims to continue the incentive scheme for cleaner heavy goods vehicles (Euro 4 and Euro 5) after 2005, if the necessary financial cover can be found. In view of the objectives for the NEC Directive, the Cabinet also plans to provide tax incentives for new diesel-driven cars which meet the Euro 5 standard for NO<sub>x</sub> and/or particulate matter ahead of schedule as soon as this is advisable and appropriate in an EU context.

As the EU standards have already been set until 2010, it is no longer possible to reduce NO<sub>x</sub> emissions in 2010 by setting EU standards. The measures relating to NO<sub>x</sub> are set out below.

### **Tax incentives for the earlier introduction of cleaner heavy goods vehicles and buses (Euro 4 and Euro 5)**

The purpose of this measure is to ensure that the average additional costs for the earlier purchase of heavy goods vehicles with Euro 4 engines (1 January 2005 to 1 October 2006) and Euro 5 engines (1 January 2007 to 1 October 2009) will be offset fully through the incentive of the Pollution Prevention Investment Tax Credit. If this measure continues throughout the entire available period, it is expected to lead to a structural reduction of NO<sub>x</sub> emissions in 2010. In addition, the earlier

purchase of Euro 4 engines will result in a reduction of fine particulate emissions also. This measure is cost-effective. Support for this measure from the transport sector is also great, partly because Euro 4 and Euro 5 engines benefit from a lower kilometre charge under the road toll system to be introduced shortly in Germany as well as other countries with (plans to introduce) kilometre charges (Austria, the UK and Switzerland).

### **Tax incentives for cleaner diesel-driven cars (Euro 5/NO<sub>x</sub> after-treatment devices)**

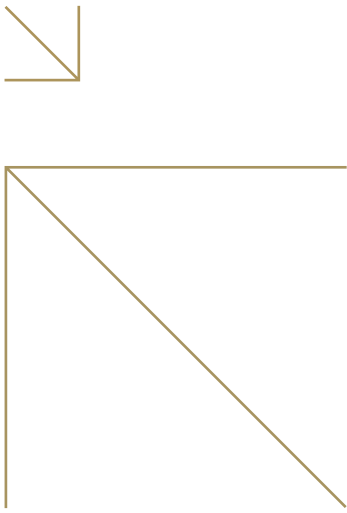
Negotiations are currently ongoing in the EU concerning the Euro 5 standard for cars which is to become effective some time around 2010. The Netherlands favours a sharp tightening-up of the NO<sub>x</sub> standards. Member states can give tax incentives to new diesel-driven cars whose NO<sub>x</sub> emissions already meet the new, stricter standards (through NO<sub>x</sub> after-treatment techniques). In anticipation of the establishment of the Euro 5 standard, there is discussion in the EU regarding the possibility of setting a temporary, indicative standard to act as a basis for incentives. The outcome of these discussions will go a long way to determining the concrete shape of such incentives in the Netherlands.

### **Subsidy scheme for cleaner engines in inland shipping vessels**

The Cabinet intends to introduce a subsidy scheme with the aim of reducing NO<sub>x</sub> emissions from inland shipping. This subsidy aim to stimulate:

- the earlier replacement of ship diesel engines by low-emission engines;
- the conversion (retrofitting) of existing ship diesel engines into low-emission engines;
- the purchase of new low-emission ship diesel engines instead of conventional engines.

The subsidy requirements are such that engines in inland shipping vessels must be fitted with advanced after-treatment systems for exhaust gases. These so-called SCR catalytic converters make it possible to reduce NO<sub>x</sub> emissions in a highly cost-effective manner (approx. € 1 per kg NO<sub>x</sub>). The Minister for Housing, Spatial Planning and the Environment will provide the subsidy for the first few years out of a budget of € 2.2 million per year which has been set aside for the period 2004-2010 (€ 15.4 million in total). The Minister for Transport,



Public Works and Water Management will contribute a further € 1.7 million per year to the scheme from 2006 to 2010 (€ 8.5 million in total). It is estimated that this measure will lead to a reduction of 1.5 kiloton NO<sub>x</sub> in 2010.

The Netherlands has brought the proposed subsidy scheme for 100% financing of the costs of fitting SCR catalytic converters in 2003 to the attention of the European Commission in connection with the review of state aid<sup>17</sup>. At the beginning of 2004, the European Commission stated that whilst it did not permit 100% financing, it did intend to extend the de minimis regime for state aid to cover inland shipping. This regime would permit 100% financing. The Cabinet is considering whether to publish the scheme with the current maximum permissible subsidy percentage of 40% now and, after the de minimis regime has been amended, to introduce the scheme offering 100% financing.

#### **Raising the matter of the testing method for heavy goods vehicles in the EU**

The NO<sub>x</sub> emissions from heavy goods vehicles in 2010 are now estimated to be 19 kiloton higher than was previously forecast. Recent research indicates that emissions from heavy goods vehicles are not, in practice, decreasing at the same rate as standards prescribe. This is due to the fact that the testing method which is used for the EU type examination test of heavy goods vehicle engines fails to reflect 'real world' operating conditions sufficiently. This is aggravated by the practice of cycle bypassing which manufacturers use to ensure their engines meet emission standards (see annex 5).

The Cabinet believes that these additional 19 kiloton NO<sub>x</sub> emissions are not a problem exclusive to the Netherlands, but one which essentially encompasses the entire EU. It is the EU's task to ensure that heavy goods vehicles are as clean 'in the real world' as they are presumed to be on the basis of the standards that have been set. The Cabinet will raise the issue of the additional 19 kiloton NO<sub>x</sub> emissions from heavy goods vehicles in the EU with the aim of ensuring the EU takes responsibility for this rather than the Netherlands having to solve it unilaterally with national measures. An improvement of the EU type examination test of heavy goods vehicle engines will probably only have a limited effect on the emissions in 2010, however, since such improvements only apply to new heavy goods vehicles. This will probably come too late for most heavy goods vehicles on the road in 2010. Nevertheless, the effect after 2010 will be considerable.

The outcome of the discussion in the EU is uncertain. It would be unwise to assume that the setback which the 19 kiloton NO<sub>x</sub> represents can be (entirely) offset within the framework of the EU. For this reason, the Cabinet will develop reserve measures (see below).

#### **Other measures in the period until 2010**

##### **Tax incentives, which have no effect on the budget, for soot filters on new diesel-driven cars**

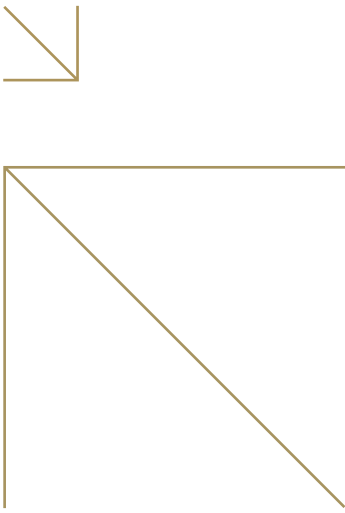
The Cabinet intends to give an incentive to the fitting of soot filters on new diesel-driven cars from 2005 by means of the purchase tax on passenger cars and motorcycles (BPM), and will request European Commission support for this measure. The aim is to reduce the health effects of particulate matter. Soot filters are very effective as they reduce particulate emissions by more than 90%. The introduction in 2005 of the Euro 4 standard does not mean that all diesel-driven cars will be fitted with a soot filter. Close consultations on this matter are being held with Germany, which is also considering similar incentives, and the European Commission.

In order to avoid member states opting for different standards to provide an incentive to diesel-driven cars with a soot filter, the European Commission recently announced informally that it was considering adopting a so-called 'soft standard' in this respect. The Netherlands supports such a non-mandatory standard and intends to devote attention to this during its forthcoming EU presidency.

##### **Local approach to improving roadside air quality**

At various roadside locations there are problem areas with respect to air quality. One of the steps that can be taken to improve this is to reduce the speed limit locally in combination with proper enforcement and measures to improve traffic flow. An example of this is the 80 kilometre per hour speed limit on the section of the A13 at Overschie, which is having a positive effect on air quality, road safety and noise pollution.

<sup>17</sup> In the past, the fitting of soot filters to buses already on the road has been successively stimulated under the MIBU (Environmentally friendly transport technologies grants scheme) programme. However, the new Community guidelines on state aid for environmental protection no longer permit 100% subsidies for the fitting of soot filters to buses. The 30% to 40% subsidies which the Community guidelines on state aid for environmental protection do permit are insufficient to encourage the market to fit filters. Retrofitting vehicles with units designed to reduce NO<sub>x</sub> emissions from heavy goods vehicles and buses, such as SCR and NO<sub>x</sub> systems, are considered technically unfeasible for the time being.



The Ministry of Transport, Public Works and Water Management is examining whether a similar reduction of the speed limit is also possible and effective on other stretches of road. The locations to be considered must be air quality problem areas, and it must be possible to attain a win-win situation for traffic flow, road safety and the quality of life. The Cabinet will inform the Lower House in 2004 about the wider use of speed limits in similar situations. As the measure implemented at Overschie will not be suitable for all problem areas, it will be necessary to adopt a far-reaching innovative approach. The Cabinet is reserving € 20 million a year until 2010 for an Air Quality Innovation Programme.

A sum of € 32 million has meanwhile been reserved for city centre problem areas as part of the Urban Renewal Investment Budget-II. This money can be used to finance measures relating to traffic circulation plans, speed restrictions and other traffic measures. These may also include measures to limit access by vehicles with relatively high NO<sub>x</sub> and particulate emissions from (parts of) urban areas. This may stimulate the use of 'clean' vehicles while at the same time giving an impulse to the creation of a liveable city centre in the broadest sense of the word. Municipalities will be sent information outlining the possibilities for such measures. At the same time it is important to ensure, however, that city centres remain accessible and that goods delivery is possible. Finally, studies will be conducted to assess the feasibility of using diesel/water emulsion fuel locally in order to improve the air quality.

#### **Air pollution from maritime shipping**

The proportion of air pollution (NO<sub>x</sub>, SO<sub>2</sub> and particulates) caused by maritime shipping is substantial and is increasing all the time. Environmental requirements for maritime shipping are realised in the UN's IMO (International Maritime Organisation). Annex VI of the MARPOL (Marine Pollution) convention was adopted in 1997.

This annex includes:

- standards for NO<sub>x</sub> emissions from ship diesel engines, which are, however, so loose that no reductions can be expected once the convention enters into force.
- a 4.5% ceiling for the sulphur content of fuels. In addition, it is laid down that the sulphur content of the fuel oil used on

board ships must not exceed 1.5% in so-called SO<sub>x</sub> Emission Control Areas (the Baltic Sea, The North Sea and the English Channel).

- limits on the use of ozone depleting substances.

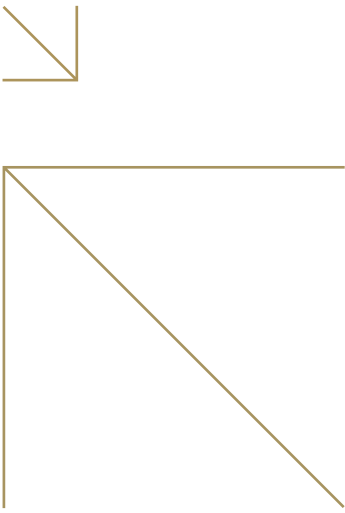
The convention enters into force once at least 15 countries controlling a minimum of 50% of the world's tonnage have ratified it. The Netherlands has yet to ratify the convention. The Cabinet will recommend as soon as possible that the Lower House should ratify MARPOL Annex VI. Following ratification, the Cabinet will support in the IMO a tightening-up of the standards for maritime engines and a further reduction of the sulphur content of fuels.

There are also European policies that are designed to reduce air pollution from maritime shipping. The European Commission, for example, has proposed regulations specifying that, in anticipation of the entry into force of MARPOL Annex VI, the sulphur content of the fuel oil used on board ships in the North Sea, the Baltic Sea and the English Channel must not exceed 1.5%. The European Commission also wants to see the sulphur content for ships anchored in ports and travelling on inland waterways set at no more than 0.2% (0.1% from 2008). The Netherlands supports these proposals in broad outline. As little progress is being made in the IMO, the Netherlands supports the EU member states' request to the European Commission to come up with proposals by 2005 at the latest for EU measures to reduce greenhouse gas emissions from maritime shipping.

#### **Tightening-up of standards and updating of type approval for LPG units**

The standards for LPG units in cars, which are determined at a national level, are being tightened up. The standards for LPG units lag behind the EU standards for petrol-driven cars. In order to rectify this discrepancy, the national requirements for LPG will also be tightened up when the new (Euro 4) EU standards for cars enter into force in 2005/2006.

The RDW (Netherlands Government Road Transport Agency) will have to hold new type examination tests in response to the stricter requirements. The extent to which the new definition of vehicles that can be fitted with a particular type of LPG unit, which was drawn up at ECE level and subsequently adopted by the EU (the so-called family definition), can be declared



applicable within the context of this new type examination test regime is currently being examined. This family definition has the advantage of guaranteeing that 'real world' emissions correspond more closely to the standard. A sampling evaluation of 'real world' emissions from LPG powered cars will be conducted in 2006 in order to check whether the updated type examination test regime for LPG units is proving effective.

#### **Innovation platform for vehicle and fuel technology**

In order to promote the exchange of know-how in the area of vehicle and fuel technology, the Cabinet intends to set up an innovation platform for vehicle and fuel technology. The focus here will be on clean, energy-efficient and quiet vehicles as well as on climate-neutral and clean fuels.

#### **Reserve package for the NEC Directive**

In the event of setbacks in the coming years, as mentioned in the Implementing Policy Paper for an Emissions Ceiling concerning Acidification and Large-scale Air Pollution 2003, so-called reserve measures will be taken. These are measures that should be ready in time for the evaluation of the NEC Directive in 2006 and which will be assessed in the coming years. A decision can be taken at that time to implement these measures; there will therefore be no decision-making in this regard at the present time. Two further reasons for developing reserve measures is the possibility of additional setbacks (see Chapter 2) and the existence of uncertainties in the forecasts. The following measures are being examined:

##### **NO<sub>x</sub> reserve measures:**

- a subsidy for early scrapping of old petrol-driven cars not fitted with a catalytic converter and of old diesel-driven cars;
- extending the subsidy for cleaner engines in inland shipping vessels;
- kilometre charges for heavy goods vehicles; this measure can lead to reduced NO<sub>x</sub> emissions, although any introduction will be primarily for other reasons (recovery of the costs of infrastructure);
- financial incentives for using diesel/water emulsion fuel.

##### **SO<sub>2</sub> reserve measures:**

- introduction of diesel fuel with a lower sulphur content for users of red diesel.

##### **VOC reserve measures:**

- introduction of a periodic motor vehicle test for scooters, and stricter enforcement.

