Environment in Slovenia 2002

Republic of Slovenia, Ministry of the Environment, Spatial Planning and Energy

Foreword

Information on the state and changes in the environment constitutes the basis for an effective environmental policy and timely action. According to the new "State of the Environment Report 2002" for Slovenia the results of the measures carried out during the report period are only partly satisfactory.

The river water quality has been slowly improving since 1992 and the waste water treatment plants in major cities (Ljubljana, Maribor, Celje) and in the costal area to be constructed by 2005 will additionally contribute to this improvement. Collection, treatment and discharge of urban waste water will be in place by 2015 when the transitional period ends for the entry into force of the relevant European directive. The nitrate and pesticide contents in groundwater have been falling on average over a decade, but they are still too high. In light of this, we adopted strict restrictive measures this year.

In the field of air we were most successful in reducing the sulphur dioxide emissions, and least in reducing nitrogen oxide emissions in transport. The consumption of substances depleting the ozone layer has been reduced by around 90 %. The greenhouse gas emissions are lower than in 1986 and we are approaching with optimism 2008 when a targeted reduction of 8 % must be reached. The share of energy produced from renewable sources has been increasing. This year we introduced significant subventions for green electricity.

Of a special concern is the increase in waste generation, i.e. municipal and hazardous waste, coupled with an increase in the population integrated into the system for regular collection and removal of municipal waste.

The otherwise rich biodiversity that is endangered also in Slovenia will be preserved through enhancement of the nature protection system by the determination of Natura 2000 sites.

The majority of other indicators recorded a favourable trend. New operational programmes are being adopted in the areas with negative trends as supplementary measures for the improvement of the state of the environment. The three major environmental problems in Slovenia now include waste, agriculture (despite the positive trends) and transport. In transport all trends are negative with the exception of lead emissions due to a ban on the use of leaded fuel. The share of road transport in comparison with rail transport is constantly growing. The emission of carbon dioxide in transport and the emissions of nitrogen oxide and ground level troposphere are also increasing. Transport is thus becoming the greatest environmental challenge for Slovenia in the future.

The present State of the Environment Report and the assessment of selected indicators, as pointers to the state of the environment, changes in the environment and the implementation of the National Environmental Action Programme, represent the basis for continued achievement of goals in this field.

Janez Kopač, MA
Minister of the Environment
Spatial Planning and Energy

Environment in Slovenia 2002

State of Environment Report 2002 – Summary

1. Reporting on the state of the environment

The State of the Environment Report 2002 has been drawn up on the basis of Article 75 of the Environmental Protection Act (Official Journal of the Republic of Slovenia – Uradni list RS – 32/93 and 1/96). The report contains data on the state and changes in the environment, pressures on the environment, the effects on human health, implementation of the National Environmental Action Programme and other action plans, financial flows in the area of environmental protection, performing public services, major international events, priority tasks and measures and other data significant for environmental protection.

The content and structure of the report follows the system of reporting practiced by the European Environment Agency. Every three years this agency drafts a comprehensive report *(Environmental Outlook[1])*, which covers information on and an assessment of the state of the environment, points out pressures on the environment and monitors societal responses. Every year the European Environment Agency produces what it calls *Environmental Signals[2]*, brief reports offering simply the values of key indicators, where the subjects are selected with regard to the relevance of the field for that year. National reports from certain EU member states, as well as from others, have been reviewed and taken into consideration.

The structure of the report also follows the EU acquis and the assuming of obligations in the area of the environment, which is also evident in the linking of individual chapters and topics to an individual EU directive, regulation or decision or to an adopted international agreement (conventions and protocols). Individual chapters provide an analysis of the situation, highlight the problems connected to it, review and assess the targets and define measures for achieving the targets. The special "box with regulations" before individual chapters is also aimed at pro-

[1] The last complete report is *Environment in the EU at the turn of the century (EEA 1999)*, while a new one is being compiled for the ministerial conference on the environment, held in May 2003 in Kiev

[2] *Environmental Signals (EEA 2000, 2001, 2002)*

viding a comprehensive overview of the most important EU regulations and relevant Slovenian legislation by subject matter.

The report contains a special "Environmental indicators" supplement, which enhances the value of this report. The report has also used the European Environment Agency's methodological fact sheets for indicators, which serve for the drafting of reports on the environment by EU member states and, more recently, by the associate members, and which are therefore internationally comparable.

A special chapter of the report is devoted to Implementation of the National Environmental Action Programme from 1999. An analysis of the implementation of each measure individually has shown that there are no major deviations from the programme, while for some measures it has turned out that they are not harmonised with the EU requirements or are no longer relevant, since the field in question is regulated differently.

