Environmental Balance 2006

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)

Agricultural Economics Research Institute (LEI)

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)

National Institute for Public Health and the Environment (RIVM)

Netherlands Institute for Spatial Research (RPB)

SenterNovem, a government agency for innovation, energy and climate,
and environment & spatial planning

Social and Cultural Planning Office of the Netherlands (SCP)

Wageningen University and Research Centre (WUR)

Netherlands Environmental Assessment Agency

Foreword

Every year the Netherlands Environmental Assessment Agency (MNP) publishes an Environmental Balance founded on the Environmental Management Act. The Environmental Balance describes the state of the environment in the Netherlands, the environmental effects of past policy, and remaining bottlenecks and policy dilemmas. The 2006 Environmental Balance was prepared for use in the debate held in the Dutch parliament on accountability in current environmental policy in May 2006. The conclusions drawn in the Environmental Balance will be translated into monetary terms for use during the presentation of the budget at the opening of parliament in September 2006.

The first chapter of this Environmental Balance is concerned with societal and economic trends and the general effects of these for environmental emissions. The subsequent chapters describe the environmental status, policy development and policy achievements. 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), air quality (Chapter 3) environmental quality of the rural areas (Chapter 4) and quality of the living environment (Chapter 5). In all the chapters attention is devoted to the comparison of trends in the Netherlands 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 (in Dutch only) is available both in book form and via the MNP website (www.mnp.nl). The English-language summary is also available via the MNP website (www.mnp.nl/en/publications/2006). Detailed current statistical data pertaining to figures on emissions and a large number of environmental indicators have been included in the Environmental Data Compendium, a joint document of the MNP and Statistics Netherlands available via www.mnp.nl/mnc/index-nl.html (in Dutch).

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 auspices of the Inspectorate of the Ministry of Housing, Spatial Planning and the Environment (VROM).

Professor N.D. van Egmond

Director, Netherlands Environmental Assessment Agency

Summary of the Environmental Balance 2006

Pressure on the environment in the Netherlands has continued to fall in recent years despite growth in the economy (GDP), mainly because industrial production has become cleaner. However, growth in consumption has led to a rise in CO_2 emissions. Much of the rise in CO_2 emissions by consumers has been driven by spending on mobility: people drive further and in heavier cars. Technological improvements in production processes have been insufficient to compensate for the increasing pressure on the environment due to growth in consumption.

It is estimated that the decoupling of economic growth from environmental pressures will continue in the period to 2010. Nevertheless, the Netherlands is finding it difficult to comply with EU requirements with its current policies, despite additional national measures to supplement EU point source pollution policy. The relatively high emissions per square kilometre in the Netherlands are partly a consequence of the high concentration of activities (population, transport), which in turn is a function of the country's geographical location. In many fields of environmental policy the Netherlands makes legitimate use of the possibilities for flexible interpretation of EU targets, such as 'area averaging' and deferring targets in time (air quality) or in amount (use of manure). Area averaging allows targets to be exceeded at some locations, as long as they are met on average across a wider area (e.g. policies for nitrate and air quality). Postponing achievement of targets may lead to greater health effects and delay in restoring environmental conditions to a level that can support the stated objectives for nature conservation and restoration. The Netherlands is not alone when it comes to difficulties in meeting the objectives. Many other EU member states are unable to meet EU targets under their current policies.

Table 1 Trends in emissions and environmental quality (1990-2000 and 2001-2004), achievement of policy targets for 2010 and expenditure on the environment (in millions of euros per year, 2005 prices).

Theme	Trend 1990-2004	Trend 2001-2004	Target achievement[2)]	Environment costs[1)] 2005
Climate: domestic targets			*	
Climate: Kyoto commitment			EU*	
Energy savings		**		890
Renewable energy				
Renewable electricity				
Emissions NO_x, SO_2			EU	
Emissions NH_3			EU	
Emissions VOC			EU	1980
Emissions: particulate matter				
Air quality: ozone			EU	
Air quality: particulate matter, NO_2			EU	
Nitrate in groundwater			EU (2009)***	
Phosphate accumulation in soils			EU (2015)	
Pesticide-induced environmental pressure				2755
Chemical quality of surface water				
Ecological quality of surface water			EU (2015-2027)	
Deposition on nature areas				
Fall in water table				Not known
Health effects: particulate matter				
Health effects: ozone				
Noise (bottlenecks)			(2020)	490
Noise nuisance				
External safety: societal risk				Not known
External safety: location-based risk				Not known
Waste management				3820

[1)] Environmental costs to society, including central government costs and excluding health costs.
[2)] EU = European obligations.

