

Environmental Balance 2005

Summary

Netherlands Environmental Assessment Agency

with

Transport Research Centre (AVV)

Statistics Netherlands (CBS)

Netherlands Bureau for Economic Policy Analysis (CPB)

Netherlands Energy Research Foundation (ECN)

Association of the Provinces of the Netherlands (IPO)

Royal Dutch Meteorological Institute (KMNI)

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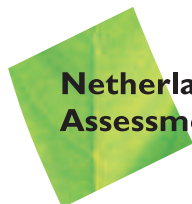
National Aviation and Space Exploration Laboratory (NLR)

National Institute for Coastal and Marine Management (RIKZ)

National Institute for Inland Water Management
and Wastewater Treatment (RIZA)

Netherlands Institute for Spatial Research (RPB)

Wageningen University and Research Centre (WUR)



**Netherlands Environmental
Assessment Agency**

Foreword

Every year the Netherlands Environmental Assessment Agency (MNP) publishes an Environmental Balance according to the Environmental Management Act. The Environmental Balance describes the state of the environment in the Netherlands, the effects of past policy, and further bottlenecks and policy dilemmas. The 2005 Environmental Balance was prepared for use in the Dutch parliament during the debate on accountability with respect to current environmental policy in May 2005. The conclusions drawn in the Environmental Balance will also be put into monetary terms for use during the presentation of the budget at the opening of parliament in September 2005.

This summary provides an overview of the Environmental Balance 2005, which is available in Dutch only. It has been prepared to reflect the selected features described in each chapter of the Environmental Balance. Chapter 1 starts off with a presentation of environmental costs, both public and societal, and the linkages between economic trends and emissions. Further chapters describe the state of the environment, policy trends and policy achievements in climate change (Chapter 2), environmental quality in rural areas (Chapter 3) and air quality & urban living environment (Chapter 4). The final chapter (Chapter 5) deals with trends in environmental policy over the last 15 years and the forms in which additional measures were incorporated into Dutch policy to meet the European Union targets. Just as in the report, this summary too devotes attention to the comparison of Dutch trends with those in the other European member states. Appendices (not included in the summary) provide the figures underpinning the analyses in the Environmental Balance and present new emission figures and figures for environmental costs. Methods for communicating uncertainty data are also available in the appendices.

The Environmental Balance is available both in book form (in Dutch only) and via the MNP website (www.mnp.nl). The English-language summary is also available via the MNP website (www.mnp.nl). Detailed statistical data used in the analyses have been included in the Environmental Compendium, a joint document of the MNP and Statistics Netherlands available via www.environmentaldata.nl. Specifically, the Environmental Compendium incorporates current, detailed figures on emissions and describes a large number of environmental indicators.

The Environmental Balance was compiled in collaboration with a number of other research institutes and policy assessment offices. These are listed on the title page of the Environmental Balance. Data have also been made available by the Emissions Registration – a broad coalition of organisations under the auspices of the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment (VROM) and SenterNovem, the TAFTIE (Association for Technology Implementation in Europe) member organisation in the Netherlands.

Professor N.D. van Egmond

A handwritten signature in black ink, appearing to read 'N.D. van Egmond', written over a horizontal line.

Director of the Netherlands Environmental Assessment Agency

Summary

Environmental quality is gradually improving, but additional Dutch policy is needed to meet EU requirements

European policies are leading to considerable emission reductions, but in the Netherlands this is not enough to meet the environmental quality standards set by the European Union (EU). Compared to other EU member states, emissions per square kilometre are higher because the Netherlands is more densely built-up and populated. Moreover, a relatively large proportion of air pollutants originate from surrounding countries. To meet the statutory quality standards, therefore, the Netherlands must implement additional measures. But if a policy of maintaining a level playing field for industries (fair competition) is strictly pursued, this can run counter to the EU's ambition of equal protection for its citizens against poor environmental quality.

The additional measures taken in the Netherlands frequently represent spatial solutions that keep pollution sources away from population centres and nature conservation areas. This avoids the need to introduce national emission standards that go beyond present European policies, thus protecting the competitive position of companies in the Netherlands. But spatial solutions are not always effective, particularly when background levels are high and where population concentrations and natural habitats are fragmented. Some new spatial developments have been delayed by private citizens insisting on the statutory quality standards.

These are the key messages of the Environmental Balance 2005. The rest of this summary reviews both Dutch performance in meeting EU targets for climate change, ammonia and manure, air quality and the urban environment, and the influence of policy. The general trends in policy are also summarised.