In the majority of fields (waste water treatment and river water quality, SO_2 emissions, greenhouse gas emissions, measures in the field of efficient energy use and renewable energy sources, agri-environmental measures, environmental taxes and so forth) the measures taken are already demonstrating the success of policy implementation and are ensuring the achieving of targets set. For those areas where the measures taken thus far have not been sufficient, it will be necessary to prepare special operational programmes as envisaged in the EU's new Sixth Environment Action Programme.

The present State of the Environment Report and the assessment of selected indicators, as pointers to the state of the environment, changes in the environment and implementation of the National Environmental Action Programme, are the basis for continued successful work and the achievement of goals in this field.

2. State and changes in the environment

Water

This chapter deals with the state of water quantities, emissions into water, water exploitation and the water quality. This field is regulated by the new Water Act, which for the purpose of managing water divides Slovenia into two river basin districts, the Danube and the Adriatic river basin district.

Water quantities

Slovenia is marked by major differences between the areas with the highest precipitation in the north-west of the country and the least precipitation in the east, where particularly in summer there are often water shortages and lengthy summer droughts. The mean annual quantity of all water potentially available in Slovenia amounts to 32.1 km^3, and on average 16,000 m^3 of water is available each year per inhabitant, which is significantly higher than the European average. As much as 41 % of the water that flows each year across Slovenian territory comes in from Austria. Analyses of the trends of significant flows, which are spread across most of Slovenia, point to a growing trend of large flows and a falling trend of medium and small flows. The circumstances indicate a reduction in the available water in the coastal Primorje region, into which in order to maintain the current state (with increased use and a continuation of trends) it will be necessary to import water from the more abundant river basins. The trend of annually potential available water in Slovenia is falling, on the basis of which one may suspect that the "water deficit" areas will expand.

Reserves of groundwater are spatially unequally distributed. Almost two thirds of reserves are in the central area, in the Sava river basin, while the smallest reserves are in the extreme north-east of the country (the Mura basin) with chiefly intergranular porosity strata and in the extreme south-west of the country (coastal area) with chiefly karstic fissured porosity. The majority of water monitoring stations (41 %) for aquifers with intergranular porosity show a statistically significant fall in areas of groundwater.

Water Emissions

In the area of collecting, discharging and treatment of urban waste water, intensive implementation is being pursued of the EU urban waste water treatment directive, for which a 10-year transition period was approved in the part of the obligation to construct collecting systems and urban waste water treatment plants. The targets are set out in the regulations and action programme. The indicator Urban waste water treatment shows that construction work is proceeding according to plans and to the envisaged dynamic. Construction of the majority of the major treatment plants is envisaged by 2005 (Maribor, Ljubljana, Celje, expanding the Koper + Izola treatment plants), so the share of treated urban waste water will also rise significantly (figure 1).

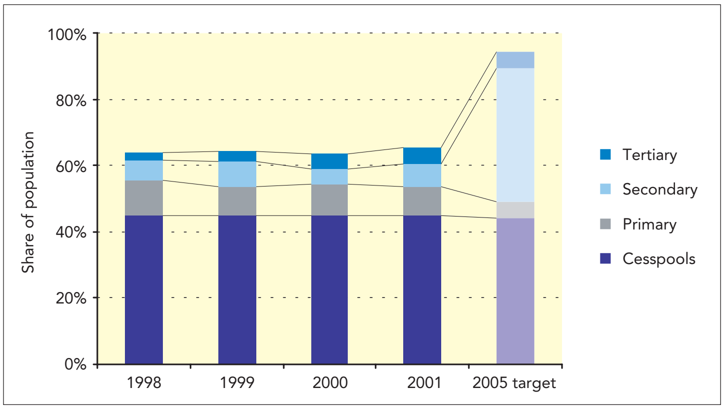


Figure 1
Share of Slovenian population whose urban waste water is treated in waste water treatment plants and cesspools and the target share envisaged for 2005
Source: Waste water treatment plants database, EARS 2002; expert estimate

Data on emissions of dangerous substances from sources of pollution are collected within the national Environmental Agency of the Republic of Slovenia (EARS) on the basis of reports on sources of pollution. In 2000 a total of 543 sources of pollution were identified, including 86 sources with mainly biodegradable waste water from the food industry and 457 industrial sources whose waste water contained dangerous substances. A review of emissions into water of substances on list I (uniform standards) indicates that from point sources there are no significant emissions of such substances into the aquatic environment (total annual quantity of mercury 0.7 kg and 14 kg of cadmium in 2000 from all point sources). The largest share of heavy metals discharge are produced by industrial plants for the production of metals and metal fabrications, followed by plants producing chemicals and chemical products, synthetic fibres, leather, footwear and leather products, and to a lesser extent by certain other industrial operations. The largest quantity of metals discharge in 2000 was in the Sava (14.9 t) and Drava (1.5 t) basins.