* Colour borderline red/yellow, i.e. the chance of achieving the target is 33%.
** Energy saving in the period 2000-2004 compared with 1995-2000.
*** Probable target achievement in the period 2010-2015.

Colour	Trend	Target achievement
	falling linear trend	> 67% chance of achieving target
	level trend within 0.5% annual deviation	fifty-fifty, with 33-66% chance of achieving target
	rising linear trend	< 33% chance of achieving target
	not applicable	no target set
	indeterminate	Indeterminate

Environment and economy

Reduction in pressure on the environment due mainly to improved eco-efficiency
Most of the reduction in pressure on the environment since 1990 has been achieved by emission-reducing technologies in the production sectors. These improvements in eco-efficiency have driven down emissions further while production has risen. CO_2 emissions are an exception, although they are levelling off as efficiency improvements take effect. The reduction in pressure on the environment has not been achieved by shifting CO_2, NO_x and NH_3 emissions to other countries, because the emissions 'avoided' – related to increased imports – are equivalent to the emissions from exports.

Change in consumption pattern raises greenhouse gas emissions
Since 1992 consumer expenditure has risen by about 30% (corrected for price inflation). Efficiency improvements and structural changes in production kept the resulting rise in consumption-related greenhouse gas emissions to about 10%, well below the projected 25% rise without these improvements. Spending on mobility, food and domestic use of gas and electricity accounts for about 60% of greenhouse gas emissions from consumer expenditure (*Figure 1*). Specifically, spending on mobility grew strongly: people are driving further and in heavier cars. The high fuel prices meant that CO_2 emissions from passenger traffic (which is related to fuel consumption) rose slightly less than if fuel prices had remained stable.

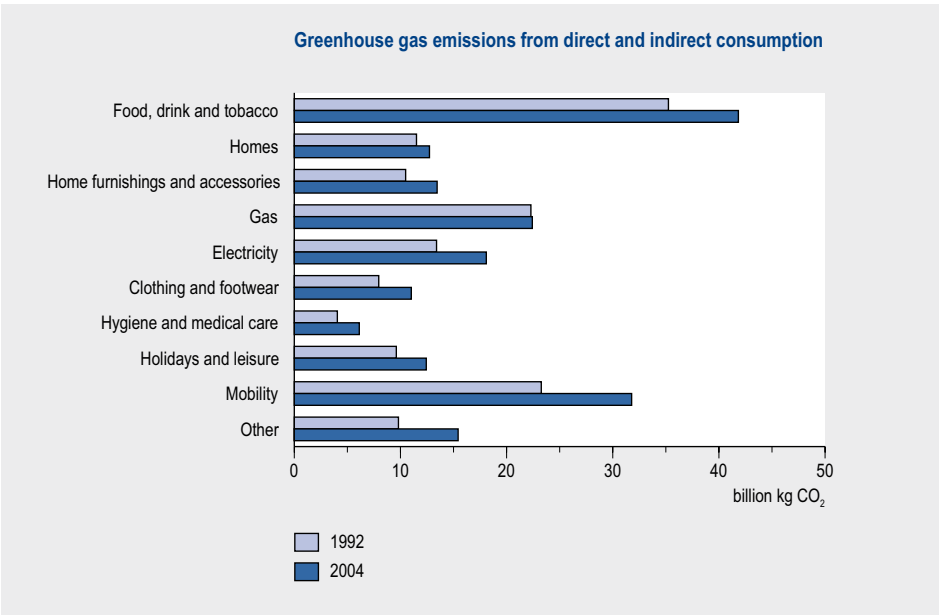

Figure 1 Greenhouse gas emissions from direct and indirect consumption in the Netherlands, without efficiency improvements in the production sectors.