Table 1 Trends in emissions, environmental quality, achievement of policy targets for 2010 and expenditure on the environment (in millions of euros per year, 2004 prices).

Theme	Trend 1985-2004	Target achievement ²⁾	Environmental cost to society ¹⁾ 2004	Average annual national budget (2005-2009)
Climate: domestic targets				
Climate: Kyoto commitment	-	EU	1130	924
Energy efficiency				
Renewable energy				
Renewable electricity				
Emissions NO ₂ , SO ₂		EU	1769	34
Emissions VOC, NH ₃		EU		
Emissions of particulate matter				
Depositions N / acid on nature				
Air quality: ozone		EU		
Air quality: particulate matter, NO ₂		EU	2602	102
Nutrient loss agriculture		EU		
Nitrate in groundwater		EU		
Use of animal manure		EU		
Phosphate-saturated soils				
Pesticides				
Surface water quality				
Organic farming			Not known	9
Fall in water table			Not known	Not known
Noise			505	481
External safety ³⁾			Not known	Not known
Soil remediation			614	278
Waste management			3577	24

1) Including central government costs.

2) EU = European obligations.

3) Assessment based on group risk and case studies.

Explanation of colours:

Column 2: green indicates reduction in environmental pressure, improvement in environmental quality; yellow indicates little or no change; red indicates an increase in environmental pressure & lowering of environmental quality.

Column 3: green indicates that targets will probably be achieved under currently adopted policies; yellow indicates a chance of achieving targets of about 50% or indeterminable; red indicates that targets will probably not be achieved under currently adopted policies.

General trends

Most emissions are falling, but many environmental targets are not being met

Under current policies emissions are decreasing too slowly. Although pressure on the environment is falling or stabilising, and environmental quality is improving, many environmental targets are not being met on time (*Table 1*). The chances of meeting many European emission targets (emission ceilings) for 2010 are about 50%. Under currently adopted policies it is expected that European quality standards will most likely not be achieved.

Eco-efficiency in the Netherlands improving

Technological improvements are raising eco-efficiency: the relationship between the profitability of a sector and its emissions is becoming increasingly favourable. Improving eco-efficiency is necessary, but not sufficient for reducing total emissions. In virtually all sectors eco-efficiency for acidifying compounds has improved so much since 1990 that emissions are decreasing despite economic growth (*Figure 1*). Dutch eco-efficiencies for SO₂ and NO₂ are among the best in Europe. In contrast, Dutch CO₂ eco-efficiency is not so good: the Dutch economy consumes more energy than the European average consumption. Emissions of all pollutants except CO₂ are currently decreasing, while the economy is growing. The total cost of reducing pressure on the environment has more than doubled since 1990, and environmental costs account for 3% of the Dutch gross domestic product (GDP), almost twice as high as the average for the EU-15.