Monitoring of the discharge of nutrient salts of nitrogen and phosphorus and certain other pollutants from the land into the sea indicates that the heaviest loading is in the interior of Koper Bay. The main sources of pollution are inadequately treated urban waste water from the Koper treatment plant, which flow out into the lower stream of the

Rižana river, added to which certain waste waters from the hinterland and industrial plants flow directly into the Rižana and Badaševica rivers. Conditions are especially critical in summer when the river flow is reduced and there are high temperatures, with results at the mouths of the Rižana and Badaševica indicating anaerobic processes. Similarly, waste water that is not fully treated flows directly from the pumping station at Izola directly into the sea, 300 m from the shoreline, along with industrial waste water from the settling tank at the Delamaris factory.

Water use

In Slovenia groundwater is the main source of drinking water, while surface water is used primarily for technological water requirements. In the period 1997-2001 the index of water use has not changed, since there is a large amount of available water in comparison with what is consumed. According to the records of water payments, 70 % of water is used for cooling, 16 % as drinking water and 14 % as technological water.

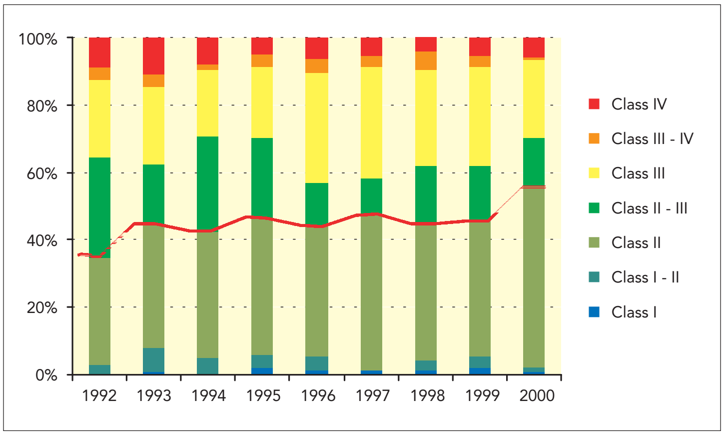
Water quality

The national programme of water quality monitoring includes river water quality, groundwater aquifers and springs, lakes and the sea, and on this basis a database has been set up covering data on the defined physico-chemical, chemical and saprobiological parameters.

Surface waters: Quality and trends are shown by the River water quality index, which ranks the sample points with regard to the parameters into four quality classes. The first class of quality comprises unpolluted surface watercourses (1 % of sampling points on the Soča, Koritnica and Kamniška Bistrica rivers at the sources). In the period 1992-2000 a trend of quality improvement was observed. An increase was observed in the share of the second quality class (good status) corresponding to a reduction in the amount of heavily polluted watercourses. The share of watercourses ranked in the fourth quality class has not changed in recent years (around 5 % of sampling points) (figure 2).

Figure 2

River water quality index – share of sampling points in specific quality classes
Source: Standardised database for water quality monitoring, EARS 2002



The state of the sea's quality is assessed by means of the so-called trophic index, which takes account of concentrations of dissolved nitrogen, phosphorus and chlorophyll, saturation with oxygen and transparency of the sea. In the period 1997-2000 the index shows values indicating moderately eutrophic water.

Groundwater: In Slovenia the period 1997-2000 was marked by the most critical pollution of groundwater by pesticides, chiefly atrazine and its metabolite diethyl-atrazine, and by nitrates. In this period the aquifers in north-eastern Slovenia experienced the heaviest pollution with nitrates. Long-term measurements of the nitrate content in groundwater show a general falling trend, yet despite this the average nitrate content for the three year period 1998-2000 is still higher than the permissible limit values of 25 mg NO_3/l in the Prekmurje, Mura, Apače, Drava, Ptuj, Sorško and Krško polje areas, in the Lower Savinja Valley, the Bolska and Kamniška Bistrica valleys (figure 3).