Further information on the reserve measures is given in annex 6.

#### **4.2.2 Measures to reduce air pollutants in the period 2010-2020**

The measures to reduce air pollutant emissions in the period 2010-2020 can be divided into three clusters:

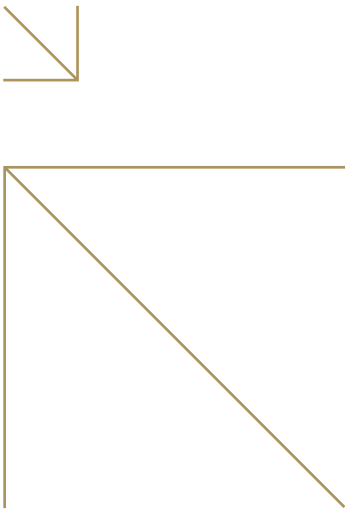
- reduced air pollution from road traffic;
- reduced environmental burden from shipping and aviation;
- other measures.

##### **Reduced air pollution from road traffic**

###### **Cars and delivery vans**

The Netherlands takes the position that the requirements in relation to NO<sub>x</sub> and particulate emissions from cars and delivery vans should be tightened up as soon as possible. The new standard (the so-called Euro 5 standard) will require a particular tightening of the rules for diesel-driven cars. The NO<sub>x</sub> standard would need to be reduced by two thirds relative to the standard that enters into force in 2005 (Euro 4). Such a tightening-up will make it necessary for all diesel-driven cars to be fitted with a so-called NO<sub>x</sub> catalytic converter. In terms of particulates, the reduction will be at least 80%. Such a tightening-up will make it necessary for all diesel-driven cars to be fitted with a soot filter. The benefit of this requirement is that the current trend towards increasingly higher amounts of smaller particles, about which there is much scientific concern regarding the possible harmful effects on health, is broken. As direct injection petrol engines can also produce fine particles, a (equally stringent) standard for petrol-driven car particulate emissions is also needed.

Negotiations are currently ongoing in the EU concerning the Euro 5 standard for cars and delivery vans. The European Commission is expected to produce a proposal for Euro 5 in 2005. Several EU countries, including Germany and Austria, support a rapid and stringent tightening of standards. In addition to a tightening of the standards, the Netherlands also supports new EU legislation to narrow the difference between emissions as measured on test beds and 'real world' emissions. This is because the testing method which is used in



the EU to determine the emissions from cars and delivery vans fails to reflect on-road operating conditions sufficiently. Finally, it may be necessary to tighten up standards even further for cars and delivery vans (through a Euro 6 standard) following the implementation of Euro 5 in order to achieve sustainable levels.

#### **Heavy goods vehicles and buses**

The standards for heavy goods vehicles should also be tightened up further. There is already talk of a Euro 6 standard to follow on from the Euro 5 standard which has already been established and which will enter into force in 2008. As regards the NO<sub>x</sub> standard, the Netherlands considers a reduction of 80% with respect to Euro 5 to be possible. This NO<sub>x</sub> level corresponds to the most stringent standards (phase 4) for non-road mobile machinery, which were recently approved in the EU. The proposed standard for particulate matter is 75% lower than Euro 5 and would require vehicles to be fitted with a soot filter.

The Netherlands supports the implementation of the Euro 6 regime for new types of heavy goods vehicle and buses in 2011, and for all types in 2012. The new testing method that has been developed at UN level, the so-called World Heavy Duty test cycle, should also be used since this method more accurately reflects 'real world' emissions.

#### **Reduced environmental burden from shipping and aviation**

##### **Inland shipping**

In the long term, it is possible to achieve a major and cost-effective reduction of air pollution by introducing more stringent standards for engines in inland shipping vessels. Such standards lag behind the standards that are set for road vehicles. Both the Central Commission for Navigation on the Rhine (CCNR) and the EU recently began establishing emission standards for new engines. CCNR standards (so-called first phase standards) were implemented on 1 January 2002, reflecting the technology applied at that time. Second phase standards are expected to be established in mid-2007. The EU recently decided to implement a first phase in 2006-2008 with slightly less stringent standards than the second phase adopted by the CCNR. The EU and the CCNR have agreed to acknowledge each other's standards. The Netherlands takes the position that a further tightening of standards to the level of the most stringent standards for heavy goods vehicles (Euro 5) should be implemented as soon as possible after 2007/2008 – in 2011, for example. In a following stage, new inland shipping engines should be subject to

requirements that in terms of the technology applied should be comparable with the very stringent phase 4 standard for non-road mobile machinery.

It is also important to establish standards for engines fitted in existing vessels, so-called replacement engines. The CCNR has ruled that replacement engines that are fitted after 1 January 2012 must meet the CCNR's phase 1 requirements in so far as the vessels concerned were already in operational use on 1 January 2002. The Netherlands believes that such stipulations for replacement engines should be tightened up in line with the standards set for new engines.

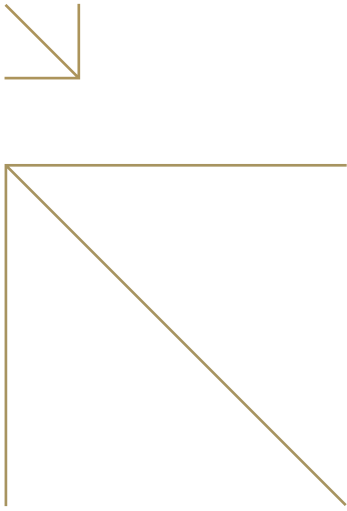
Finally, there will be an examination of the need at any time for international steps to reduce emissions from existing inland shipping engines. This will depend on the useful life of inland shipping engines and the practical implementation of the transitional arrangements for existing vessels.

##### **Maritime shipping**

Without additional policies, the proportion of emission-based pollution from maritime shipping will increase as emissions from land-based sources decrease. Further reductions of NO<sub>x</sub>, SO<sub>2</sub> and particulate matter emissions from maritime shipping are required after 2010 to achieve a no-effect level in the long term. As soon as Annex VI of the MARPOL convention has entered into force, the Cabinet will urge the IMO members to agree to a tightening of the standards for maritime engines and a further reduction of the sulphur content of fuels. Given the pace of international decision-making, this will probably not lead to any environmental effects until after 2010.

##### **Sulphur content of fuels used by inland shipping vessels, non-road mobile machinery and diesel locomotives**

In addition to the environmental requirements in relation to engines, there are also requirements with regard to the sulphur content of fuels. The current EU standard for the sulphur content of fuel oil used on board inland shipping vessels, by non-road mobile machinery and by diesel locomotives (< 2000 mg/kg) is roughly 40 times higher than the standard which effectively applies to the diesel used by road vehicles at the present time (< 50 mg/kg). From 2008, the permissible sulphur content of the fuel oil used for these applications will be halved (to 1000 mg/kg). The new requirements for engines which the Netherlands proposes will require after-treatment devices which only function well at very low sulphur content levels. Accordingly,



the Netherlands is seeking a further reduction of the sulphur content in the EU.

#### Aviation

The emission requirements for the aviation sector have been set by the ICAO since 1986 and were originally intended to protect the air quality in the vicinity of airports. The requirements relate to NO<sub>x</sub>, NMVOC, CO and particulate matter emissions during landing and take-off (LTO). The NO<sub>x</sub> requirements were tightened up in 1993 and 1999, and it is anticipated that a decision will be taken to tighten up the NO<sub>x</sub> requirements further in 2004. In this respect, negotiations are being held to set a 5% to 30% tougher standard for new aircraft, which will enter into force in 2008-2012. A large number of European countries (Germany, Norway, Switzerland, the United Kingdom and Sweden) support a tightening-up by 20%. The ICAO's environmental committee, of which the Netherlands is a member, has recommended that standards be tightened up by 12% in 2008. More than half the engine types currently in production already meet this standard.

#### Other measures

##### Motorcycles and scooters

The standards for motorcycles and scooters, which are far from being stringent, need to be tightened up. Two new, tougher standard levels were recently established for motorcycles. Scooters produce relatively high emissions of volatile organic compounds (NMVOC) and carbon monoxide (CO).

##### Non-road mobile machinery and tractors

New standards were recently agreed in the EU for non-road mobile machinery (agricultural vehicles, excavators, etc.) and tractors. These standards will be implemented between 2006 and 2014 (depending on the engine size). The new phase 4 standards are very stringent and will presumably work through into new standards for other forms of transport.

##### Diesel locomotives

Recently, the first steps were taken to establish standards for diesel locomotives. An initial phase is expected in the period 2006-2008. This will be followed by a second phase in 2011 to achieve a level comparable with the standards for heavy goods vehicles that will enter into force in 2005 (Euro 4). In a following stage, the aim should be to reach a level that is comparable with the phase 4 standards for non-road mobile machinery.

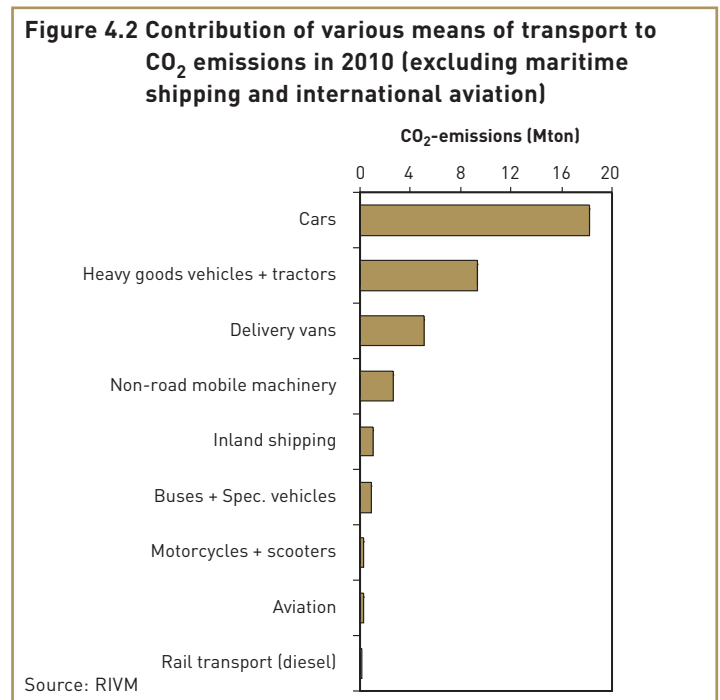
### 4.3 Greenhouse gas measures

#### 4.3.1 Measures to reduce greenhouse gases in the period until 2010

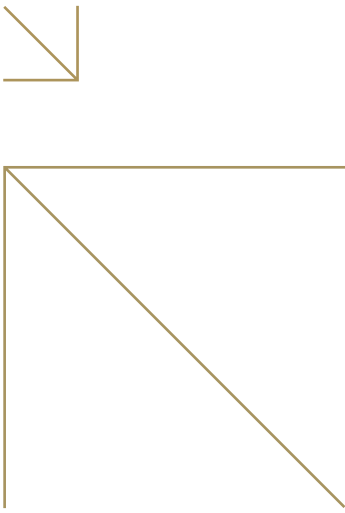
CO<sub>2</sub> reducing measures in the period to 2010 are mainly needed in relation to road traffic (see figure 4.2). Maritime shipping and aviation are also major sources of CO<sub>2</sub> emissions. The Netherlands supports an international reduction regime for these modes of transport, although this can probably not lead to any environmental benefit until after 2010.

As stated in Chapter 3, there are three strategies for achieving CO<sub>2</sub> reductions in road traffic:

- an efficiency strategy;
- influencing vehicle use;
- climate-neutral fuels.







### Efficiency strategy

There is a so-called EU strategy to reduce the CO<sub>2</sub> emissions from new cars. The object of this strategy, which was approved by the member states and the European Parliament in 1996, is to reduce average CO<sub>2</sub> emissions from new cars to 120 gram per kilometre by no later than 2010. This corresponds to an average fuel consumption of 5 litres per 100 kilometres (20 kpl) for petrol-driven cars and 4.5 litres per 100 kilometres (22 kpl) for diesel-driven cars.

The strategy comprises:

- covenants with the automotive industry;
- tax incentives;
- improved information about fuel consumption to consumers (energy consumption labelling).

### EU covenants regarding CO<sub>2</sub> emissions from cars

The main part of the strategy is the covenants which the European Commission has concluded with the European, Japanese and Korean automotive industries. The aim of these covenants is to achieve a reduction of average CO<sub>2</sub> emissions from new cars to 140 gram/km (25% reduction) in 2008/2009. It was also agreed that the automotive industry would indicate in 2003 whether a further reduction to 120 gram/km in 2012 is feasible.

The European automotive industry (ACEA) has since stated that the objective of 120 gram/km in 2012 does not appear feasible. Otherwise, the performance of the European automotive industry to date is virtually on schedule, while the Japanese and in particular the Korean manufacturers are behind schedule. At the interim evaluation of the covenants in 2004, the Netherlands will express its concern that the covenants are partly being met by an increase in the share of diesel in new car sales, which is having negative consequences for NO<sub>x</sub> and particulate emissions in the EU.

A standard EU approach to the CO<sub>2</sub> emissions per kilometre from delivery vans is also desirable. This is possible from 2007 when official consumption figures for delivery vans will become available. This means that there should also be covenants for new delivery vans. If the manufacturers are not prepared to take this step, or if covenants turn out not to be effective enough, the focus will have to shift to establishing standards. Additionally, an EU-wide energy label should be introduced for delivery vans. There needs to be some mechanism to follow up the covenants.

As this will mainly be effective after 2010, it will be discussed in the following paragraph.

### Tax incentives for energy-efficient cars

In order to encourage tax incentives for energy-efficient cars, the European Commission urged the member states in 2002 to link car taxes wholly or in part to the CO<sub>2</sub> emissions from new cars. The UK has already responded to this request from the European Commission by linking the vehicle holder's tax (road tax) and the addition to taxable income for private use of a company car to the CO<sub>2</sub> emissions. In doing so, the UK intends to help ensure that 10% of all new cars sold in the UK in 2012 will produce CO<sub>2</sub> emissions of 100 gram/km or less.

The Cabinet will examine how the purchase tax on passenger cars and motorcycles (BPM) can be partly linked to how energy-efficient a car is, with a view to implementation from 1 January 2006. A precondition is that this measure should have no effect on the budget. The possibility of exempting hybrid cars and cars that run on hydrogen, which meet certain requirements, from BPM for an extended period is being examined.