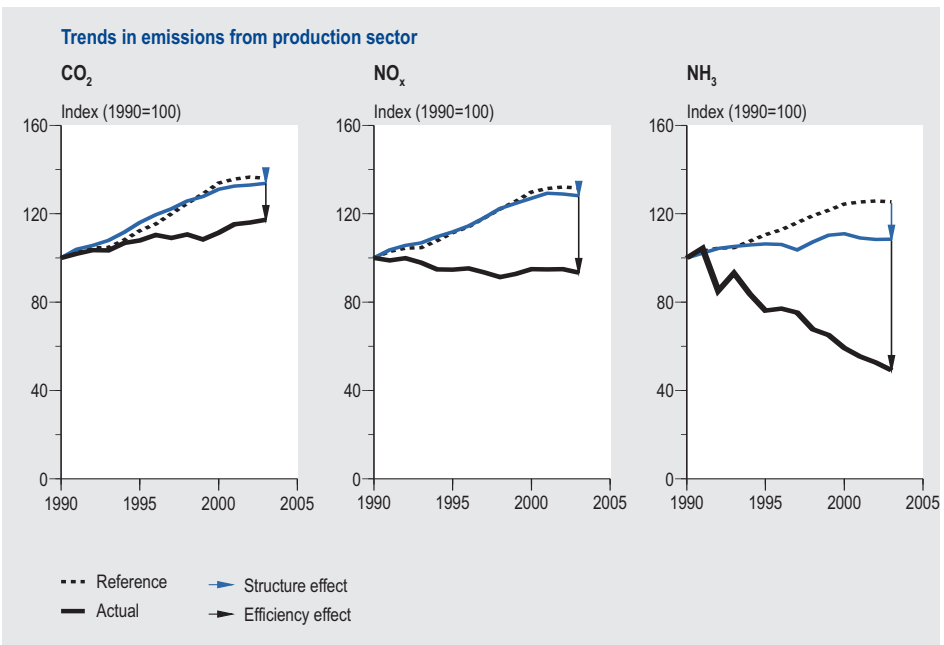


Figure 1 Emission trends explained by economic growth, changes in sector structure and changes in environmental intensity of the economy.

Climate change

Warming likely largely due to human activity

The warming of the climate since 1950 cannot be explained by natural warming from solar energy and volcanoes alone: the influence of human activity has to be taken into account. Global climate change is noticeable in the Netherlands. The average annual temperature is rising and the chances of the traditional *Elfstedentocht* (long-distance ice-skating) event taking place are falling (*Figure 2*). The low elevation of the Netherlands makes it vulnerable to rising sea levels and extreme weather conditions.

Maximum 2°C global increase demands severe greenhouse gas reductions: Kyoto target as modest step

The European Union wants to keep the rise in global temperature to within 2°C above the pre-industrial level up to 2100. New insights suggest that to be more than 50% certain of meeting this target, greenhouse gas emissions will have to fall 30-50% between 1990 and 2050, a reduction of 40-60% from current emission levels. The industrialised countries participating in the Kyoto Protocol have pledged to reduce their greenhouse gas emissions by 5% from the 1990 level between 2008 and 2012. Kyoto, therefore, represents a modest step towards meeting the challenge, but will create an administrative infrastructure for taking further steps.

The Netherlands meets the Kyoto target by acquiring foreign emission reductions

By purchasing foreign emission reductions, the Netherlands has a 50% chance of achieving the Kyoto commitment if domestic emissions remain roughly stable (*Figure 3*). Stabilisation of domestic emissions depends on the prolongation of the available

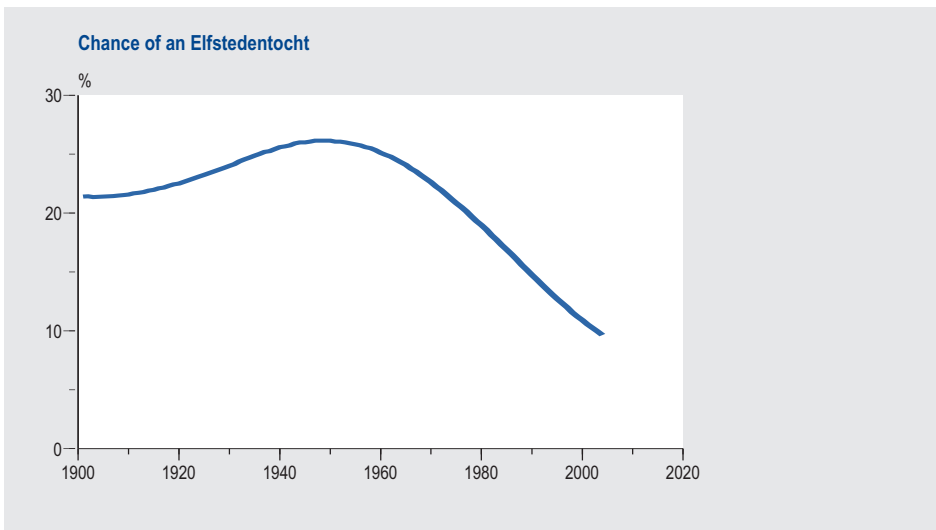


Figure 2 Chances of an *Elfstedentocht* (ice-skating event) taking place.