Thirty per cent of environmental costs paid by government

In 2005 environmental measures cost about 13 billion euros, almost 3% of GDP. Thirty per cent of these costs were borne by central government and the provincial and local authorities. Households financed about 25% via local taxes, such as sewerage and waste charges. The business community (agriculture, industry and the service sectors) financed about 45% of environmental costs. Over time the introduction of new technologies, including investment in increasingly effective environmental technologies, has brought down the unit costs of emissions reduction.

Climate change

Under current policies domestic target for 2010 exceeded by 2 Mtonne

New insights indicate that, under current policies, greenhouse gas emissions in 2010 are likely to be 224 Mtonne, or 2 Mtonne above the domestic target (222 Mtonne). The margin of uncertainty around the estimate of 224 Mtonne is –8 to +9 Mtonne. The estimate for 2010 is 3 Mtonne higher than projected in the Environmental Balance 2005. Much of the difference results from a new estimate for traffic emissions: the trend in CO_2 emissions per kilometre travelled by passenger cars is structurally less favourable than was previously assumed. Moreover, although technological improvements have led to a reduction in emissions per kilometre travelled per weight class, this benefit has been more than cancelled out by a growth in sales of heavier cars. Another reason for the higher estimate of greenhouse gas emissions is the Government's decision to delay the introduction of the energy performance certificate for buildings. The remaining increase is due to an upward adjustment of the emission factor for natural gas by about 1%, which accounts for around 1 Mtonne of the increase in estimated emissions. However, because the domestic target was also raised following the adjustment to the emission factor, the resulting increase in estimated emissions will have little effect on progress with achieving the target. The projections for achieving policy targets are based on policies in force on 1 January 2006.

Policy in preparation will restrict emission reductions

The Environmental Assessment Agency calculates that the package of 'policies in preparation' described in the evaluation report on Dutch climate policy will take no more than 6.1 Mtonne off the current emissions estimate, at least 3.1 Mtonne less than estimated in the evaluation document. The difference can be explained by an overestimate of reductions in emissions from buildings and the fact that the newest estimates include part of the extra reductions in traffic emissions. The policies announced in the evaluation report on climate policy have not yet been adopted and are therefore not included in the emission estimates for 2010. Oil prices are an additional source of uncertainty for the future. If the price of oil remains high, current emission estimates may also prove to be too high.

EU-15 buy more emission reductions abroad to meet Kyoto targets

The EU-15 can only meet its Kyoto target if the member states implement their planned additional domestic measures as well as buying emission reduction credits abroad under the Joint Implementation (JI) and Clean Development Mechanism (CDM) (*Figure 2*). In 2005 the estimated reduction from the purchase of foreign credits was increased from 1% (2004) to 2.5%. However, the estimated reduction resulting from domestic policy measures (current and additional) is now almost 1% lower than in 2004 (in 2004: 7.7%; now 6.8%).

In addition to the Netherlands, Luxembourg, Austria, Belgium and Finland are unable to meet their Kyoto targets without buying emission reduction credits through the JI and CDM. France, Germany and Greece expect to be able to meet their targets through the implementation of additional measures. Sweden and the United Kingdom expect that existing policy measures will allow them to realise higher reductions than those