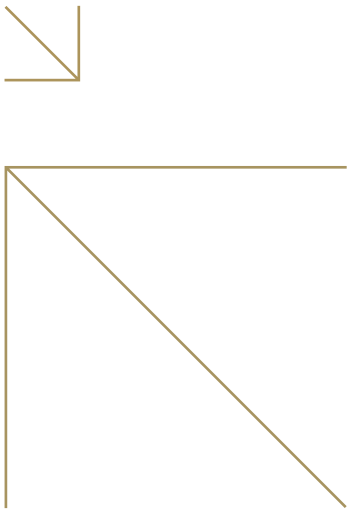
The Netherlands supports the development in the EU of a voluntary standard for the energy efficiency of new cars to act as a basis for tax incentives.

### Energy consumption labelling for cars

In order to improve the quantity and quality of information provided to consumers, it has been agreed in the EU that all member states will introduce an energy label for cars. As the EU Directive does not prescribe the precise format of this label, unlike the labelling on refrigerators and washing machines, each member state has its own energy label.

The effect that an energy label has on the consumer's purchase decision is limited, as the evaluation of the Dutch energy label also shows. The importance of labelling is chiefly that it paves the way for tax incentives for energy-efficient cars.

An EU-wide evaluation of the Labelling Directive, possibly leading to harmonisation, is expected in 2004 and 2005. The Netherlands believes that there should be a standardised energy label for cars in the EU identical (i.e. with the same format and same manner of category comparison) to the energy label already used in the EU for refrigerators, washing machines, etc. in order to increase consumer recognition.



The Netherlands also believes that regulations should be simplified since this will lighten the administrative burden on the automotive industry, and because not all the regulations are effective. The Netherlands, for example, does not follow the European Commission's recommendation that the internet sites of the car importers should include information about the fuel consumption of new cars. In the opinion of the Netherlands, the EU requirements for showroom posters, the inclusion of fuel consumption figures in advertising matter and the availability of fuel consumption leaflets can also be scrapped during the forthcoming EU harmonisation. At the request of the automotive sector, a few changes will be made in relation to implementation in the labelling resolution which the Netherlands will table.

#### **Variable fuel duty according to sulphur content**

The EU directive concerning fuel quality specifications for road vehicles requires the introduction of extra measures from 2005 in order to reduce the sulphur content of market fuels for road vehicles. From 1 January 2009, the sulphur content of petrol and diesel used by road vehicles may not exceed 10 mg/kg. This concentration is so low that these fuels are referred to as sulphur-free fuels. In addition, petrol and diesel with a sulphur content of no more than 10 mg/kg must be available on an 'appropriately balanced geographical basis' from 1 January 2005. A low sulphur content is necessary for certain types of energy-efficient cars and aids the functioning of exhaust gas after-treatment systems and devices (the NO<sub>x</sub> catalytic converter and soot filter). In 2005, the duty on diesel containing sulphur will be increased by 1 eurocent per litre. At the same time, the duty on sulphur-free diesel (10 mg/kg) will be left unchanged. It is expected that this measure will encourage the entire market to switch to sulphur-free diesel and that, accordingly, the duty differentiation will not lead to additional revenues for the state. The market is already taking steps to make sulphur-free petrol available. The fact that other countries are also obliged to implement the EU directive means that the level playing field is not endangered by this measure.

#### **Influencing vehicle use**

##### **A driving style that reduces fuel consumption (ECO-DRIVING)**

A long-term programme has been set up in the Netherlands (under the name *Het Nieuwe Rijden* (ECO-DRIVING)) comprising projects that are designed to get motorists to adopt a driving

style (particularly driving at low rev speeds) that will cut fuel consumption substantially. There are additional benefits in terms of reduced noise pollution and NO<sub>x</sub> and particulate emissions. As part of the ECO-DRIVING long-term programme, these elements of driving style will be included in approved driving lessons in the Netherlands. Significant progress has been made in this respect in recent years – 90% of driving instructors have been trained in ECO-DRIVING. This approach will be continued. The aim is to make ECO-DRIVING a mandatory part of practical driving examinations for a licence to drive cars, following on from the examinations for a HGV licence and a licence to drive buses, through the implementation of European and Dutch regulations. A media campaign will be launched in June 2004 with the aim of encouraging the large pool of existing drivers to adopt the ECO-DRIVING style.

##### **Fuel-saving in-car devices**

Fuel-saving in-car devices help road users to adopt an economical driving style. Given the low additional costs and high cost-effectiveness of such devices, the Netherlands would like to see that all new cars in the EU are fitted with fuel-saving in-car devices, such as an on-board computer with an econometer that shows the kpl.

The extension of the speed limiter for heavy goods vehicles, which is mandatory in Europe, to cover 3.5 ton and 10 ton vehicles is also a welcome reinforcement to the set of instruments.

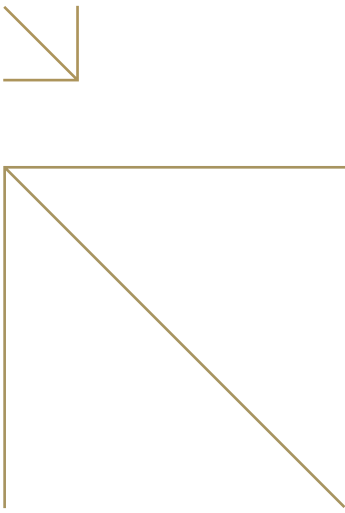
Since 1 May 2001, the Netherlands has enjoyed a fiscal incentive scheme (through a flat rate BPM exemption) under which econometers, on-board computers and cruise control can be fitted as standard on new cars for a reduced price.

Approximately three quarters of new cars sold are now fitted with these devices.

##### **Climate-neutral fuels**

###### **Biofuels for road vehicles**

In order to make biofuels sufficiently attractive from an economic viewpoint, it will be necessary either to introduce mandatory requirements for the market as a whole or offer financial compensation of the additional costs associated with this fuel type. In the short term, there is no legal provision for subjecting the market to any form of mandatory requirement. The Cabinet has therefore opted, in principle, to follow the path of financial incentives.



The Cabinet has set a 2% target value for the biofuel energy content of petrol and diesel from 2006. With this target in mind, the Cabinet is doing its utmost to introduce an incentive scheme for biofuels from 2006. The necessary research and preparation, including the necessary funding, to make this possible will be undertaken immediately. In 2005, the Cabinet will announce the results that have been achieved with regard to research, preparation and funding.

The target value of 2% biofuel content includes niche markets<sup>18</sup>. In addition to reduced CO<sub>2</sub> emissions, a further important objective is to set in train the innovation of biofuel use by road vehicles. Preparations for this will be developed in consultation with oil companies and non-governmental organisations. It is not feasible to introduce incentives from 2005 since the regulations for biofuel use need to be developed further and also because trade and industry is not yet ready to start the wide-scale introduction of biofuels as early as 2005. The effect of the incentive strategy for biofuels will be evaluated in 2007. Based on this evaluation, the Cabinet will determine whether the guide value of 5.75% market share in 2010 for the Netherlands mentioned in the EU Directive is feasible.

As an incentive to the development of so-called second generation biofuels, it is proposed to set sustainability requirements (including reduced CO<sub>2</sub> emissions and maintenance of biodiversity) for biofuels. From 2006, the requirements in this respect will be so loose that they can be met by the current generation of biofuels. It is intended, however, that the requirements will be tightened from 2010. Work will start on setting up a certification system to allow biofuels to be assessed in terms of sustainability aspects. The possibilities for providing incentives to the development of new technologies will also be examined.

#### 4.3.2 Measures to reduce greenhouse gas emissions in the period 2010-2020

The measures to reduce greenhouse gas emissions after 2010 can be divided into two clusters:

- reduced CO<sub>2</sub> emissions from road traffic;
- tackling greenhouse gas emissions from maritime shipping and aviation.

#### Reduced CO<sub>2</sub> emissions from road traffic

##### Reduction of car fuel consumption

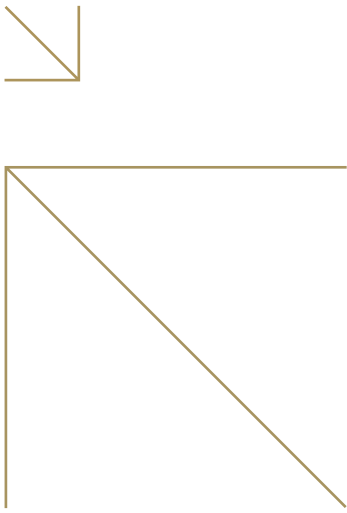
Measures to follow on from the EU covenants concluded with the automotive industry (see paragraph 4.3.1) are desirable to reduce CO<sub>2</sub> emissions from 2010. Despite the European automotive industry's announcement that a reduction of the average CO<sub>2</sub> emissions from new cars to 120 gram/km in 2012 would not appear to be feasible, the Netherlands (along with Germany and France) nevertheless wishes to adhere to this figure. It is conceivable that a new target will be laid down in new covenants with the automotive industry. If the industry declines a voluntary agreement in this respect, or if the current covenants prove not to be effective enough, the Netherlands believes that the only option will be to set standards for average CO<sub>2</sub> emissions per kilometre. In that case, the average CO<sub>2</sub> emissions from new cars marketed in the EU by a manufacturer will have to meet a particular standard which can be tightened up on a periodic basis, for example once a year.

Such standards will have to be established in such a way that they allow for trading. A manufacturer marketing a car in the EU with CO<sub>2</sub> emissions exceeding the standard by x units can compensate for this by marketing another car with CO<sub>2</sub> emissions of x units below the standard, or by buying an emissions surplus from another manufacturer. Trading between manufacturers leads to the creation of a market on which emissions surpluses and shortfalls can be bought or sold. Manufacturers receive a surcharge on their production costs if they exceed the standard and a discount if they stay below the standard.

##### Biofuels as part of the transition to sustainable mobility

In the longer term, the aim should be to continue to build on the current Biofuels Directive. The Netherlands supports the inclusion after 2010 in the EU Biofuels Directive of requirements in relation to the CO<sub>2</sub> efficiency of biofuels. In the longer term, the aim is for biofuels with improved CO<sub>2</sub> efficiency to become available. There is also a clear need for far-reaching EU harmonisation. Guide values should be replaced by mandatory values for the share of biofuels. The Netherlands proposes that this value be raised after 2010.

<sup>18</sup> Examples of niche markets are pure vegetable oils, pure biodiesel and a blend of 85% ethanol and 15% petrol.



### **Ban on HFCs in car air-conditioning systems**

Alongside CO<sub>2</sub>, leakage losses of coolants used in car air-conditioning systems also make a sizeable and increasing contribution to greenhouse gas emissions. The European Commission recently proposed that the use of the coolant HFC-134a in the air-conditioning systems of new cars be phased out in the period 2009-2014. The Netherlands is in favour of this measure.

### **CO<sub>2</sub> emissions trading for road vehicles**

Under the terms of an EU directive, a system of emissions trading will be implemented for (heavy) industry. This directive does not seek to apply to road vehicles for the time being. Following an evaluation to be held in 2004, it will be seen whether the system can be extended to cover other activities or greenhouse gases. In addition, the member states can, with the approval of the European Commission, include other activities under the system from 2008 onwards. The Cabinet wishes to examine whether it is possible to include the traffic sector in the EU's CO<sub>2</sub> emissions trading system in the medium to long term.

### **Tackling greenhouse gas emissions from maritime shipping and aviation**

#### **General**

Emissions from international aviation and maritime shipping make a significant contribution to the enhanced greenhouse effect, but do not fall within the reduction targets set under the Kyoto protocol. The signatories to the Kyoto protocol agreed that these emissions should be limited through the UN organisations ICAO (International Civil Aviation Organisation) and IMO (International Maritime Organisation). Within the ICAO and IMO, the Cabinet supports the inclusion of greenhouse gas emissions from aviation and maritime shipping under a climate change regime. Additionally, the EU can implement its own measures. In the Netherlands' opinion, the decision-making concerning EU measures must be seen in the light of progress that is being made at a global level.

Negotiations about the period following Kyoto will probably commence in 2005 under the UN Framework Convention on Climate Change. The Netherlands will work to ensure that these negotiations, where they relate to aviation and maritime shipping, are properly prepared within ICAO, IMO, the UNFCCC (United Nations Framework Convention on Climate Change) and the EU.

#### **CO<sub>2</sub> emissions from maritime shipping: IMO**

At IMO level, the Netherlands is contributing to the development of CO<sub>2</sub> reduction instruments. These arise from the so-called resolution on greenhouse gas emissions which the participating countries have adopted. The principal measure is the so-called CO<sub>2</sub> efficiency index for maritime ships and the development of uses for the same. In the resolution, the IMO also announced its intention to implement voluntary measures. The Netherlands believes, however, that mandatory and possibly market-compatible instruments are needed.

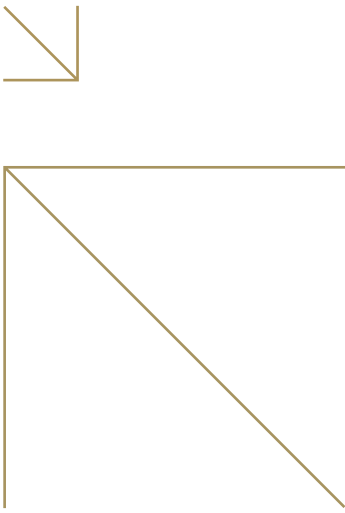
#### **CO<sub>2</sub> emissions from aviation: ICAO**

At ICAO level, the Netherlands is participating in studies looking into measures that can be taken to stem the growth of CO<sub>2</sub> emissions from aviation. The ICAO is examining three types of measure: voluntary agreements, an international emissions trading system also embracing aviation, and charges. The Netherlands is in favour of market-compatible measures, such as emission charges and tradable emission rights. In this context, the Netherlands will also make efforts within the ICAO to ensure that sufficient flexibility is maintained for the EU to take market-compatible measures. Within the ICAO, progress is slow with regard to charges and emissions trading because the United States and developing countries in particular are fearful of negative economic effects.

#### **EU measures to reduce CO<sub>2</sub> emissions from maritime shipping and aviation**

The 6th Environmental Action Programme of the European Union specifies that the EU would implement its own measures if the ICAO and IMO failed to take measures in 2002 or 2003 to reduce greenhouse gas emissions. As yet, no such measures have been taken. The EU recently decided to present proposals for European measures by 2005 at the latest.

As little progress is being made in the ICAO, the Netherlands is in favour of the EU introducing market-compatible measures for aviation, such as the so-called en route charge or emissions trading. In 1999, the European Commission called the en route charge, a variable charge per kilometre based on the environmental characteristics of aircraft, a highly promising instrument. Such a charge would apply to all (European as well as non-European) airlines flying in European airspace. Other options are excise duty on kerosene for air traffic within EU airspace or emissions trading. The feasibility of all the measures is dependent on the degree of support in Europe.



Ahead of the ICAO Assembly that is scheduled for autumn 2004, the Netherlands is calling on the EU to determine a position in good time regarding future steps in relation to CO<sub>2</sub> measures for air traffic. This applies in particular to the market-compatible instruments, such as charges and emissions trading, since progress within the ICAO is slow.