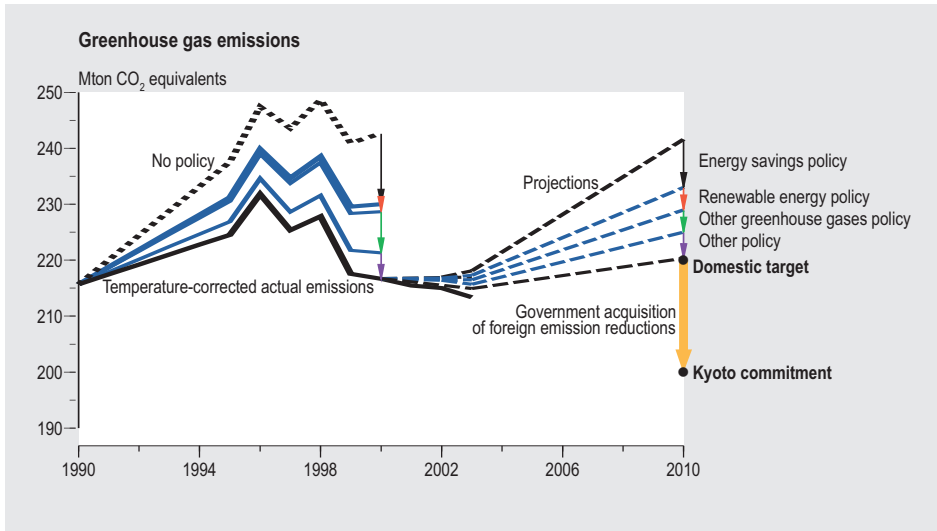


Figure 3 The effects of Dutch national policies and foreign emission reductions on achieving the Kyoto commitment.

renewable energy subsidies and on industrial CO₂ emission ceilings remaining at present levels beyond 2007.

The Netherlands has agreed to a 6% reduction in greenhouse gas emissions compared to 1990 levels in 2008-2012. This is equivalent to an annual emission ceiling of 200 Mton in the period of 2008-2012. Domestic greenhouse gas emissions in the Netherlands in 2010 are projected to be 220±10 Mton. Compared with other EU member states, the Netherlands has been quick to adopt many measures in other countries, purchasing emission reductions via the Kyoto Mechanisms (5 × 20 Mton for 2008-2012). The contracts and financial arrangements for these purchases are almost all complete, but the proposed projects must be formally approved before they can start up. The industrial sector is not expected to exceed its CO₂ emission ceiling and will therefore not buy extra foreign reductions through the European emissions trading system.

Dutch policies for energy (energy savings, renewable energy targets) and for other greenhouse gases are helping to only slightly increase greenhouse gas emissions. The Netherlands will not reach its target of 1.3% energy savings every year (the actual figure is just 1%). Neither will the target for renewable energy (5% in 2010) be achieved; in 2010 renewables will account for about 3.5% of the energy use. The target for renewable electricity, though, will be met.

A broad range of policies must adapt to climate change

Climate change will affect the future of the Netherlands mainly through its water system. Even if temperature rise is limited to 2°C, the Netherlands will still have to adapt

to climate change. The changes in water policy have been translated into plans and several projects are already being implemented. In other policy areas, such as land use planning, agriculture and nature conservation, the first steps still have to be taken.

Manure and ammonia

A fifty-fifty chance of meeting the National Emission Ceiling for ammonia

Since 1990 ammonia emissions have fallen from 250 kton to about 130 kton, slightly above the National Emission Ceiling (NEC Directive). Ammonia emissions are projected to be 104 to 145 kton in 2010, which means a fifty-fifty chance of meeting the National Emission Ceiling. However, new insights may alter the picture: a recent field study indicates that working manure into the soil results in lower reductions in ammonia emissions than previously assumed. If this study proves representative, meeting the NEC target in 2010 looks even less likely.

Despite the reduction in ammonia emissions, many nature conservation areas are still subject to high levels of nitrogen deposition and only 15-25% of the total conservation area is adequately protected. Streams, dry heath, wet heath and nutrient-poor heath and grassland are least protected against high nitrogen deposition. Area-based policies (ammonia zoning and relocation of livestock farms) currently contribute little to improving environmental quality in conservation areas because the background concentration is too high. Moreover, the fragmented nature pattern makes the area to be covered too large for an effective area-based policy.

Manure and fertiliser use standards for 2009 adequate for reports on meeting nitrate target after 2009

The use standards for 2009 will presumably result in a nitrogen surplus low enough to meet the 50 mg/l target for nitrate in groundwater. Time-lag effects mean that measurements confirming the target can probably only be reported after 2009. At the moment the Netherlands reports concentrations in the top metre of groundwater to the EU, whereas the draft monitoring directive permits deeper sampling up to five metres below the water table. If samples are taken at these greater depths, the chances of meeting the target for nitrate in groundwater in 2009 are greater. However, targets to be drawn up under the Water Framework Directive could impose further restrictions on the application of nitrogen.