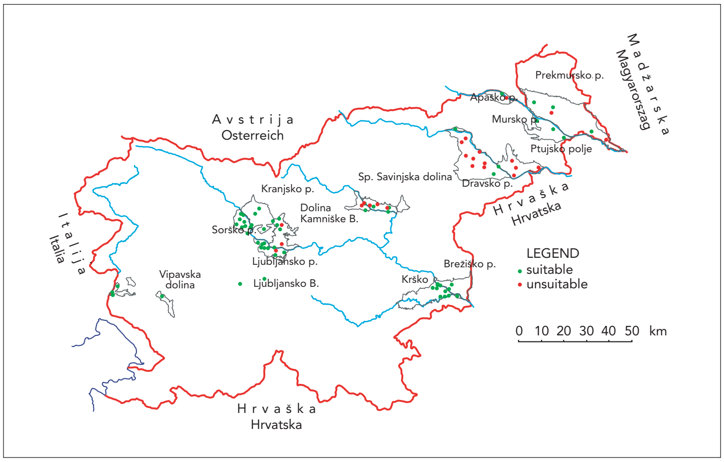


Figure 3
Suitability of groundwater in terms of nitrate content at individual sampling points in 2000
Source: EARS

Limit values for the amount of pesticides in 2000 were exceeded in 7 of 13 aquifers (the Prekmurje, Drava, Ptuj and Sorško polje areas, Lower Savinja Valley, the Bolska and Kamniška Bistrica valleys). Limit values were exceeded to the greatest extent by the pesticides metholachlor and atrazine and its metabolite disethylatrazine (figure 4).

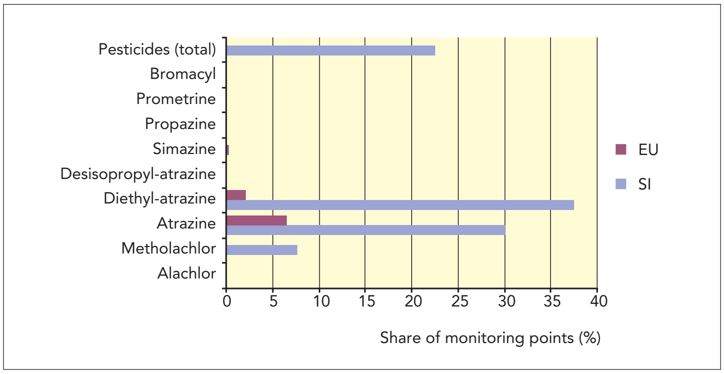


Figure 4
Share of monitoring points where the concentration of an individual pesticide in 2000 exceeded 0.1 µg/l, and the sum of pesticides exceeded 0.5 µg/l – comparison with the EU
Source: Standardised database for water quality monitoring, EARS 2002

Air

This chapter deals with the air quality, emissions of substances and transboundary air pollution, climate change and the Kyoto Protocol and the thinning of the ozone layer. The quality of outdoor air in Slovenia is affected chiefly by the emission of substances within the country, but an important part is also played by the long-range transboundary air pollution.

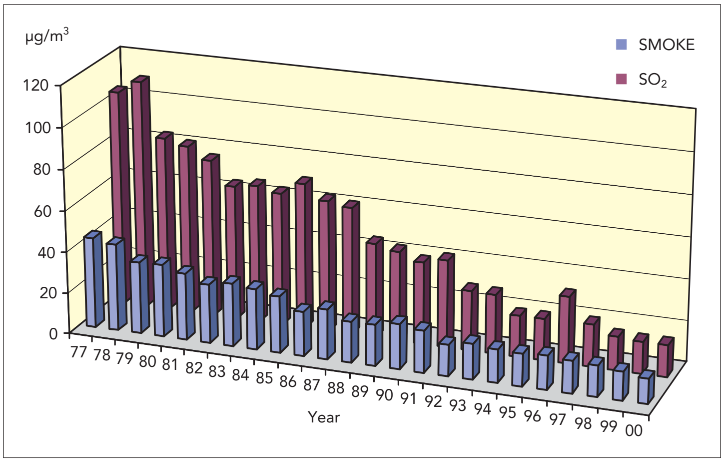
Air quality

Measurements of air quality in the monitoring network have been conducted over the longest time for sulphur dioxide (SO_2). In the period 1977-2000 (figure 5) average annual concentrations of SO_2 fell dramatically. At Šoštanj the concentrations dropped significantly owing to the operation of the desulphurisation apparatus, while limit values are occasionally exceeded in the surroundings of the Trbovlje thermal power plant.

Figure 5

Average annual values of the index of air pollution by acid gases (I(SO_2)) and smoke in Slovenia – average for 12 locations

Source: EARS



Of the other pollutants, limit values are occasionally exceeded by concentrations of ozone, especially in spring and summer, when the conditions are favourable for the onset of photochemical reactions. Other substances only rarely exceed limit values.