As little progress is being made in the IMO, the Netherlands supports the EU member states' request to the European Commission to come up with proposals by 2005 at the latest for EU measures to reduce greenhouse gas emissions from maritime shipping.

#### Aviation: NO<sub>x</sub> emissions and climate change

Research indicates that aviation contributes to the greenhouse effect not just through CO<sub>2</sub> emissions and aircraft vapour trails, but also through NO<sub>x</sub> emissions in higher layers of the atmosphere<sup>19</sup>. The continuing growth of aviation compels us to address this issue. Whilst there is still no specific policy to tackle this problem, the ICAO standards for local NO<sub>x</sub> emissions [see paragraph 4.2.2] go some way to influencing, albeit indirectly, NO<sub>x</sub> emissions in higher layers of the atmosphere. At ICAO level there are also plans to study possible measures for other stages of flights than just landing and take-off.

### 4.4 Noise measures

#### 4.4.1 Noise reduction measures in the period until 2010

Under the Noise Innovation Programme (see box), measures are being developed for road traffic (cars, delivery vans, heavy goods vehicles) and the railways. For the period until 2007/2008, the measures are as follows.

##### Quiet tyres

The EU Noise Directive lays down very loose requirements for tyres. The noise output standard is 2 dB(A) higher than the noisiest tyres. In the Netherlands, tyres are available which are far quieter (7 dB(A)) than the EU standard. It is possible to achieve substantial reductions in noise emissions by using quiet tyres: in the case of wide-scale use approximately 2 dB(A), and in the slightly longer term even 3 dB(A). The Cabinet will hold talks with the transport, automotive and tyre sectors with the aim of reaching agreements concerning the wide-scale introduction of quiet tyres in the Netherlands.

#### Noise Innovation Programme

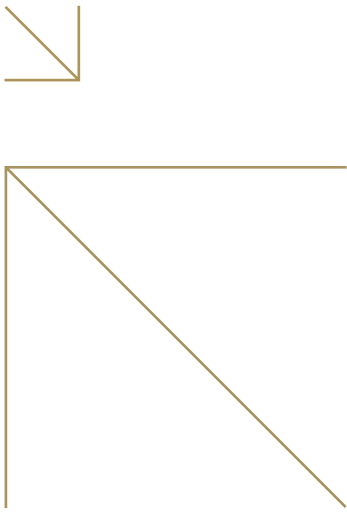
The Noise Abatement Act provides that any improvement in road and rail infrastructure may not, in principle, lead to increased noise levels for homes. This means that an increase in traffic will require acoustic baffles to be replaced by higher baffles as well as the siting of many new acoustic baffles. This will be so costly that the Ministry of Transport, Public Works and Water Management has joined forces with VROM to set up the Noise Innovation Programme with the aim of developing innovative and cost-effective solutions. There turned out to be many ideas already in circulation, but more importantly there were already many innovations just waiting to be implemented. The focus is therefore on making these innovations suitable for large-scale implementation. Technical, legal and financial barriers to achieving this must be removed.

With regard to road traffic, the Noise Innovation Programme foresees a broader use and improvement of twin-course pervious coated macadam (ZOAB), the development of even quieter road surfaces, quiet vehicles and tyres, and improved acoustic baffles. For the railways, the emphasis is on a pilot programme to make existing goods rolling stock quieter (Dolomiet shuttle), the phasing-out of noisy goods rolling stock, the conversion and phasing-out of noisy passenger rolling stock, smooth rails and track noise dampening measures. Under the Noise Innovation Programme, € 110 million has been set aside for the period until May 2007. Of this sum, € 70 million is earmarked for roads and € 40 million for railways. Of this € 40 million, € 15 million will be spent on noise reduction measures in the Sloelijn project. A further € 200 million has been reserved until 2010 for implementing innovative measures in respect of road infrastructure (for example, the Road Widening Emergency Act).

##### Quiet road surfaces

The road surface (roughness, sound absorption properties) is a major factor in determining the noise level of tyres. In 1989, an agreement was made only to use pervious coated macadam (ZOAB) on motorways. There is now a twin-course ZOAB available which is 5-6 dB(A) quieter than ordinary asphalt. This type of asphalt is already being used at major environmental problem areas, such as the A10 West in Amsterdam. With the adoption of the Noise Innovation Programme, strenuous efforts are now being targeted at developing further and implementing quiet road surfaces on motorways.

<sup>19</sup> See, for example, the IPCC report "Aviation and the global atmosphere" (1999).



As part of the decision-making process for motorway projects, the possibility of using twin-course ZOAB is assessed on a project-by-project basis, depending on the noise situation, the additional costs and the technical feasibility. From 2006/2007, low-noise road surfaces – with the acoustic quality of what is known as twin-course pervious coated macadam (ZOAB) – will be used on motorways where they run through populated areas and possibly also in the National Ecological Network, unless it becomes apparent in 2005 that this is not cost-effective.

The use of low-noise road surfaces is also provided for under the Road Widening Emergency Act. Under this Act, a noise-reducing road surface layer with the acoustic quality of twin-course ZOAB will be laid during so-called semi-permanent road alteration projects (whereby the Noise Abatement Act is temporarily suspended) if the noise output exceeds permissible levels by 70 dB(A) in noise-sensitive areas, such as housing developments. The legal requirements of the Noise Abatement Act will be taken into consideration immediately in the second tranche of road widening work. This means that the noise reduction measures will be taken as the project is executed.

VROM is currently operating an incentive scheme to introduce other authorities to quieter road surfaces that are suitable for urban traffic applications. This scheme has proved to be so successful that the funding available under it – for the full four-year period – was fully allocated within a short time. It is anticipated that the example that this scheme has set will lead to the broader use of quieter road surfaces in urban traffic environments.

#### **Enforcement of noise requirements for scooters and motorcycles**

The increase in serious noise nuisance from road traffic of the last few years is entirely attributable to scooters and mopeds<sup>20</sup>. Legislation and regulations contain clear type examination test requirements for the maximum permissible noise output. The Cabinet believes it is important to strengthen enforcement in this respect. The Ministry of Housing, Spatial Planning and the Environment (VROM), the Public Prosecutions Department (OM) and the police are currently discussing this matter. The aim is to reduce the number of noise-related offences drastically through enforcement of the law and regulations.

#### **Quieter trains**

A substantial proportion of current rolling stock causes far more

noise than is necessary given the technical possibilities available. This results in nuisance, high costs for acoustic baffles, inefficient use of rail capacity and social and administrative resistance to rail projects. The technical solution to this problem is well-known: replacing the cast iron brake systems with plastic block systems. This involves refitting **existing** trains; establishing standards for new trains would have no effect for many years to come since trains have a useful service life that stretches to several decades. Quieter trains would enable the government to save hundreds of millions of euros in the cost of constructing acoustic baffles. The costs of the Ministry of Housing, Spatial Planning and the Environment's cleanup programme can also be cut dramatically, allowing it to be completed more quickly.

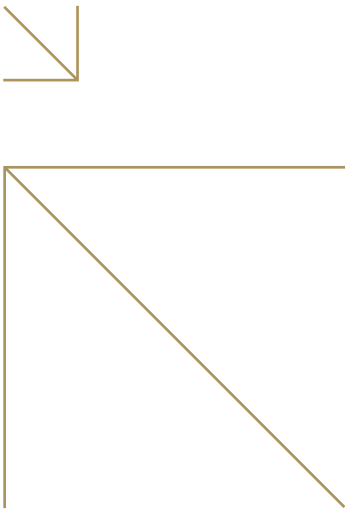
In its project 'Benutten en bouwen' (Utilisation and construction), the rail sector itself noted that rail capacity can be used more efficiently by making rolling stock quieter. If rail transport does not become quieter, it will not be possible for the railways to realise their growth ambitions as the company that is responsible for the rail infrastructure (Prorail) will then be required to introduce limitations so as to comply with environmental standards. The positive experience of the Swiss railways with their refitting programme shows that quieter trains are technically possible. There are similar positive experiences with a demonstration project for refitting goods wagons (Dolomiet shuttle) as part of the Noise Innovation Programme. NS Reizigers (the passenger carrying organisation of the Dutch railways) is currently refitting several passenger trains.

The goal is that in 2010 most trains will have a noise output that is at least 7 dB(A) lower than that of rolling stock fitted with cast iron brake blocks. In any event, only quiet trains will operate at night on all sections of track in 2015.

There are two policy lines for limiting noise along railway tracks – a generic policy and a section-related strategy.

The generic policy focuses on converting the current fleet of passenger coaches and goods wagons into quiet rolling stock. The most likely approach is a combination of linking the usage fee to the noise characteristics of rolling stock and a bonus/penalty scheme. This will provide train operators

<sup>20</sup> TNO (2000). 'Nuisance and other voluntarily reported effects of environmental pollution in the Netherlands; 1998 survey of disturbances'.



with a financial incentive to purchase only quiet rolling stock in future and to refit existing noisy rolling stock. The goods rail transport company Railion and Dutch Railways (NS) favour this approach. The precise way or ways in which the noise output can be linked to the usage fee is currently being examined so that this can be introduced as soon as possible (target is 2008).

The section-related strategy is intended to support the generic source policy and tackle specific problem areas. This strategy is connected with the so-called integral capacity management currently under development and which will become operational in 2008. From 2008, the first steps will be taken to ban noisy trains from noise-sensitive sections of track during the night and/or evening if this is necessary in order to meet noise regulations or the government's noise targets. The Railways Act and European regulations allow for such restrictions. This approach has been taken up in the government's position with regard to the HST Eastern line; once the Betuwe route has been taken into service, noisy rolling stock will be banned from the section Utrecht-Arnhem-German border, initially in the evenings and at night. The advisability of preserving the noise situation at sections of track where noise levels have been put in order through statutory noise output ceilings is being examined. Through the above approach, the Cabinet is following one of the recommendations of the Interdepartmental Policy Study into Rail<sup>21</sup> Utilisation Measures.

The strategy is supported by the € 25 million<sup>22</sup> which the Cabinet has earmarked to implement the Noise Innovation Programme for source measures on the railways in the period 2004-2010.

In addition to carriage and wagon-related measures, the Noise Innovation Programme also further develops measures in relation to infrastructure, specifically track noise dampening measures and a polishing regime to keep rail tracks smooth.

In view of the strong international orientation of rail transport, it would be helpful if an approach as outlined above were also to be adopted by other countries. The Netherlands would like, in the first instance, to consult mainly with Germany, Switzerland and Austria since so many of the goods wagons travelling on Dutch tracks originate in these countries and because these countries have also developed, or are in the process of developing, an approach to the issue of rail noise.

### Regional and Small Aviation

Under the Regional and Small Aviation Regulations (RRKL) project, specific noise source policy will be developed for small aviation. This may take the form of noise requirements which are more stringent than those prescribed by the ICAO when approving new aircraft, for example. The possibility of providing incentives for quieter aircraft amongst the current fleet of aircraft will also be examined.

#### 4.4.2 Noise reduction measures in the period 2010-2020

##### Cars and delivery vans: engines

The existence for 30 years of vehicle noise requirements in the EU has still not resulted in quieter cars or delivery vans. The standards have been tightened up on various occasions, but each time any useful effects have been cancelled out by changes in the measuring method. We have now arrived at a situation where it is technically possible to make cars 7 dB(A) quieter than standards require, and there are even manufacturers who make it their policy to turn out cars that operate at 3 dB(A) under the limit values.

Noise requirements for cars should be tightened up to 71 dB(A) in 2008 so as to make full use of state-of-the-art technology. A similar tightening is also desirable for delivery vans since they make such a major contribution to the whole issue of noise.

##### Cars and delivery vans: tyres

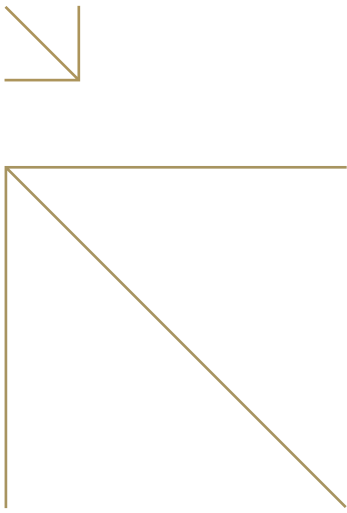
As previously mentioned, the noise standards for tyres adopted by Brussels are too loose at the moment to have any effect on tyre design. The EU directive concerned includes a guide limit value which will enter into force in 2008. The Netherlands believes that this should be tightened up to 68 and 73 dB(A) (depending on the tyre width).

##### Heavy goods vehicles: engines

Of all road vehicles, only heavy goods vehicles have become significantly quieter. This is not so much due to policy as to the efforts of the sector itself. Even without new technical developments, it is possible for heavy goods vehicles to become even quieter. The Netherlands would like to see a tightening to 78 dB(A), to enter into force in 2008.

<sup>21</sup> Benutten beter benut (making better use of utilisation). Final report of the Rail Utilisation Measures working party. Interdepartmental Policy Study 2002.

<sup>22</sup> Of the € 40 million originally set aside, € 15 million will be spent on noise reduction measures in the Sloelijn project.



#### Heavy goods vehicles: tyres

It is technologically possible to make the tyres on heavy goods vehicles quieter also. Test and demonstration projects are showing what is possible in this area. These now need to be translated into standards. An example would be a reduction of 2 to 3 dB(A), to enter into force in 2012.

#### Road surfaces

Naast de projecten voor stille wegdekken die reeds voor 2010 tot resultaat kunnen leiden, zijn er in het kader van het Innovatieprogramma Geluid twee projecten voor de wat langere termijn opgenomen. Eén hiervan is gericht op het verder verbeteren van dubbellaags zoab wat betreft geluidsproductie, levensduur en onderhoudskosten. Het andere project is gericht op het ontwikkelen van de zogenoemde derde generatie stille wegdekken, die nog stiller zijn.

#### Goods trains

Within the EU, plans are being developed to introduce noise standards for new goods trains. When the Interoperability Directive is amended in 2004, the Cabinet will urge that these standards be implemented in full force. The long useful service life of locomotives and wagons does mean, however, that it will be some considerable time before these standards have any effect.

#### Passenger trains

With regard to passenger trains, work is ongoing to develop the so-called second generation of quiet rolling stock. These are characterised by a dampening of the wheels. The Ministries of Transport, Public Works and Water Management and Housing, Spatial Planning and the Environment are conducting a pilot project in this regard within the framework of the Noise Innovation Programme. International noise requirements are also being sought for existing trains.

#### Aviation

The approach to tackling the issue of aviation noise at the source has been relatively successful: aircraft have become a lot quieter. However, the growth in aviation is so great that simply making **new** aircraft quieter will not solve the noise problems in areas close to airports. There has therefore also been talk of phasing out noisy aircraft, in combination with a sliding scale of landing fees according to the noise output of each aircraft.