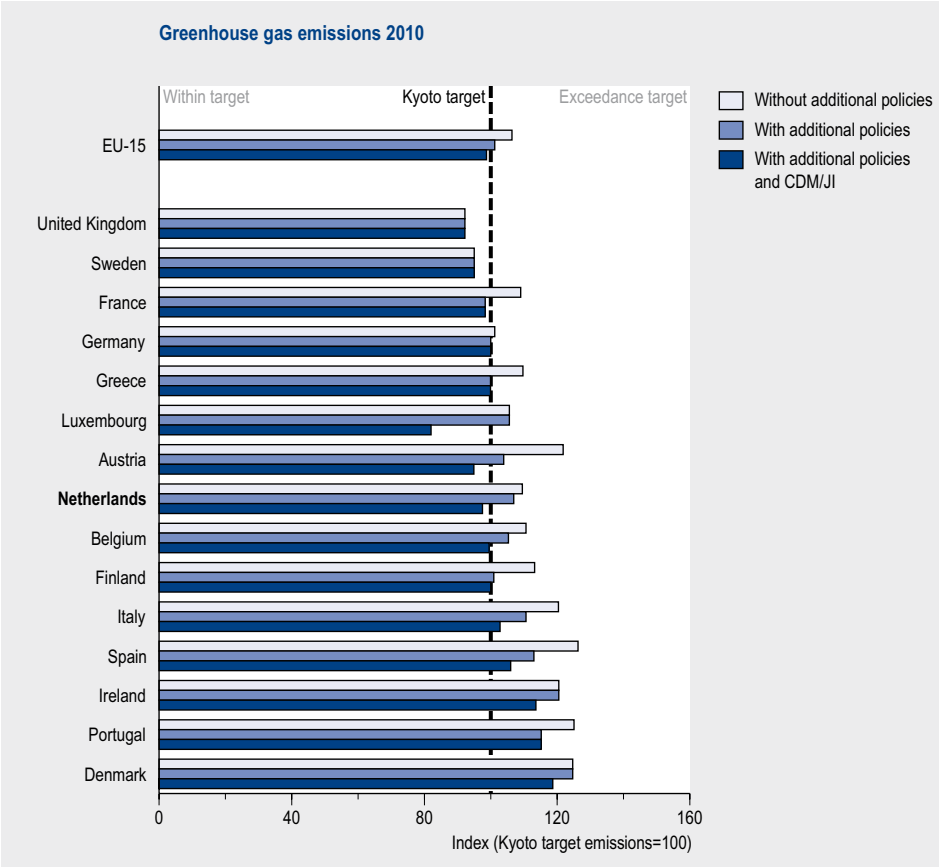

Figure 2 Relative differences between the Kyoto targets for the EU member states and estimated greenhouse gas emissions for 2010, based on expected reductions from measures under current policies (no additional policies), from measures under current and additional domestic policies, and from domestic measures plus reduction credits (purchase of emission credits abroad under the JI and CDM).

required to meet their Kyoto targets. The remaining EU-15 states (Denmark, Ireland, Italy, Portugal and Spain) do not expect to meet their targets, even with additional policy measures or the use of JI or CDM.

Air quality

Despite strong indications of lower concentrations of airborne particulate matter in the Netherlands, regional levels remain high compared to other countries

There are strong indications that particulate matter concentrations in the Netherlands are on average 10-15% lower than was previously thought. The main evidence for this are the lower values for measured concentrations over the last two years, which are considered to be highly plausible. As a result, the areas of the country where EU limit values for particulate matter may be exceeded has been reduced considerably (*Figure 3*). Nevertheless, regional concentrations in the Netherlands remain high compared with other countries, and levels found in the cities are comparable to those in many other European countries.

The uncertainties surrounding particulate matter concentrations remain high. These unavoidable uncertainties in determining air quality remain problematic given the need for accurate values to implement current policy measures.