In comparison with other countries, Dutch phosphate and nitrogen surpluses fell sharply between 1998 and 2002 (*Figure 4*), in part due to the Dutch system of minerals accounting. This trend came to an end in 2003, and it is expected that the surpluses will not fall any further in the period of 2004-2006. The use standards to be introduced in 2006 will present the agricultural sector with a considerable challenge in meeting the nitrate target. The regions with sandy soils may face particular problems in meeting the limit for nitrate in groundwater of 50 mg/l (Nitrate Directive): in these

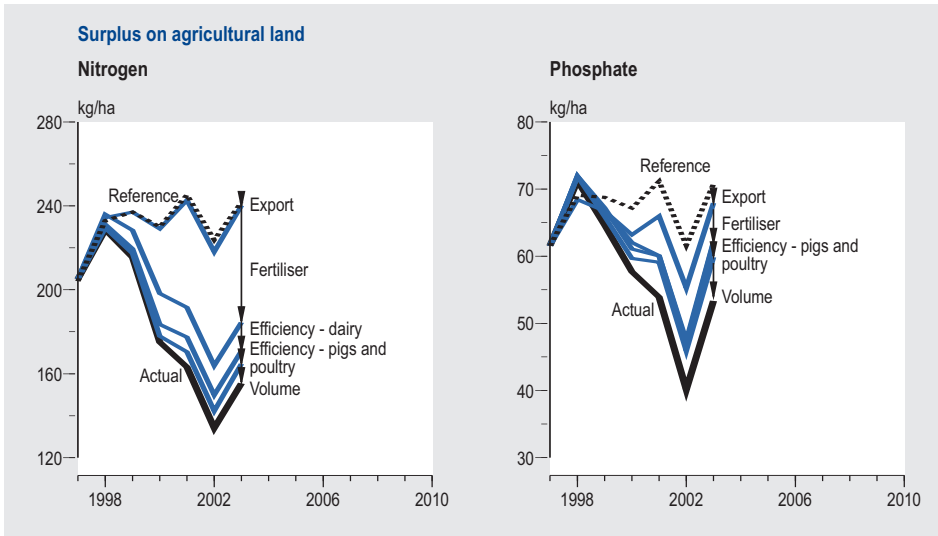


Figure 4 Nitrogen and phosphate surpluses on agricultural land.

regions the average nitrate concentration in groundwater in 2002 was about 90 mg/l (Figure 5).

The transition to the use standard system will mean a considerable tightening of the phosphate limits. Unless manure processing, transfer and exports rise, manure production will have to fall 20% from current levels by 2015.

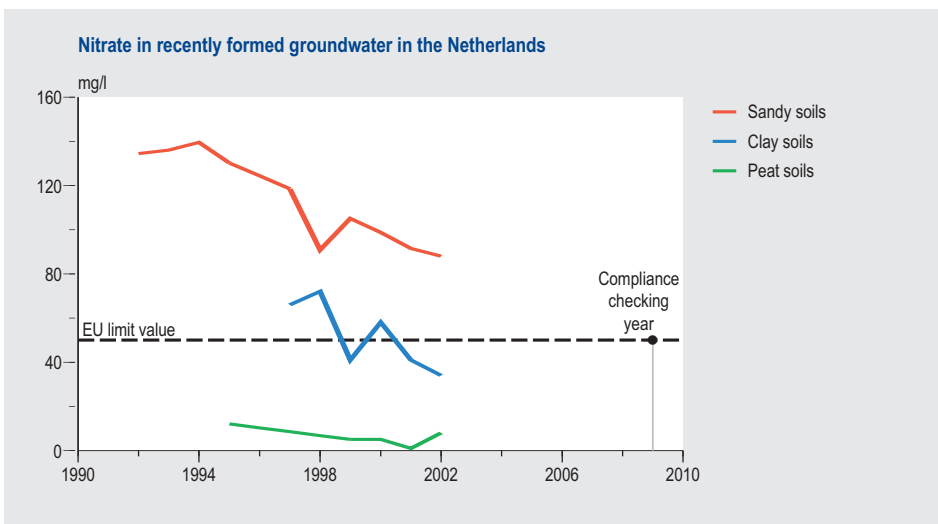


Figure 5 Average nitrate concentrations in recently formed groundwater per soil region.