The Netherlands seeks to achieve a quieter worldwide fleet of aircraft, particularly for those aircraft flying to and from Dutch airports, and intends to play a leading role in international consultations (within the ICAO and in Europe) in this regard. The ICAO established stricter requirements in 2001. These will enter into force from 1 January 2006 and mean a reduction, formally, of 10 EPNdB (effective perceived noise level). With aircraft getting heavier, however, the actual reduction will be less. For the time being, resistance from the USA means that there are no plans for a further tightening of noise standards.

#### 4.5 Summary

The table below gives a summary of the actions set out in this policy document. The name of the ministry primarily responsible for implementation is listed next to each action. The sums of money mentioned have already been set aside.



Table 4.1 Summary of actions

Action	Which ministry is primarily responsible?	Which other ministries are (most closely) involved?
<b>Reduced air pollution from road traffic</b>		
1 The Netherlands will support in the EU a stringent tightening-up of the standards for NO <sub>x</sub> and particulate matter from cars (in particular diesel-driven cars), delivery vans and heavy goods vehicles.	VROM	V&W
2 The Cabinet will raise the issue of the additional 19 kiloton NO <sub>x</sub> emissions from heavy goods vehicles in the EU with the aim of ensuring the EU takes responsibility for this rather than the Netherlands having to solve it unilaterally with national measures.	VROM	
3 The Tax Plan 2005 and, if financial cover can be found, the Tax Plan 2006, will include financial measures that will contribute to the total package of domestic measures (i.e. including subsidies) leading to a reduction of NO <sub>x</sub> emissions of at least 8 kiloton in 2010, and will also contribute to an improvement of the air quality.	Finance	VROM, V&W, EZ, LNV
4 The national standards that have been set for LPG units will be updated.	VROM	V&W
5 In the event of setbacks in the coming years, so-called reserve measures will be taken. These are measures that should be ready in time for the evaluation of the NEC Directive in 2006 and which will be assessed in the coming years.	VROM	Finance, V&W, EZ, Justice
6 The possibility of reducing the speed limit in combination with proper enforcement, such as the 80 kilometre per hour speed limit on the A13 at Overschie in Rotterdam, on other stretches of road is being examined. The Cabinet will inform the Lower House on this matter in mid-2004.	V&W	VROM, Justice
7 Municipalities are being sent information outlining the possibilities for designating areas as exclusively for 'clean' vehicles.	VROM	
8 The Cabinet is implementing an Air Quality Innovation Programme in order to develop solutions for air quality problem areas. A total of € 20 million has been reserved for this until 2010.	V&W	VROM
<b>Reduced CO<sub>2</sub> emissions from road traffic</b>		
9 With the target percentage of 2% in mind, the Cabinet is doing its utmost to introduce a incentive scheme for biofuels from 2006.	Finance	VROM, V&W, EZ, LNV
10 The Netherlands will argue for an extension of the covenants on car CO <sub>2</sub> emissions which the EU has concluded with the automotive industry. The Netherlands believes that this new covenant should set an objective of 120 gram/km in 2012. If the industry declines any further covenants as a means of tackling this issue, or if covenants turn out not to be effective enough, EU standards (which may be tradable) will have to be imposed. The Netherlands is also in favour of an EU-wide approach to delivery vans.	VROM	V&W

Action	Which ministry is primarily responsible?	Which other ministries are (most closely) involved?
11 The Cabinet will examine how the amount of purchase tax levied on passenger cars and motorcycles (BPM) can be partly linked to the fuel efficiency of cars, with a view to introducing this measure from 1 January 2006. A precondition is that this measure should have no effect on the budget. The possibility of exempting hybrid cars and hydrogen-powered cars which meet certain requirements from BPM for a long period is currently being examined.	Finance	VROM, V&W, EZ
12 The Cabinet will do its best to ensure that all new cars in the EU are fitted with fuel-saving in-car devices, such as on-board computers with econometers which provide drivers with information on fuel flow.	VROM	V&W
13 A driving style that reduces fuel consumption (ECO-DRIVING) will become a compulsory part of the practical driving test for passenger cars. A media campaign will be launched in 2004 with the aim of promoting awareness of ECO-DRIVING as a means of reducing fuel consumption.	V&W	VROM
14 In order to meet the EU directive on sulphur-free fuels, the Cabinet will, through the introduction of a differential excise duty structure, ensure that sulphur-free diesel is available in 2005. Sulphur-free fuels are necessary to make the development of certain types of energy-efficient and clean cars possible.	Finance	VROM
15 In consultation with the European Commission, the Cabinet will examine whether, with regard to long-term CO <sub>2</sub> reduction, it is possible for the traffic sector to take part in the EU's CO <sub>2</sub> emission trading system. This might take the form of an emissions trading scheme with a CO <sub>2</sub> ceiling for fuel suppliers.	VROM	V&W
<b>Reduced environmental burden from shipping and aviation</b>		
16 In order to reduce emissions from inland shipping, a subsidy scheme for cleaner inland shipping engines will be introduced (NO <sub>x</sub> reduction: approx. 1.5 kiloton).	VROM	V&W
17 The Netherlands firmly believes that the international standards for inland shipping engines should be tightened up as soon as reasonably possible to the level of the most stringent standards for heavy goods vehicles and non-road mobile machinery, and that fuel should be made cleaner on an international scale.	EU: VROM CCR: V&W	
18 The Netherlands supports the European Commission's proposals to reduce the sulphur content of fuels for maritime shipping. The Netherlands supports the member states' request to the European Commission to present proposals in 2006 for EU measures for NO <sub>x</sub> reduction if the IMO (International Maritime Organisation) fails to come up with proposals to tighten up standards in this respect under MARPOL Annex VI.	VROM	V&W
19 The Cabinet will recommend as soon as possible that the Lower House should ratify the UN Convention for the Prevention of Air Pollution from Ships (MARPOL Annex VI) dating from 1997	V&W	VROM

Action	Which ministry is primarily responsible?	Which other ministries are (most closely) involved?
20 As soon as MARPOL Annex VI has entered into force, the Netherlands will support in the UN (IMO) a tightening-up of the NO <sub>x</sub> standards for maritime engines and a further reduction of the sulphur content of fuels.	V&W	VROM
21 The Netherlands supports, with reference to the 1994 UN Framework Convention on Climate Change, the creation of an emissions reduction regime for maritime shipping and aviation.	VROM	V&W
22 The Netherlands seeks to achieve at UN level (ICAO: International Civil Aviation Organisation) market-compatible instruments for international aviation, such as emission charges and emissions trading. Efforts within the ICAO are also aimed at ensuring that sufficient flexibility is maintained for EU measures.	ICAO: V&W UN Framework Convention on Climate Change VROM	
23 The Netherlands is committed to the adoption at UN level (IMO) of mandatory and possibly market-compatible instruments to reduce greenhouse gas emissions from maritime shipping.	V&W	VROM
24 In view of the ICAO Assembly to be held at the end of 2004, the Netherlands would like to see the EU determine its position with regard to progress on CO <sub>2</sub> measures for air traffic in good time.	VROM	V&W
25 As little progress is being made in the ICAO, the Netherlands is in favour of the EU introducing market-compatible measures for aviation, such as charges (e.g. the en route charge) and emissions trading, and hopes that the European Commission will make proposals in this respect by 2005 at the latest.	Environment Council: VROM Transport Council: V&W	
26 As little progress is being made in the IMO, the Netherlands supports the EU member states' request to the European Commission to come up with proposals by 2005 at the latest for EU measures to reduce greenhouse gas emissions from maritime shipping.	Environment Council: VROM Transport Council: V&W	
27 At ICAO level, the Netherlands is in favour of a tightening-up of NO <sub>x</sub> emission requirements for aircraft.	V&W	VROM
<b>Quieter road and rail traffic</b>		
28 The Cabinet is putting the importance of stringent noise requirements for road and rail traffic in the EU on the political agenda, for example during the Dutch Presidency of the EU.	VROM, V&W, EZ	
29 At EU and UN level, the Cabinet is in favour of a tightening-up of the noise standards for cars, delivery vans, heavy goods vehicles, trains and tyres.	Coordination and input in UN: VROM Input in EU: V&W and EZ	
30 At EU level – for example regarding the amendment of the Interoperability Directive in 2004 –, the Cabinet is in favour of a tightening-up of the noise standards for new trains.	V&W	VROM

Action	Which ministry is primarily responsible?	Which other ministries are (most closely) involved?
31 The Cabinet is holding talks with the transport, automotive and tyre sectors with the aim of reaching agreements concerning the wide-scale introduction of low-noise tyres in the Netherlands.	VROM	V&W
32 From 2006/2007, low-noise road surfaces – with the acoustic quality of what is known as twin-course pervious coated macadam (ZOAB) – will be used on motorways where they run through populated areas and possibly also in the National Ecological Network, unless it becomes apparent in 2005 that this is not cost-effective.	V&W	VROM
33 Within the framework of the Noise Innovation Programme, a sum of € 70 million is available until 2007 for innovations that will lead to a reduction of road traffic noise. A further € 200 million has been reserved until 2010 for implementing innovative measures in respect of road infrastructure (for example, the Road Widening Emergency Act).	V&W	VROM
34 The precise way or ways in which the noise from goods and passenger trains can be linked to the usage fee will be examined this year so that this can be introduced as soon as possible (target is 2008).	V&W	VROM
35 From 2008, the first steps will be taken to ban noisy trains from noise-sensitive sections of track during the night and/or evening (as has already been done for the HST Eastern line) if this is necessary in order to meet noise regulations or the government's noise targets.	V&W	VROM
36 The Cabinet has reserved € 25 million in the period 2004-2010 to implement the Noise Innovation Programme for source measures on the railways.	V&W	VROM

# Annex 1

## NO<sub>2</sub> and particulate matter concentrations in the Netherlands

According to figures released by the RIVM, background concentrations of nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub>) are highest in the Randstad conurbation, in the west of the country, and lowest in the North East. The EU standard for NO<sub>2</sub> (annual average 40 µg/m<sup>3</sup>) is exceeded in particular along very busy roads, mainly in the Randstad conurbation. The EU standard for the average daily level of particulate matter (50 µg/m<sup>3</sup> that may be exceeded on no more than 35 days a year) is exceeded on a wider scale.

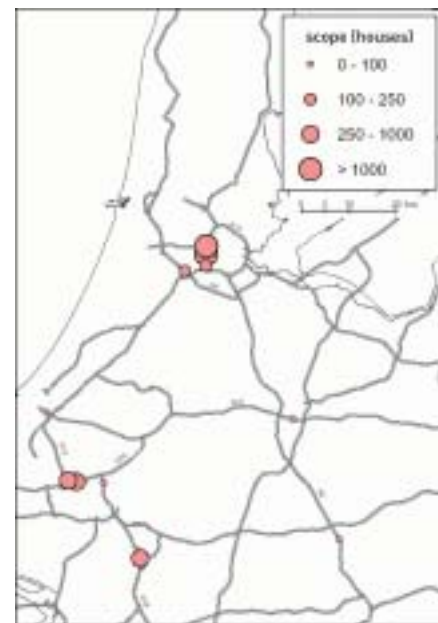
### NO<sub>2</sub> levels in the Netherlands

Figures 1 and 2 show the geographical distribution of background concentrations of NO<sub>2</sub> for 2001 and the remaining NO<sub>2</sub> hotspots for 2015. The figures show that the EU standard for NO<sub>2</sub> may still be exceeded in the urban environment (Amsterdam and Rotterdam). By mid-2010, this will be limited to certain high-exposure locations or along very busy roads in the Randstad conurbation. By mid-2015, the scale of non-compliance with standards will have been reduced even further.

**Figure 1. Distribution of NO<sub>2</sub> concentration in 2001**



**Figure 2. Remaining NO<sub>2</sub> hotspots in 2015**



The letter sent to the Lower House in October 2003<sup>23</sup> on air quality hotspots gives the main locations at which standards will be exceeded close to housing. The hotspots concerned are as follows:

NO<sub>2</sub> hotspots at road section:

- A10 Westlandgracht; Overtoomseveld; De Kolenkit – Sloterdijk (Amsterdam)
- A20 Kleinpolder – Blijdorp – Bergpolder (Rotterdam)
- A13 Overschie – Kleinpolder (Rotterdam)
- A16 Het Lage Land – Prinsenland – 's-Gravenland (Rotterdam)
- A16 Viottakade – Zeehavenlaan – Wielwijk (Dordrecht)
- A12 Utrechtsebaan (Voorburg)
- A9 Badhoevedorp
- A12 Nieuw Hoograven (Utrecht)
- A2 Waardenburg

<sup>23</sup> Lower House, parliamentary year 2003-2004, 28 663, no.8

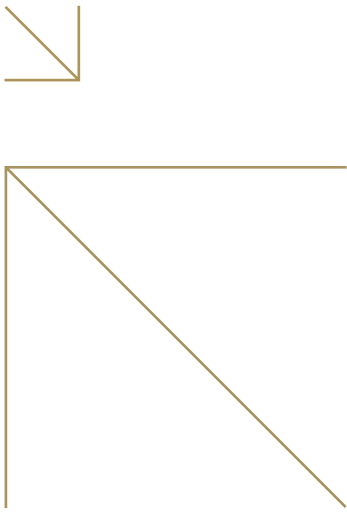


Figure 3 gives the trend in annual average NO<sub>2</sub> concentrations in the last 10 years. This figure shows an average annual decrease of 2% for the Netherlands as a whole. Increases such as in 1991, 1996 and 1997 are the result of unfavourable meteorological conditions. The top band in the figure gives the highest concentrations of NO<sub>2</sub> in 10% of the surface area of the Netherlands. The areas involved are mainly urban areas.

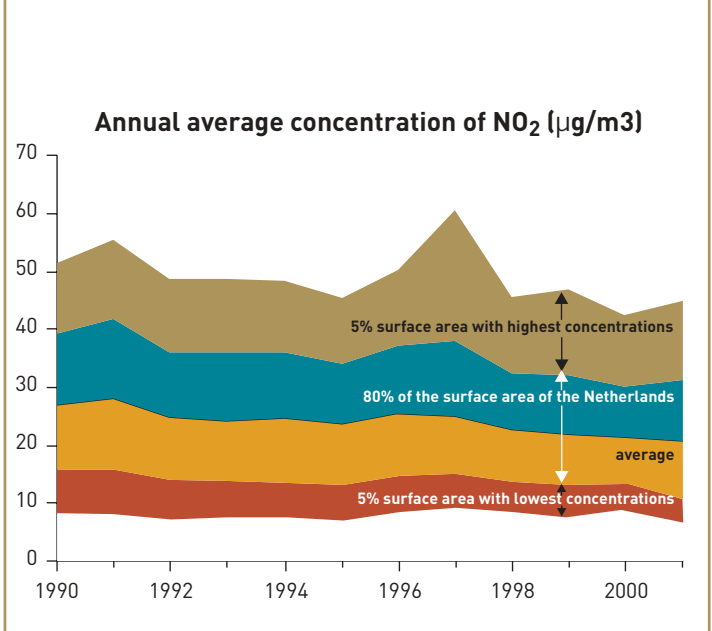
**Levels of particulate matter in the Netherlands**

Figures 4 and 5 show the geographical distribution of the daily and annual average background concentrations of particulate matter in 2001. The picture for particulate matter is comparable with that of NO<sub>2</sub>, with the important difference, however, that the daily average EU standard for particulate matter is exceeded in large areas of the country. This is not the case for the annual average level. The scale is comparable with that for NO<sub>2</sub>.