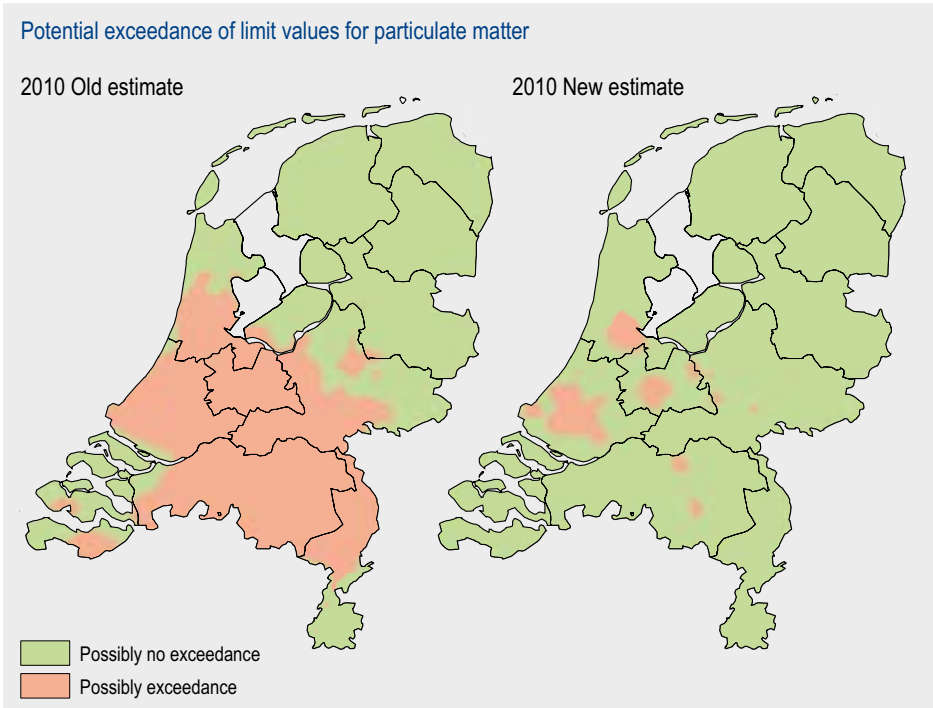

Figure 3 General background concentrations of particulate matter plus indicative local contributions. Combined they give a picture of the potential exceedance of the daily limit value for particulate matter in 2010.

EU limits for particulate matter exceeded in many places, but problems can be solved in the medium term

According to the latest findings, in 2005 particulate matter concentrations in many areas of the cities and along motorways exceeded the EU limit value. Until recently it was assumed that these high concentrations of particulate matter could not be brought down to acceptable levels until 2020. Recent findings, though, indicate that it will be possible to bring the concentrations of particulate matter down below EU limits in the medium term (2015) by introducing additional national, local and EU policy measures. The national policy pursued to date (so-called 'Prinsjesdagpakket') will remain cost-effective, certainly the traffic-related elements. As the EU limit value came into force in 2005, the Netherlands will have to apply for a derogation to avoid breaching European regulations.

Emission reduction rate too low to meet EU emission ceilings for SO_2 and NO_x

Despite emission reductions made in the past and expected further reductions to 2010, current policy measures are not bringing down emissions of SO_2 and NO_x quickly enough to meet the national emission ceilings (NEC) for 2010 set by the EU. However, new policy measures and the new emissions estimate for freight transport by road and inland waterway have narrowed the gap for NO_x. Many other EU states are also finding it difficult to meet their national emissions ceilings.

EU emissions ceilings for volatile organic compounds will probably be met

An adjustment to the estimates for vehicle emissions probably means that emissions of VOCs are within the national emission ceiling (NEC). Estimated VOC emissions are about 15 ktonne lower because they now take account of the fact that on average less use is made of older cars and engines.

Environmental quality in rural areas

Nitrogen and phosphate emissions to the soil and air fell by half between 1990 and 2000. However, this drop in emissions has not continued since 2002 because farmers had little incentive to make further reductions. Nevertheless, the EU emission targets for manure and ammonia are well within reach.

National emission ceiling for ammonia within reach if poultry and pigs housed in low-emission sheds

Ammonia emissions for 2010 are estimated at 126 ktonne, a little lower than the national emission ceiling (128 ktonne). However, the uncertainties surrounding this figure are large and the risk of exceedance is about 45%. To bring emissions within the national emission ceiling (NEC), all medium-sized farms will have to house their livestock in low-emission sheds by 2010. If the introduction of compulsory low-emission housing for poultry and pigs is postponed beyond 2010, ammonia emissions may exceed the NEC by about 5 ktonne. If the NEC is met, 20-30% of natural habitats will be sufficiently protected against high levels of nitrogen deposition.