Emissions

SO_2 in the period from 1980 to 2000: From 1980 to 2000 the annual emission of SO_2 in Slovenia fell by 59 %. The largest share of the entire emission of 96,000 t SO_2 in 2000 was produced by thermal power plants and heating stations, accounting for 87 %. In 1995 SO_2 emissions fell significantly compared to the previous year owing to the operation of a desulphurisation unit at block 4 of the Šoštanj thermal power plant, and also owing to the lower sulphur content in the liquid fuel following the new regulation on the quality of liquid fuel. A further reduction has been aided by the desulphurisation unit at Block 5 of Šoštanj, which started operation in the second half of 2000.

NO_x in the period from 1980 to 2000: After 1992 emissions of NO_x started to increase, owing in particular to the greater density of motor vehicle traffic; the increase has been large despite the continuously growing number of vehicles with catalytic converters. After 1997 NO_x emissions fell markedly owing to a reduction in consumption of motor vehicle fuel (cross-border sales fell). The greatest share of the entire NO_x emissions is contributed by road transport (motor vehicle traffic), accounting for 63 % in 2000.

Since 1995 there has also been an important and marked reduction in emissions of lead, since in that year the new regulation on the quality of liquid fuel entered into force. Since 2001 the sale of leaded fuel has been prohibited in Slovenia, and this has meant a further reduction in lead emissions from motor vehicle traffic.

Transboundary air pollution is a problem for the whole of Europe, and is being resolved in a harmonised way through the Convention on Long-Range Transboundary Air Pollution, from 1979. Under this convention, European countries are responsible for reducing emissions in Europe. Slovenia is a net exporter of sulphur, since the exported quantity of sulphur is greater than the imported amount. In the case of nitrogen oxides (NO_x) and reduced nitrogen (NH_3), export out of the country is greater than import.

Climate change

After 1986 greenhouse gas (GHG) emissions started to fall and bottomed out in 1991 and 1992, then started rising again. The growth trend of these emissions has come to something of a halt in recent years. Of the various sectors, the largest share of emissions is created by the production of electricity and heating, followed by transportation (figure 6).

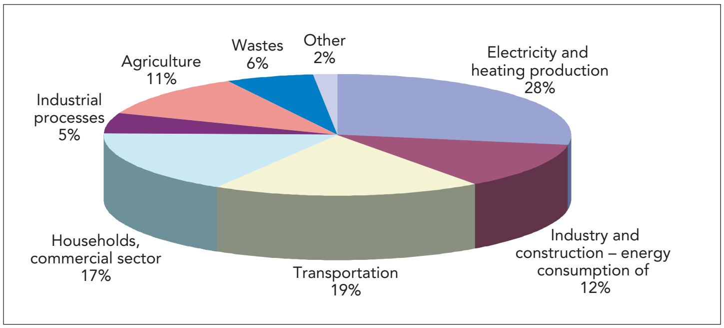


Figure 6

Emission of direct greenhouse gases CO_2, CH_4, N_2O, CF_4, C_2F_6, HFC, SF_6 (expressed in equivalents of CO_2) by sector (1999)

Source: Ministry of the Environment, Spatial Planning and Energy

The Kyoto Protocol (1997) sets out the obligations of the industrialised countries (the countries in annex I to the convention), such that in the first target period of 2008-2012 they reduce or limit GHG emissions relative to the start year (for Slovenia by 8 % relative to 1986). Projections of GHG emissions up to 2020 have been made, through measures already taken and alongside measures still planned for implementation. All the necessary measures will be defined in the action programme for reducing GHG emissions, which is in preparation.

Ozone depleting substances

Phasing out the use of chlorofluorocarbons (CFC) has been in progress since 1995. By 2002 their use had been greatly reduced (the entire annual consumption of CFC's in Slovenia fell by approx. 90 %). The use of partly halogenated chlorofluorocarbons (HCFC) is also being abandoned, and currently does not exceed 11 % of the permissible level of calculated consumption for Slovenia. Slovenia does not produce any ozone depleting substances.

Soil

This chapter deals with the characteristics of the soil in Slovenia, loss and pollution of soil, and fertilising and the effect of fertilisers on the environment.