**Figure 4. Daily average background concentrations of particulate matter**



**Figure 3. Development of annual average concentrations of NO<sub>2</sub> in the Netherlands.**



**Figure 5. Annual average background concentrations of particulate matter**



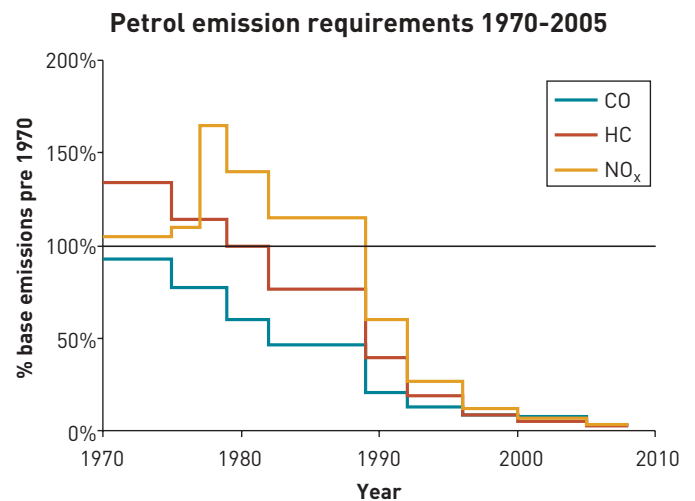
## Annex 2

# Development of emission standards and 'real world' emissions

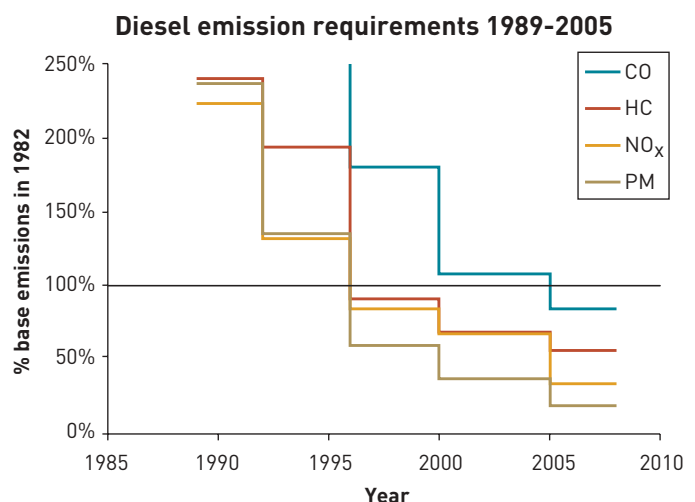
The tightening of emissions legislation has led to a dramatic reduction in air pollution emissions from road traffic over the last twenty years (see Figures 1 and 2). Following implementation of the Euro 4 requirements in 2005, the emission requirements for polluting substances for petrol-driven cars will be less than 5% of the level of emissions from petrol-driven cars in 1970 before the start of emissions legislation. This tightening of the requirements for petrol-driven cars (by a factor of 40) has been made possible chiefly by the use of the fully controlled three-way catalytic converter. After 2005, the requirements for particulate emissions and NO<sub>x</sub> emissions from diesel-driven cars will be approximately 20% and 35%, respectively, of the original emissions from diesel-driven cars before the start of legislation. The tightening of the requirements for diesel is less than that for petrol because in the case of diesel the original intention was only to tackle excessive polluters.

Considerably tougher standards are planned for diesel from about 2010. The phase 4 requirements for the engines of non-road mobile machinery that were agreed in the EU at the end of 2003 represent a milestone in this respect. Pursuant to these requirements, NO<sub>x</sub> emissions in 2013 may not exceed 0.4 gram per kilowatt-hour, and particulate emissions may not exceed 0.025 gram per kilowatt-hour. For heavy diesel engines, these requirements similarly represent a tightening by a factor of 40 relative to original emission levels. Such strict requirements make the use of advanced after-treatment systems for exhaust gases necessary for diesel engines. These include devices like SCR (selective catalytic reduction) catalytic converters for NO<sub>x</sub> control and soot filters to reduce particulate matter emissions. The phase 4 requirements for non-road mobile machinery are still subject to a technical review in 2007 by the European Commission. It is expected that similarly tough requirements will be agreed for diesel-driven cars and heavy goods vehicles also in the coming years. If this happens, the new requirements will be implemented for all new vehicles around 2012 or 2013. Similarly tough standards are also expected to be established for new inland shipping engines and diesel locomotives in the next few years. These tough new standards represent a reduction for diesel also to less than 5% of the requirements that applied when standards were first introduced. The introduction of advanced after-treatment systems for exhaust gases will represent a technology leap for diesel after 2010 similar to that experienced by petrol engines at the end of the nineteen eighties when fully controlled three-way catalytic converters were first introduced.

**Figure 1. Development of emission requirements for petrol engined cars (adjusted for changes in testing procedure and in the processes for sampling and analysis).**



**Figure 2. Development of emission requirements for diesel engined cars (adjusted for changes in testing procedure).**



## Annex 3

# Environmental performance of cars powered by petrol, diesel, LPG and natural gas

**Figure 1. Tank-to-wheel emissions from petrol, diesel, LPG (retrofit and OEM) and natural gas (OEM)**

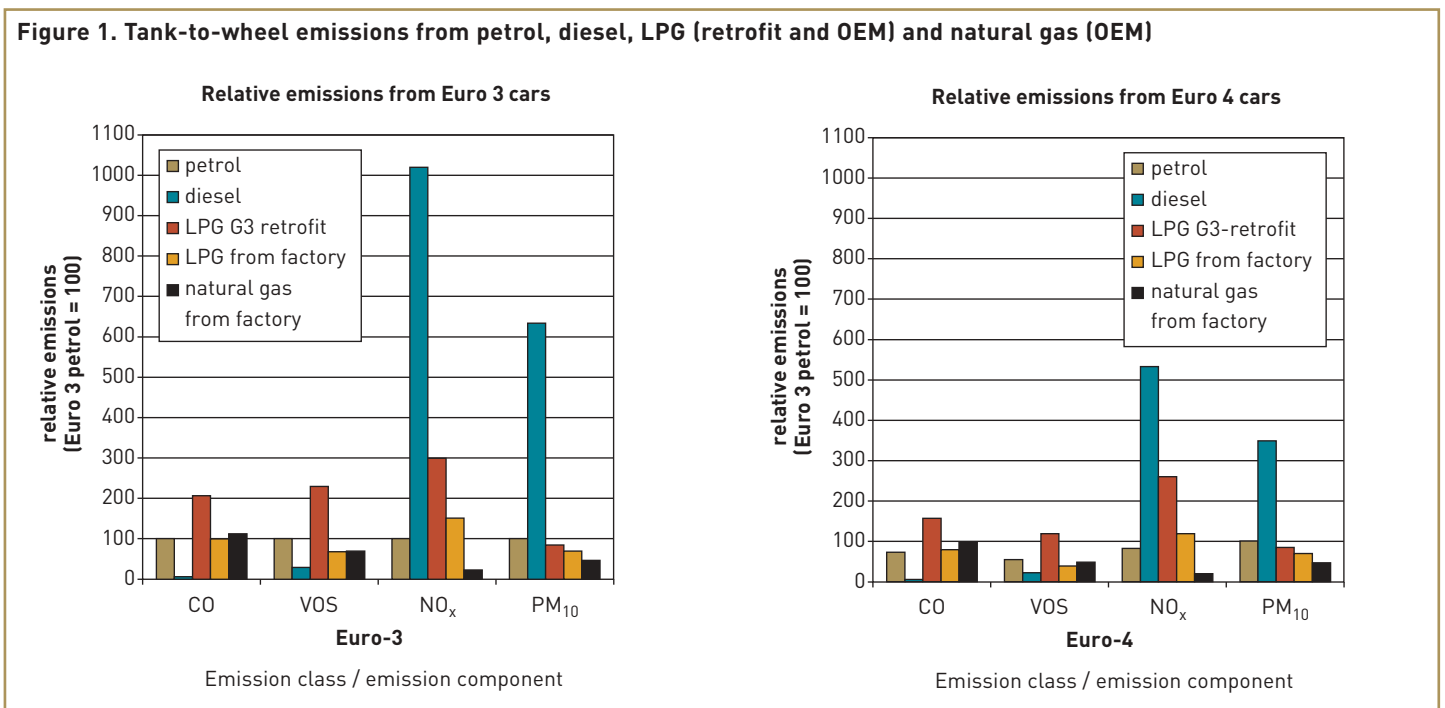


Figure 1 shows the average 'real world' air pollutant emissions from Euro 3 and Euro 4 cars powered by petrol, diesel, LPG (G3 retrofit unit and from factory unit) and natural gas with a from factory unit<sup>24</sup>. The emissions are relative to Euro 3 petrol-driven cars and include the effects of cold starts and the use of air-conditioning systems and other accessories.

The figure shows that modern diesel-driven cars are still far more polluting than modern petrol-driven cars. NO<sub>x</sub> emissions per kilometre from new Euro 3 diesel-driven cars today are ten times higher than those from Euro 3 petrol-driven cars, whilst particulate emissions per kilometre are six times higher. NO<sub>x</sub> emissions per kilometre from Euro 4 diesel-driven cars, which will be mandatory from 2005/2006, are expected to be seven times higher than those from petrol-driven cars, and particulate emissions per kilometre are expected to be three times higher<sup>25</sup>. Recent research further suggests that the proportion of NO<sub>2</sub> in the NO<sub>x</sub> emissions from modern cars is greater than from older vehicles. The effect is most pronounced in the case of diesel engines with an oxidation catalytic converter.

So the introduction of the Euro 4 standard in 2005/2006 will enable diesel to make up some of the gap on petrol. This is because many Euro 3 petrol-driven cars already meet the Euro 4 limit values, whereas the NO<sub>x</sub> and particulate emissions from Euro 3 diesel-driven cars are usually just below the Euro 3 limit values. Euro 4 diesel-driven cars are still 'dirtier' than Euro 4 petrol-driven cars, however. The difference in (absolute) environmental performance between diesel and petrol will not decrease to any significant degree until the introduction of a sufficiently tough Euro 5 standard, which is expected in 2010.

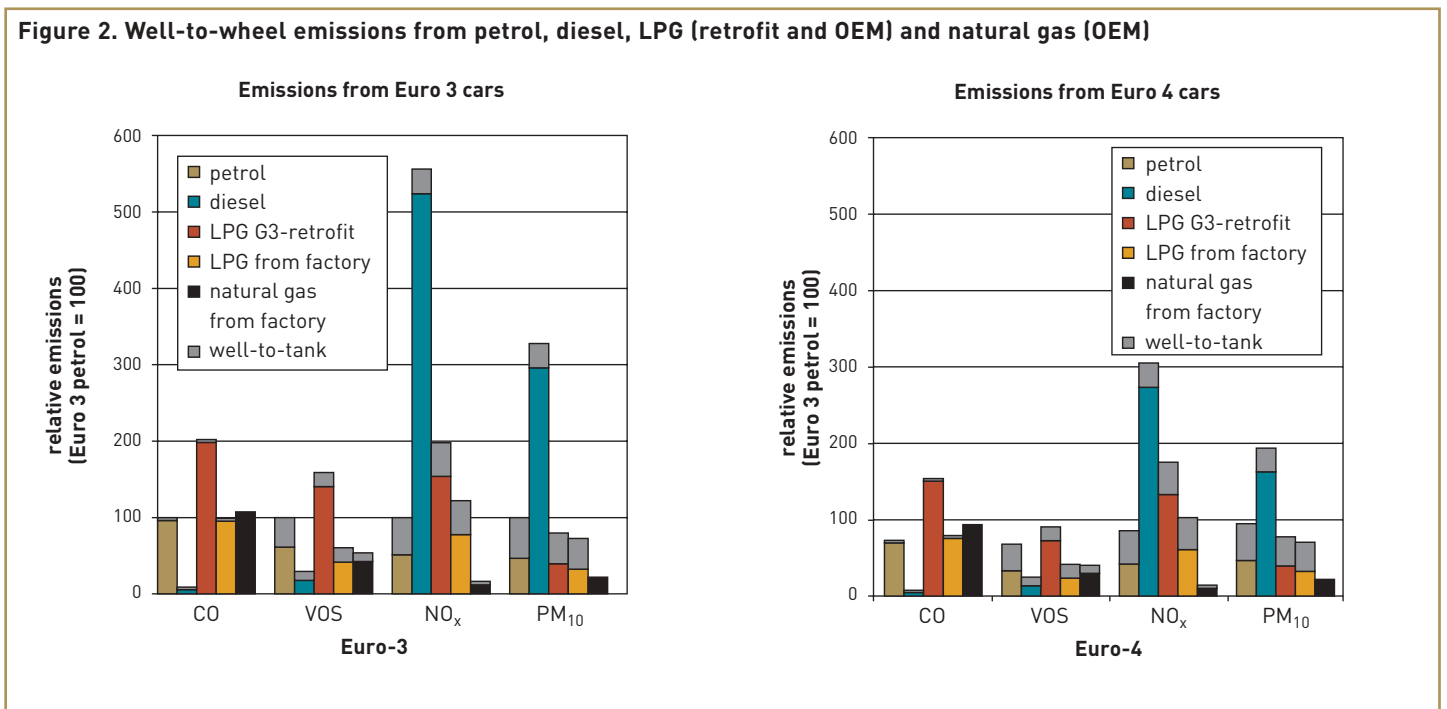
NO<sub>x</sub> emissions from Euro 3 cars retrofitted with an LPG-G3 unit are three times higher than those of Euro 3 petrol-driven cars and three times lower than those of Euro 3 diesel-driven cars. Based on the current (national) type approval tests for LPG units, the NO<sub>x</sub> emissions from Euro 4 cars retrofitted with an

<sup>24</sup> The emission values for vehicles powered by natural gas are subject to change since they are based on measurements from only 3 vehicles.