Air quality

Particulate matter considerably above European limits; NO₂ slightly too high

Concentrations of particulate matter in the air exceed European air quality standards to a considerable extent across wide areas of the Netherlands. Average annual concentrations of nitrogen dioxide near roads in and around the cities are still slightly above the air quality standards. Urban air quality in the Netherlands, measured by nitrogen dioxide concentrations, is comparable with other European cities, but regional background concentrations in the Benelux and the German Ruhr region are relatively high (Figure 6). The air quality limits for particulate matter will still be exceeded on a large scale in 2010.

Dutch implementation of European Air Quality Directive relatively strict

The Dutch Air Quality Decree represents a strict implementation of the European Air Quality Directive, particularly because of its integration with the spatial planning legislation. In the past two years the Council of State delayed or nullified dozens of plans by virtue of the Air Quality Decree. These judgements clearly show that the impacts of site development plans, land use plans and road alignments should be carefully assessed against the provisions of the Air Quality Decree. This stands in contrast to the

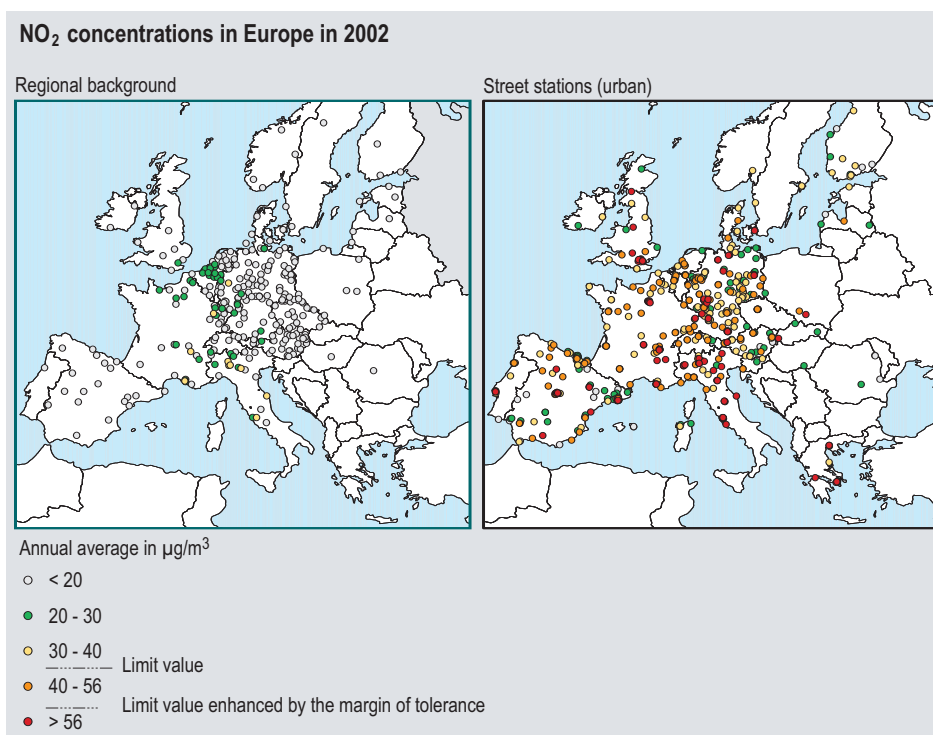


Figure 6 NO₂ concentrations in Europe: regional background concentrations and concentrations in urban areas.

global evaluation of the effects of development proposals and plans on local air quality that the public and private sectors have been used to making.

Additional point source pollution policy insufficient to meet NO₂ emission platform and air quality targets

Under currently adopted policies, the Netherlands will probably not meet its National Emission Ceiling for nitrogen dioxide, even though Dutch policy on point source emissions is more stringent than in other EU member states. Several other European countries will also fail to meet their national ceilings. The Netherlands supports an approach based on additional European policy, which could reduce the degree to which air quality standards in the Netherlands are exceeded. It is doubtful, though, that other European countries will support a tightening up of emission policy if they are already able to meet European air quality requirements. Additional Dutch measures, such as those described in the policy documents 'Traffic Emissions' (*Verkeers-emissie*) and 'Make or Break' (*Erop of eronder*, on emission ceilings), do not appear in a concrete form in the National Air Quality Plan. Once the details have been determined, they could contribute to reducing excess emissions. Local measures can improve urban air quality by reducing ambient NO₂ concentrations but have little or no effect on particulate matter.