Loss of soil

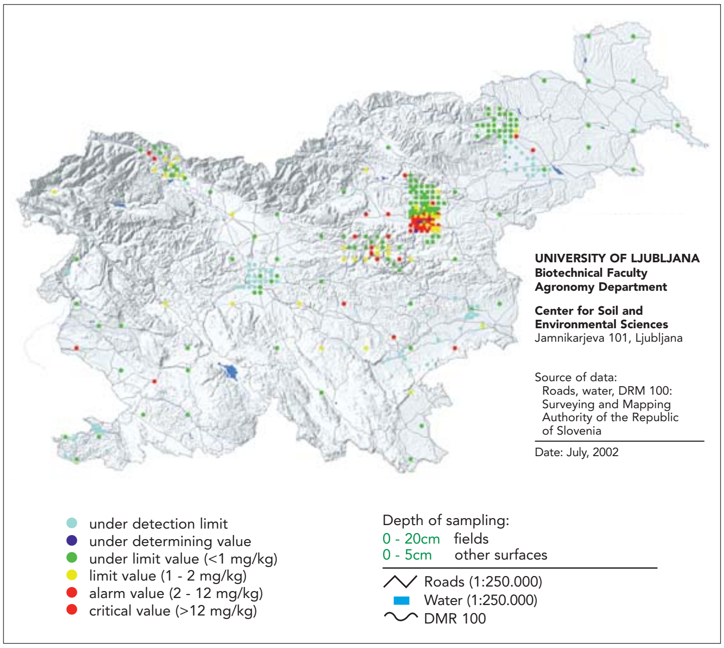
The greatest problem of soil loss is its destruction and removal in a single encroachment, usually during various construction works, where the best agricultural soil is most at risk. In the period 1993-1997 the area of roads and soil built over increased by 4078 ha, forests by 74,677 ha, while agricultural land was reduced during this period by 81,092 ha.

Soil pollution

To date systematic soil pollution research has been conducted in areas covering approximately 13 % of Slovenia's territory (only 8 % in 1999). Heavy metals (zinc, cadmium, lead) limit values have been exceeded at locations surrounding industrial centres (in the area of Celje, at certain locations surrounding Maribor and Jesenice) (figure 7). The majority of identified dangerous organic substances appear in the soil in low concentrations.

Figure 7

Content of cadmium (mg/kg d.m.) in topsoil (0-5 cm or 0-20 cm) in researched areas



Fertilising and effect of fertilisers on the environment

Pollution chiefly of groundwater by excess nutrients from agriculture represents a problem, particularly in areas where agricultural land is in close contact with shallow-lying groundwater and farming is intensive (areas of shallow brown soil in the Mura, Sava, Drava and Savinja river basins). The latest data for Slovenia indicate that on average the nitrogen balance is positive (+ 64 kg N/ha), which also means that in 55 % farmers are fertilising excessively.

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Nature and biodiversity

This chapter deals with the conservation of biodiversity through the conservation of habitat types and habitat species, through the conservation of species, and *in situ* conservation through the designation of areas of conservation importance. The regulation of the international market in animal and plant species is given a special presentation.

Endangered species and habitat types

Slovenia is one of the pre-eminent European countries in terms of biodiversity. For the better known taxonomic groups the category of threat of species is shown in figure 8. In Slovenia there are approximately 850 narrow endemits, the majority of which are associated with underground habitat types, Alpine and sub-Alpine grasslands and cliffs and scree slopes. The habitat types with significant numbers of endangered species which are endangered owing to loss of this habitat type, are primarily dry and wet grasslands, coastal, marine and inland waters.

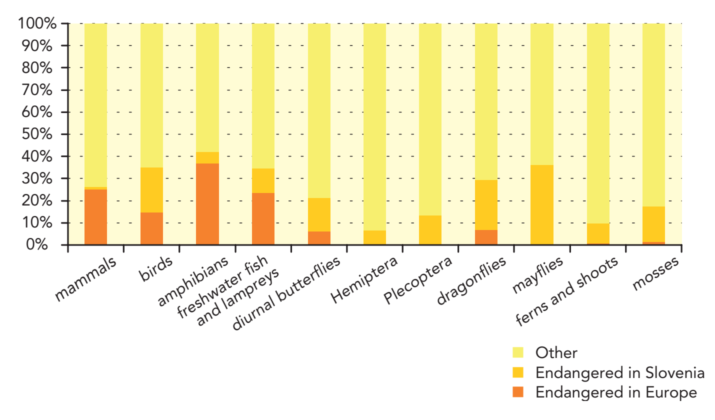


Figure 8

Share of selected endangered animal and plant species

Source: Ministry of the Environment, Spatial Planning and Energy

In situ conservation

For the *in situ* conservation of species and habitat types, NATURA 2000 sites will be identified, in line with the objective criteria of EU directives. The procedure for identifying these areas and areas of national importance (ecologically important areas) is in progress.