<sup>25</sup> The emissions estimate for Euro 4 petrol applies to conventional cars fitted with a three-way catalytic converter. As no measurement data are available, it is not yet possible to estimate the emissions from Euro 4 with direct injection petrol engines.



Figure 2. Well-to-wheel emissions from petrol, diesel, LPG (retrofit and OEM) and natural gas (OEM)



LPG-G3 unit are also three times higher than those of Euro 4 petrol-driven cars and two times lower than those of Euro 4 diesel-driven cars.

Air pollutant emissions from cars built to run on LPG are largely comparable with those of petrol-driven cars. Cars with a natural gas unit built in by the manufacturer return slightly better scores than petrol-driven cars. Finally, measurements<sup>26</sup> show that the environmental performance of cars converted to run on LPG can vary greatly. Some vehicles with a retrofit LPG unit perform similar to cars with a LPG unit built in by the manufacturer, whilst a significant portion produces emissions that are several factors higher than those of the original petrol-driven cars.

In Figure 2, the well-to-tank emissions that occur during the extraction, production and distribution of the fuel<sup>27</sup> have been added to the tank-to-wheel emissions from Figure 1. The overall picture of well-to-wheel emissions that arises does not differ fundamentally from the picture for tank-to-wheel emissions, however. Modern diesel-driven cars are more

polluting than modern petrol-driven cars; cars that have been retrofitted with an LPG-G3 unit fall somewhere between petrol and diesel. Cars with a from factory LPG unit are roughly as clean as petrol-driven cars, and cars with a from factory natural gas unit are slightly cleaner.

<sup>26</sup> H.C. van de Burgwal et al. (2003), In-use compliance programme, Overview of Automotive LPG vehicles 1999-2003, report no. 03.OR.VM.0371.1/HVDB.

<sup>27</sup> P. Hendriksen et al. (2003), Evaluation of the environmental impact of modern passenger cars on petrol, diesel, automotive LPG and CNG, report no. 03.OR.VM.055.1/PHE.

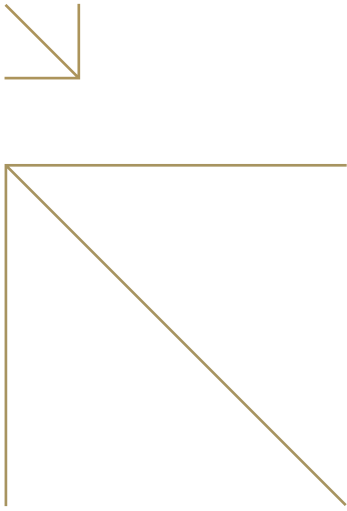
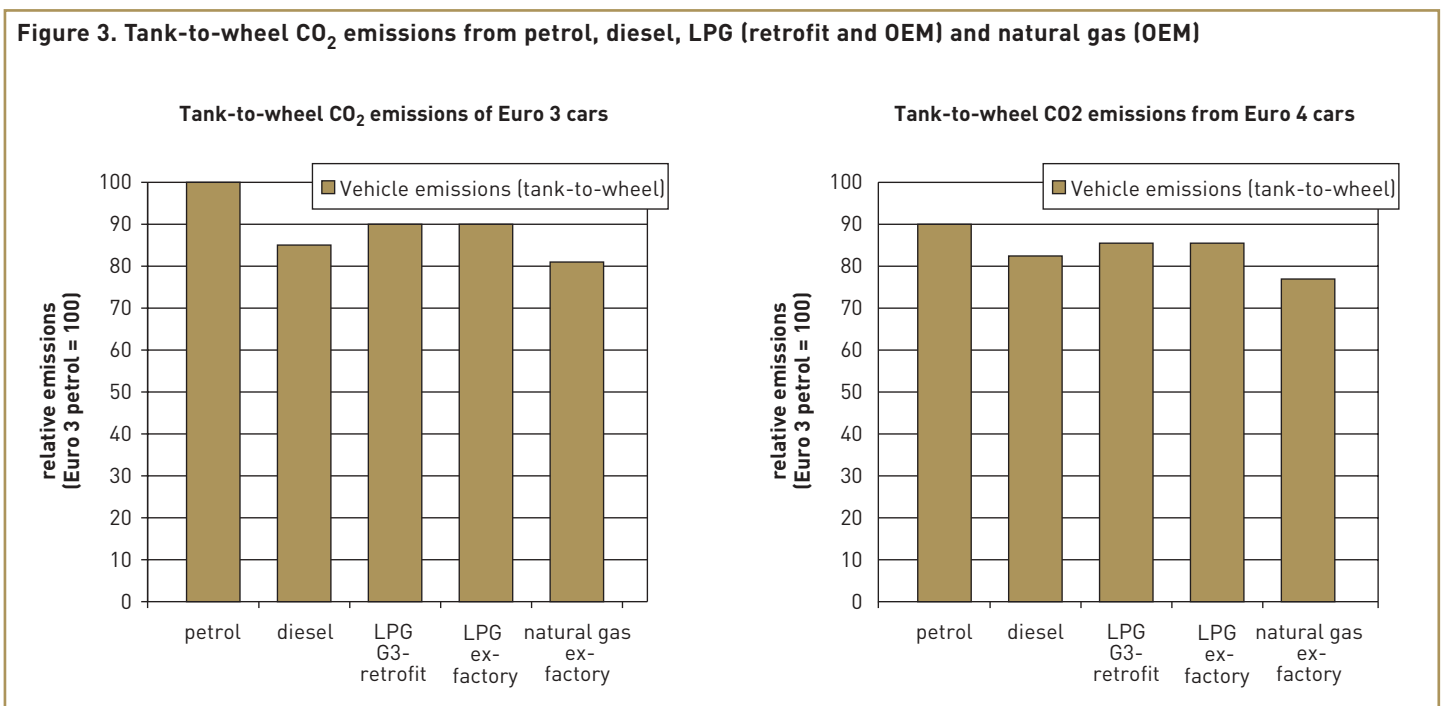


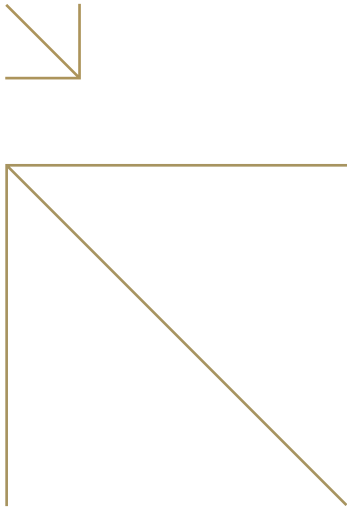
Figure 3 shows the average ‘real world’ CO<sub>2</sub> emissions from Euro 3 and Euro 4 cars powered by petrol, diesel, LPG (G3 retrofit unit and from factory unit) and natural gas with a from factory unit. The emissions are again relative to Euro 3 petrol-driven cars and include the effects of cold starts and the use of air-conditioning systems and other accessories.

traced back to the assumption that these fuels will not initially be used with direct injection engines.

The tank-to-wheel CO<sub>2</sub> emissions per kilometre from Euro 3 diesel-driven cars are 15% lower than from Euro 3 petrol-driven cars. For LPG this figure is 10%, and for natural gas 19%. Euro 4 petrol-driven cars are expected to be 10% more energy-efficient than Euro 3 petrol-driven cars, partly due to a limited improvement in the fuel consumption of conventional petrol engines and partly to the introduction of significantly more energy-efficient direct injection petrol injections. As a consequence, Euro 4 diesel-driven cars are expected to have 8% lower CO<sub>2</sub> emissions than Euro 4 petrol-driven cars. It is estimated that Euro 4 LPG cars will emit 5% less CO<sub>2</sub> than Euro 4 petrol-driven cars, and natural gas powered cars will emit approximately 15% less CO<sub>2</sub>. The lower CO<sub>2</sub> benefit from Euro 4 LPG and natural gas powered cars relative to petrol can be

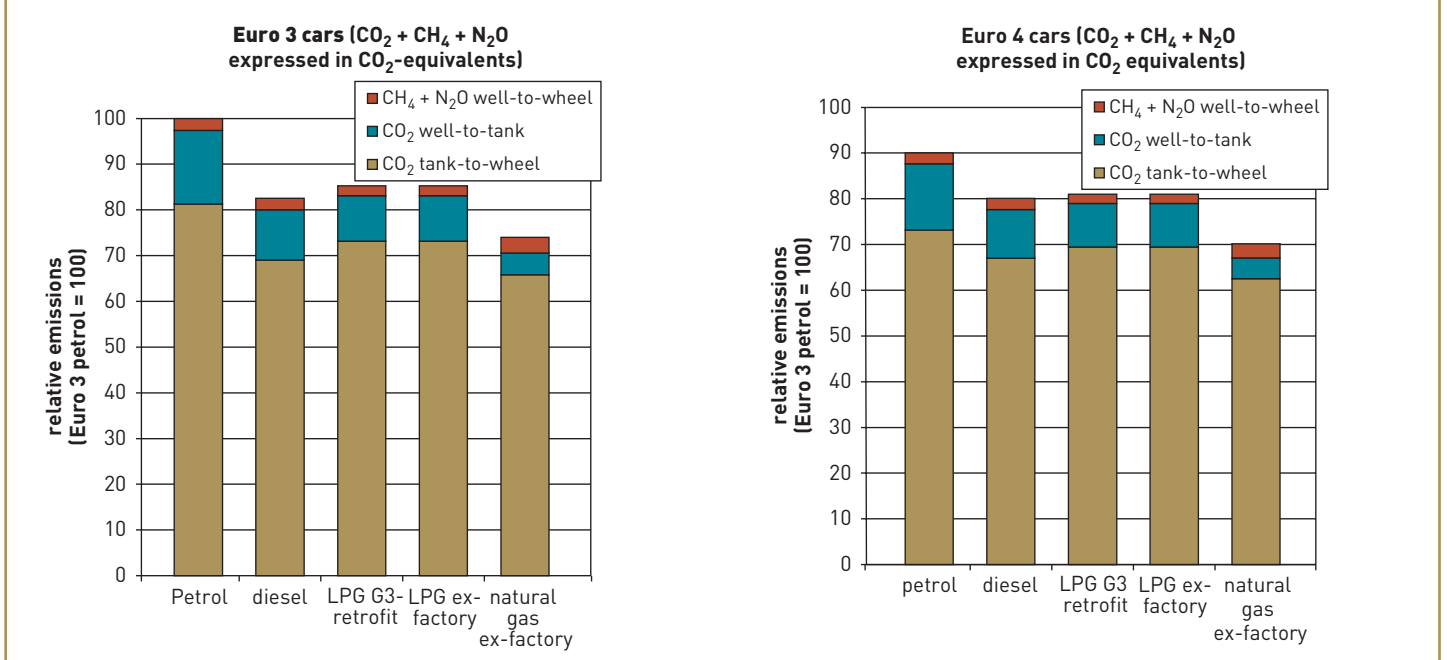
**Figure 3. Tank-to-wheel CO<sub>2</sub> emissions from petrol, diesel, LPG (retrofit and OEM) and natural gas (OEM)**





In Figure 4, the well-to-tank emissions, and also the emissions of the greenhouse gases  $N_2O$  and  $CH_4$ , have again been added to the tank-to-wheel  $CO_2$  emissions from Figure 3. The well-to-tank emissions of the diesel and LPG energy chains are lower than those of petrol so that the benefits of these fuels on a well-to-wheel basis are greater than if one only considers direct  $CO_2$  exhaust emissions. Despite the slightly higher methane emissions, the well-to-tank emissions from natural gas are less than those from the other fuels, so strengthening the advantage of natural gas on a well-to-wheel basis.

**Figure 4. Well-to-wheel greenhouse gas emissions from petrol, diesel, LPG (retrofit and OEM) and natural gas (OEM)**



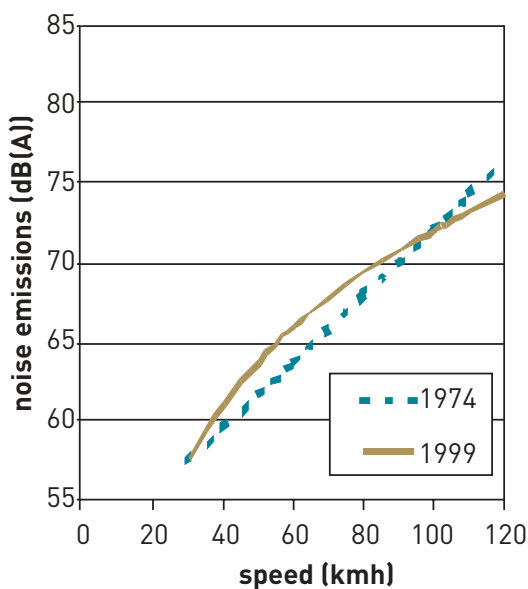
## Annex 4

# Development of noise output from vehicles

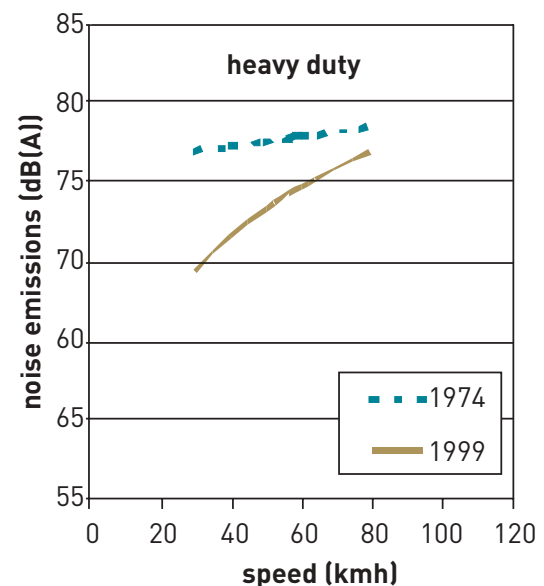
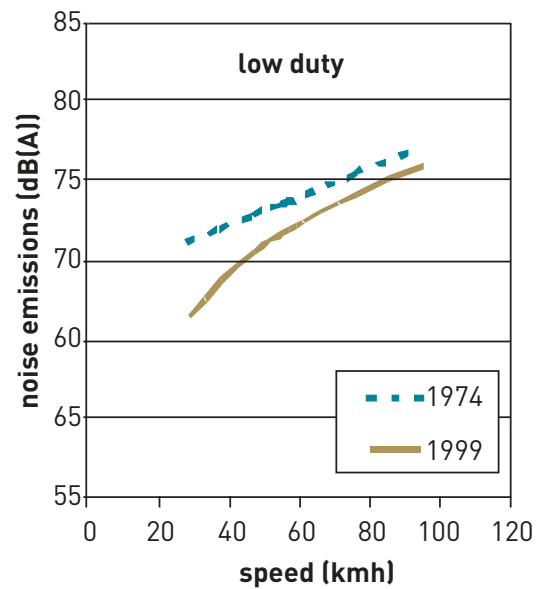
Figures 1 and 2 show how the actual noise output from passenger cars and heavy goods vehicles developed from 1974 to 1999. In the case of cars, noise emissions at low speeds have increased, whilst at high speeds they have decreased slightly. In the case of heavy goods vehicles, the sector itself has taken steps to reduce noise emission levels.