Urban environment

Noise nuisance around Schiphol airport stable until 2010

While air traffic has doubled during the last fifteen years, noise nuisance near Schiphol airport has been almost halved and will remain more or less stable until 2010. The number of homes within the location-based risk contours has been halved by the construction of the fifth runway, and is now lower than in 1990. By 2010 the societal risk will almost double because of the growth in flight movements, and expansion of offices and industry near the airport.

At current progress the soil remediation programme will run until 2065

Recent estimates indicate that 55,000 to 65,000 heavily contaminated sites will have to be cleaned up. Most of these sites are in urban areas. At the current rate of progress of about 1000 sites per year, the programme will not be completed until 2065, whereas current policy aims at 2030. The total cost of cleaning up the remaining sites is estimated at 18 billion euro, about half of which is currently borne by the private sector. To complete the soil remediation programme in 2030 with the available government funds, the private sector contribution will have to rise to 75%. Market interest in cleaning up contaminated land depends on a change in permitted uses. Spending on soil remediation in the Netherlands (per head or as per cent GDP) is among the highest in Europe.

Trends in environmental policy

More modest goals but firmer control over environmental pressure; further tightening-up of point-source measures

The emission reduction ambitions following the First National Environmental Policy Plan have not always been equally ambitious. But the transposition of European directives into national law has given them a stronger legal basis. Point-source measures have been repeatedly tightened up, and the associated increase in policy pressure is reflected in improved eco-efficiency. Some of the delay in transposing European environmental directives into Dutch law has been partly made good.

Table 2 Key environmental quality data for the Netherlands.

	Unit	1990	2000	2003	EU target 2010
Social trends					
index (1985=100)					
Population		103	110	112	
Vehicle-kilometres road traffic		120	153	163	
Energy consumption		113	126	131	
Livestock		102	92	82	
Waste		108	125	131	
Gross Domestic Product		118	157	159	
Environmental costs/GDP	%	1.7	2.6	2.8	
Environmental expenditures	%	1.0	1.8	2.1	
central govt / Total expenditures					
central govt					
Green taxes	%	8.6	13.8	13.4	
Emissions					
Climate change					
CO ₂ ¹⁾	billion kg	162	172	176	
Total greenhouse gases ¹⁾	billion kg CO ₂ -eq	216	217	213	200/220 ²⁾
Acidification					
SO ₂	million kg	191	75	65	50
NO _x	million kg	576	414	393	260
VOC	million kg	493	269	224	185
NH ₃	million kg	249	152	130	128
Eutrophication					
Phosphate	million kg	97	61	57	
Nitrogen	million kg	498	337	396	
Environmental quality					
Acidification					
Acid deposition	mol/ha	4800	3400	3000 ⁹⁾	2300 ³⁾

Tabel 2 (continued)

	Unit	1990	2000	2003	EU target 2010
Environmental quality					
<i>Eutrophication</i>					
Total nitrogen deposition	mol/ha	3200	2480	2160	1650 ³⁾
P surface water	mg P/l	0.2-0.5	0.1-0.3	0.1-0.3 ⁹⁾	0.15 ⁴⁾
N surface water	mg N/l	4-5	4-5.5	2-5 ⁹⁾	2.2 ⁴⁾
<i>Shallow groundwater</i>					
Natural habitats on sandy soils	mg NO ₃ /l	30	20	10	
Agriculture on sandy soils	mg NO ₃ /l	150 ⁶⁾	105	90	50
<i>Air quality⁵⁾</i>					
Exposure to particulate matter	µg/m ³	42 ⁶⁾	31	34	40 ¹⁰⁾
Exposure to NO ₂	µg/m ³	27	21	22	40 ¹⁰⁾
Exposure to ozone					
No. days limit exceeded		40	9	20	
No. people affected by noise	%	50	43	44	
Waste					
Landfill	billion kg	14	5	3	2 ⁷⁾
Nature conservation					
Area protected against					
- acid deposition	%	5	10	10	20-30 ⁸⁾
- nitrogen deposition	%	10	10-20	10-20	20-30 ⁸⁾ (NER)

1) Temperature corrected.

2) Total Kyoto target/Kyoto domestic target.

3) Average for Dutch habitats; reformulated NEPP targets.

4) Goal of the Fourth National Environmental Policy Plan.

5) National average. Local hotspots may contain concentrations substantially above the limit.

6) 1992.

7) Target for 2012 in the Waste Management Plan.

8) Level of protection derived from deposition targets.

9) 2002.

10) Annual standard.