In Slovenia the protected areas of various categories currently cover 8 % of the national territory. The major part of the surface area covered by Slovenia's protected areas is taken up by the Triglav National Park, which includes primarily mountain and forest habitats. An expert proposal has also been drafted for determining natural assets, and this has recorded 5232 structures, of which 1373 enjoy legal protection (natural monument, nature reserve and monument of designed nature).

Trade in plant and animal species

Trade in plant and animal species, which includes trade in parts thereof (skins, tusks etc), reaches amounts to tens of billions of US dollars each year around the world. Over the past ten years it has also been growing in Slovenia. This field is regulated by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In Slovenia the largest share of imports of live animals is accounted for by birds and reptiles, while mammal fur, reptile skins and hunting trophies account for the major portion of imported animal parts (figures 9 and 10). The majority of imported animals are intended for sale in Slovenia, although some are sold on to other countries by Slovenian companies.

Figure 9

Import of live animals protected under the CITES convention

Source: Ministry of the Environment, Spatial Planning and Energy, EARS

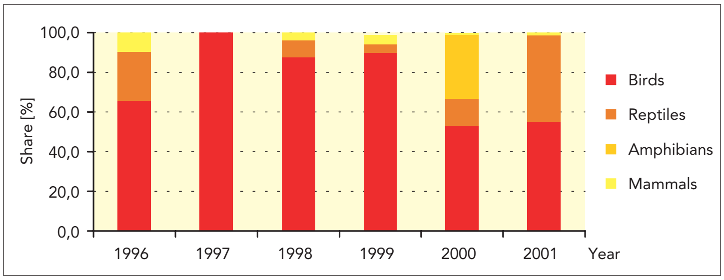
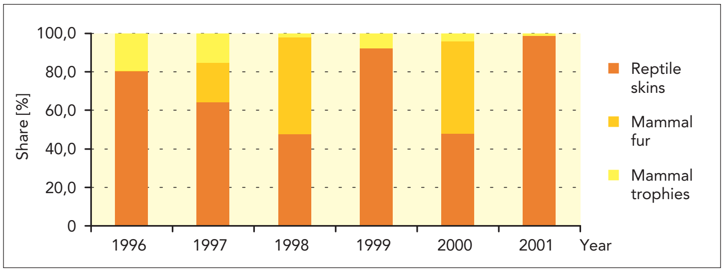


Figure 10

Import of animal parts protected under the CITES convention

Source: Ministry of the Environment, Spatial Planning and Energy, EARS



Waste

The chapter deals with the generation various types of waste, the transboundary movements of waste (import, export) and waste management.

Human activities produce each year 1.7 million tons of waste, or 873 kg per inhabitant. The generation of hazardous waste is growing. A major increase was recorded in 2001 compared to 2000 (by 43,503 t) (figure 11). In part this increase can be ascribed to the changed methodology of reporting, and to the change in the classification list, while there was also an increase in the number of those liable to report (by 64).

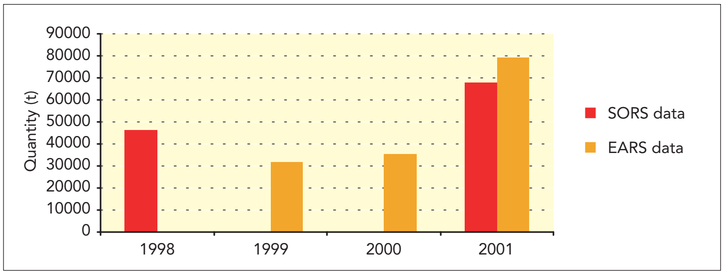


Figure 11
Generation of hazardous waste
Source: Waste Management database, EARS 2002; Statistical Yearbook 2000 and 2001, SORS (Statistical Office of the Republic of Slovenia) 2001

Data show that around 450 kg of municipal waste per inhabitant is generated each year in Slovenia. Owing to the changed methodology of data collection, it is not possible to identify any trend. According to data from the European Environment Agency, there is a trend of growth in the generation of municipal waste in the member states (for 1999 the average quantity was 500 kg/inhabitant/year).

The share of the population incorporated into the public service of regular collection and removal of municipal waste is rising continuously. From approximately 76 % in 1995 the share grew to 93.4 % in 2001. Thus far 70 % of the municipal waste management public service contractors have started implementing separate collection of waste.

Waste management methods are still dominated by land filling, at 51 active municipal landfills. In line with the regulations on landfill of waste the operation of 21 landfills is due to cease by 2004, and a further 13 landfills will cease operation by 2009. After 2008 a total of 17 landfills should still be operating, and by then they will have adjusted to the prescribed demands. Only one hazardous waste landfill is operating in Slovenia (Metava), and this takes around 500 t of waste each year (mainly from the greater Maribor area).