The figure shows that it has still not been possible to develop an effective noise source policy in the EU. The reason for this is that the object of the noise requirements is not to reduce noise levels but to harmonise production requirements and facilitate the free movement of goods. Decisions are taken in administrative committees in which the automotive industry is also represented.

**Figure 1. Development of actual noise output from cars between 1974 and 1999**



**Figure 2. Development of actual noise output from heavy goods vehicles between 1974 and 1999**



# Annex 5

## Cycle bypassing in relation to truck and bus engines

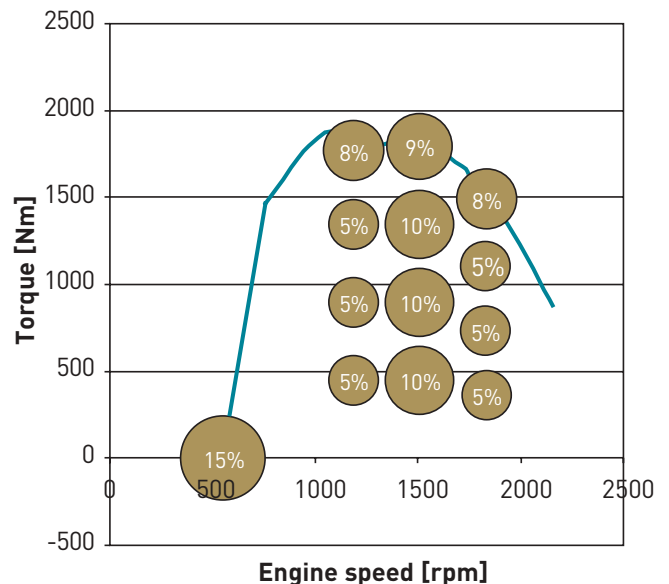
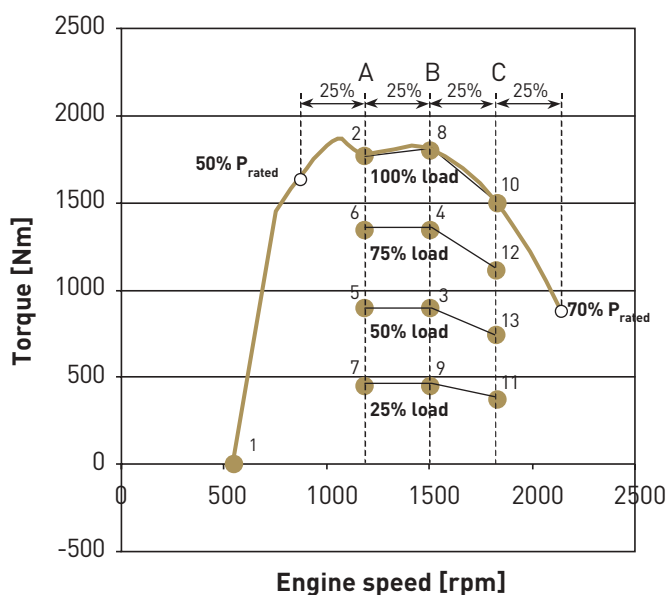
Recent research indicates that emissions from heavy goods vehicles are not, in practice, decreasing at the same rate as standards prescribe (see table 1). This is due to the fact that the testing method which is used for the EU type examination test of heavy goods vehicle engines fails to reflect 'real world' operating conditions sufficiently. This is aggravated by the practice of cycle bypassing which manufacturers use to ensure their engines meet emission standards.

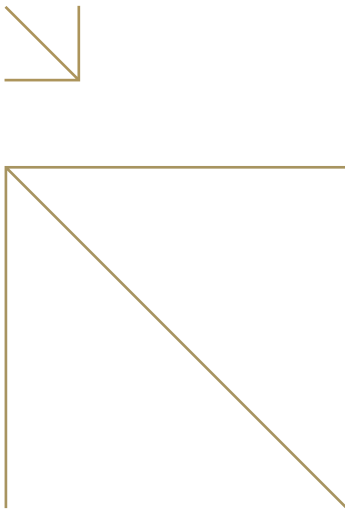
Cycle bypassing refers to the practice of manufacturers of deliberately altering the characteristics of diesel engines in order to increase the size of the area in the characteristic curve of the engine where no emissions are measured during testing. In this area the engine is optimized for fuel consumption and driveability, and not for emissions. This is accompanied by increased NO<sub>x</sub> emissions relative to the values measured in the part of the characteristic curve that is assessed in the type examination test. The engine is, nevertheless, tuned so that the emission requirements would be met under standard test conditions. So the engines meet the test requirements. This practice is made possible by the increasing use of electronics for engine management systems.

**Table 1. NO<sub>x</sub> limit value during type examination test versus 'real world' NO<sub>x</sub> emissions.**

	NO <sub>x</sub> limit value (g/kWh)	'real world' NO <sub>x</sub> emissions (g/kWh)
Euro 1	8	7,8
Euro 2	7,2	8,9
Euro 3	5	7,2

**Figure 1. Test modes and weighting factors for the ESC 13-mode test**





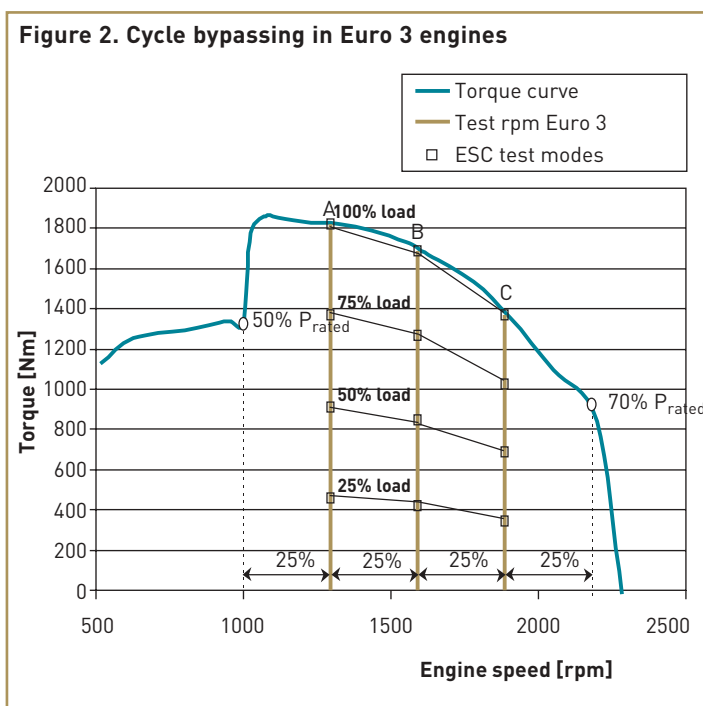
The practice of cycle bypassing is explained below. When the Euro 3 legislation for trucks and buses was introduced in 2000/2001, a new test cycle was implemented – the ESC 13-mode test cycle (European Steady state Cycle). A novelty of this cycle was the introduction of an extra test rpm and the addition of an extra control area, i.e. an area of test modes within which an emission may not deviate by more than 10% from the linearly-interpolated results from the neighbouring test modes. With regard to the previous test cycle, this restricts the possibilities for cycle bypassing and avoids an explicitly ‘dented’ characteristic curve, although only within the cycle control area.

In the new test cycle, the position of the test rpm is dependent on the line described by the power curve. Two reference rpms are determined: where the engine first delivers 50% of its maximum power ( $P_{rated}$ ), and where the engine last delivers 70% of its maximum power. In this intermediate area, three rpms are defined at equal distances. This latter definition enables a manufacturer to move along and/or reduce the size of the control area by altering the torque curve. The latter

action is often undertaken with Euro 3 engines. The ‘dent’ that occurs has the effect of moving the control area to the right and making it slightly smaller. As a consequence, more ‘space’ is created under the ‘A’ rpm for optimizing fuel consumption during normal use at the expense of  $NO_x$  emissions.

the A, B and C test rpms to move along. The space between approximately 1000 and 1300 rpm is in this case very useful for normal driving conditions since a lot of torque is available. Due to a lower torque, the area between approximately 500 and 1000 rpm offers slightly less driveability but is, of course, also useful. As this whole area falls outside the control area, the engine does not have to meet emission requirements here. This is a typical example of cycle bypassing: the engine meets the legal requirements precisely, but by altering the engine characteristics, the manufacturer ensures that, in practice, the engine load occurs outside the test or control area.

As vehicles are being manufactured with increasingly high rates of power and torque, it should be possible to choose a transmission ratio of the (automatic) gearbox and rear axle reduction such that the engine operates optimally at low rpm, which is good for fuel consumption. If this duty point is located before the ‘A’ rpm, i.e. outside the control area, fuel consumption can be optimized further at the expense of  $NO_x$  emissions. From this point of view, it is attractive for manufacturers to maximise the space under this ‘A’ rpm by describing another torque curve.



## Annex 6

# Reserve package for the NEC Directive

In the event of setbacks in the coming years, reserve measures will be taken. These are measures that should be ready in time for the evaluation of the NEC Directive in 2006 and which will be assessed in the coming years. Within the context of this policy document, no decisions will be taken in respect of these measures. The measures which will be studied are explained below.

### **NO<sub>x</sub>: A subsidy for early scrapping of old petrol-driven cars not fitted with a catalytic converter and of old diesel-driven cars**

By making a scrapping premium available, it is possible to remove old cars from our roads sooner rather than later. One example is a premium for scrapping petrol-driven cars not fitted with a fully controlled three-way catalytic converter and old diesel-driven cars.

### **NO<sub>x</sub>: Extending the subsidy scheme for cleaner inland shipping engines**

If the subsidy scheme for cleaner inland shipping engines proves successful, it might be possible to increase the budget available to allow more vessels to be converted. Supporting policy can also be implemented in order to improve the effectiveness of the subsidy scheme.

### **NO<sub>x</sub>: Differential kilometre charge for heavy goods vehicles**

This reserve measure relates to the introduction of a differential kilometre charge for heavy goods vehicles. Germany will shortly introduce a per kilometre charge for heavy duty trucks on its motorways. The charge in Germany will be on average € 0.124 per kilometre, depending on emissions of acidifying substances (Euroklasse). This level of charge for heavy duty trucks and a charge of € 0.08 for light trucks would lead to a 2 to 4 kiloton reduction in NO<sub>x</sub> emissions in the Netherlands. This effect is achieved partly through the use of more efficient planning systems, the larger volume cargoes of each vehicle movement, the use of large vehicles, etc. An additional effect is that the differential kilometre charge on the basis of a vehicle's Euroklasse stimulates the use of cleaner

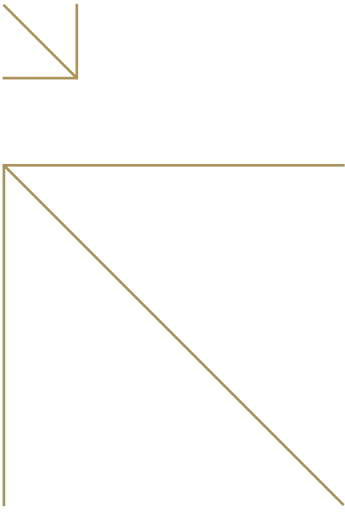
heavy goods vehicles. The possibility of introducing a per kilometre charge is being examined within the context of the Interdepartmental Policy Study into usage fees for goods transport.

### **NO<sub>x</sub>: A subsidy for using diesel/water emulsion fuel**

Using diesel/water emulsion fuel for public transport buses would reduce particulate matter emissions locally by several percentage points. General application of this fuel for public transport buses can also reduce national NO<sub>x</sub> emissions by several dozen kiloton. The advantage of this measure is that it can be implemented within a relatively short period of time. The disadvantage is that the effect of the measure disappears almost as soon as the financial incentive to use diesel/water emulsion fuels is removed. This makes this a typical example of a measure that can be implemented quickly to plug a policy gap. If the 2006 evaluation of the NEC Directive reveals that extra measures are needed to bring down NO<sub>x</sub> emissions in 2010, the possibility of introducing a subsidy for diesel/water emulsion fuel can be considered.

### **SO<sub>2</sub>: lowering the sulphur content of red diesel**

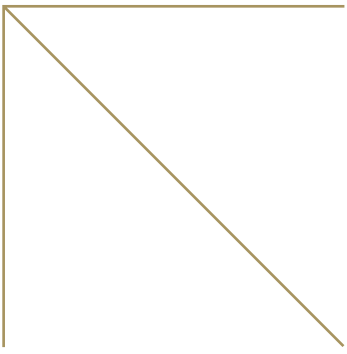
Tightening the sulphur content requirements for red diesel can be considered as a reserve measure with regard to SO<sub>2</sub>. The sulphur content of red diesel for non-road mobile machinery and tractors (off road diesel) may not exceed 2000 mg/kg (milligram per kilogram). This is significantly higher than the 50 mg/kg for fuels currently used by road vehicles. The EU fuel sulphur content directive prescribes a reduction to 1000 mg/kg from 1 January 2008. In connection with the phase 4 emission requirements for non-road mobile machinery, the European Commission has offered the prospect of a further reduction in the sulphur content of off road diesel. If a more stringent standard is not implemented before 2010, consideration might be given to bringing forward this requirement by several years. The directive explicitly gives member states the option to adopt more stringent national requirements.

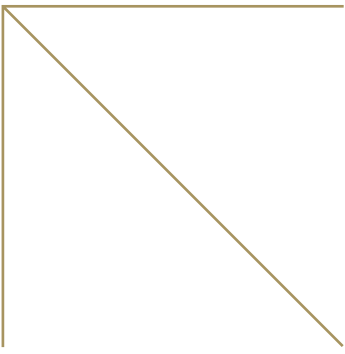


**NMVO: introduction of a periodic motor vehicle test for scooters, and stricter enforcement**

Souping up scooters and mopeds has become a common practice. If it becomes evident in 2006 that there is a policy gap in respect of VOCs, consideration can be given to introducing a periodic motor vehicle test scheme for scooters. The proposed vehicle registration requirement for scooters would make this possible. A further option is to ensure stricter police enforcement of rules relating to the souping up of scooters and mopeds. The effect of a periodic motor vehicle test for scooters and stricter enforcement is estimated to be a 1 kiloton reduction in VOCs. The costs of both moves have not yet been examined.











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