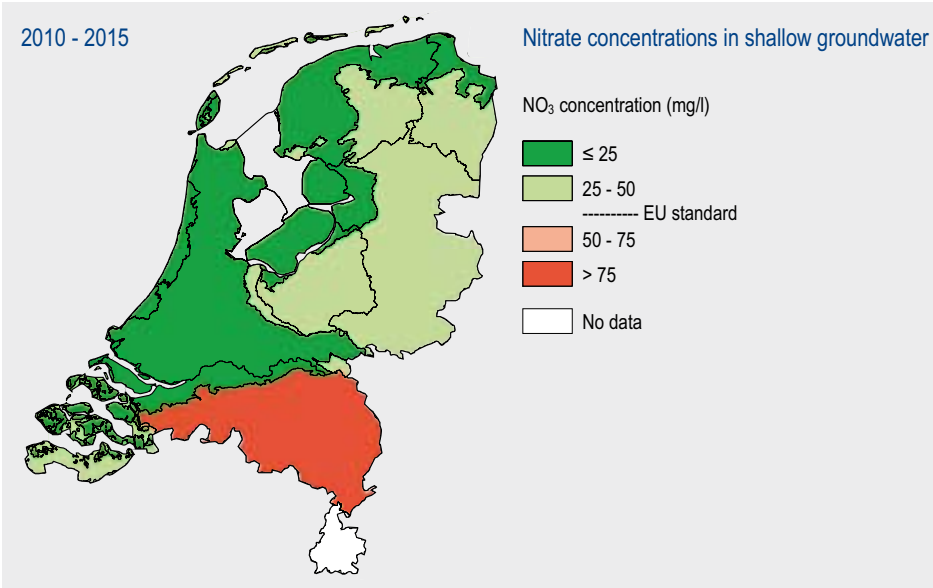

Figure 4 Calculated average nitrate concentrations in shallow groundwater in agricultural areas per groundwater body (2010-2015). Nature reserves and protected areas are not included in this figure.

EU standards for nitrate come within reach between 2010 and 2015, but with large regional differences

In 2009 average nitrate concentrations in shallow groundwater in agricultural areas are expected to be around 35 mg/l. However, in the regions with sandy soils average concentrations in 2009 are expected to exceed the standard (50 mg/l). The targets for nitrate in groundwater across the regions with sandy soils as a whole will come within reach between 2010 and 2015 (50-55 mg/l), but within this overall picture there are large regional differences. Particularly on the drier sandy soils and in the southern areas, concentrations will probably be well above the limit (*Figure 4*). It is not clear whether this will be in breach of the EU Groundwater Directive, which is expected to include regional reporting.

No further improvement in ecological quality of surface water without additional measures

The chemical quality of surface water has improved considerably in recent decades, but water quality in many Dutch water bodies will not be good enough to meet water quality objectives. Most of the improvement in water quality has been achieved by sewage treatment plants and industry. Proposed policy measures (including the new manure policy) will slightly reduce phosphorus load to surface water bodies from present levels. Without additional measures, therefore, the ecological quality of surface waters will hardly improve.

Urban environment

Environmental quality below standard at many locations
The maximum limit values for air quality, noise and/or external risk are exceeded in about 5% of homes. Currently less than half the population lives in an environment that meets the requirements for a high quality environment over the long term. Environmental quality is lowest in residential areas near busy roads in the major urban conurbations.

Considerable health effects of air pollution; removal of natural fraction may lead to health loss
Dutch studies indicate that each year two or three thousand people in the Netherlands die prematurely (from a few days to many months) as a result of *short-term* exposure to particulate matter and ozone. The health effects of *long-term* exposure to particulate matter are probably much greater than those caused by *short-term* exposure: each year a few tens of thousand of people may die prematurely (up to a few years) as a result of long-term exposure to particulate matter. Our knowledge about these effects, however, is subject to a considerable degree of uncertainty.

Both *long-term* and *short-term* exposure have an effect on health at concentrations below permitted levels. While not all fractions and components of particulate matter are thought to be equally important for health risks, the proposal not to count natural particulate matter when assessing measured concentrations against the standard would in effect raise the limit. If the resulting concentration gap in the target setting is 'filled up' with damaging anthropogenic particulate matte, additional health loss may result.

Fewer homes within risk contours; impact of new policy on societal risk remains unclear
Measures already implemented have reduced location-based risk: the number of homes within the risk contours has fallen. Under current policy most of the targets (2010) for location-based risk are expected to be achieved, with the exception of risks from pipelines and the transport of hazardous wastes by road and water. In 2010 the number of problems associated with this transport will probably not be any lower. Threats to safety posed by pipelines are still not being tackled in a consistent and planned manner, although pipelines laid in recent years are safer. The acceptable level of risk for several thousand people living in the vicinity of airports is up to ten times higher than for other sources of risk.

There is no legal standard for the risk of an accident with multiple deaths (societal risk), only an indicative value. The size of the area affected by societal risk is greater than for location-based risk, and it is not uncommon for new housing to be built within zones prone to societal risk. The recent improvements in location-based risk, therefore, do not lead to an equivalent improvement in societal risk.