Import and export of waste

In 2000 a total of 4702 tons of hazardous waste were exported, only to EU countries (Austria, Germany, Belgium and the United Kingdom). Of this, 4177 tons of hazardous waste were exported for removal procedures and only 525 tons for recycling. In 2000 a total of 22,326 tons of hazardous waste were imported from Croatia, Hungary and Romania for recycling, of which 22,280 tons were waste lead batteries sent at MPI Mežica and 45.6 tons were acid and base solvents at the Celje zinc works.

Waste incineration

In Slovenia there are two waste incinerators that have obtained licences for incinerating waste (LEK d.d., Ljubljana and PINUS TKI d.d., Rače), and five waste incineration plants (Energetika Ravne d.o.o., Ravne na Koroškem, Salonit Anhovo d.d., Anhovo, OPTE Ptuj d.o.o., Ptuj, Glin Pohištvo d.o.o., Nazarje and ETRA 33 d.d., Ljubljana), which have obtained licences for processing waste (the use of waste as fuel).

The report also deals with the issue of managing waste from agriculture and forestry, mining and power generation, construction, sewage sludge and other types of waste, for which the rules and methods of management are or will be governed by special regulations (waste oils, end of life vehicles, end of life tyres, waste of electrical and electronic equipment, batteries, asbestos, PCB/PCT, waste from TiO_2 production, medical waste, slaughterhouse waste and packaging waste).

Noise

Noise is increasing in the natural and living environment. The levels of noise in a given area are directly linked to the density of population. In the urban environment noise generally exceeds that in the rural environment, with the population numbers increasing twice as quickly in urban areas as in the non-urban environment.

The main factor of environmental noise is road traffic. In recent years there has been a dramatic rise in the number of motor vehicles registered, while a significant amount of the noise in cities is produced by outdated vehicles (especially urban passenger transport vehicles). According to noise measurements in Ljubljana, the wider area of the city centre has an above-average noise load. Around 50,000 residents are estimated to be living in these areas, representing approximately a fifth of Ljubljana's inhabitants.

Noise loading was calculated for all 6156 km of national roads in 1999. The total number of excessively burdened buildings during day and night is 10,526 in the day and 10,365 in the night, most of them lying alongside class I main roads.

Biotechnology – genetically modified organisms (GMO)

This year saw the adoption of the Management of Genetically Modified Organisms Act, on the basis of which it will be necessary to register units in which work with GMO's will be conducted, permission or approvals will have to be obtained for work with GMO's for an individual safety class and permission will be needed for the deliberate release of GMO's into the environment and for placing GMO products on the market.

Currently work with GMO's is being conducted in 21 closed systems, most of them (12) at university faculties, 5 at public institutes and 4 at units within companies. In 19 cases genetically modified microorganisms are being used, in 5 cases transgenic plants, in 5 cases transgenic animals and the remaining 3 closed systems are dealing with genetically modified cell cultures, human and animal cell cultures and embryo cells.

No controls have yet been put in place for the import of GMO's, although given the data on imports of the two main types of maize and soya by origin of import it can be concluded as highly probable that genetically modified organisms are also present.

Chemicals

On the basis of the chemicals act, since 1999 within Slovenia's national chemicals office records have been set up for producers and importers of dangerous chemicals, and data on dangerous chemicals has been systematically collected. The list has entries for 12,813 reports of placing dangerous chemicals on the Slovenian market. The share of imported chemicals amounted to 86 %, and the share produced in Slovenia was 14 %. The major portion of chemicals were in the group that are harmful to health (4775). By far the largest share of dangerous chemicals (10,774) is intended for industry and craft establishments, 1771 are intended for general use, and only a minor portion (443) is for use in agriculture and specialised shops.

Radiation

This chapter deals with natural and artificial radioactivity in the environment and radioactive waste.

Natural radioactivity

Natural radioactivity levels are higher in the central and south-western parts of the country. Extensive research on radon concentrations in all schools and kindergartens in the country has shown that in the majority of buildings (72 %) the concentration was under 100 Bq/m^3, while in 2 % the values exceeded 800 Bq/m^3. In two kindergartens the concentrations exceeded 2000 Bq/m^3. Appropriate mitigation work was carried out in these buildings.

Artificial radioactivity in the environment is a consequence of global radioactive contamination, the operation of nuclear plant, the mining and processing of uranium ore and contamination linked to technologically enhanced sources of natural radioactivity.

A comparison of the contamination of Slovenian territory with the levels of long-lived radio-nuclide ^{137}Cs directly after the Chernobyl accident (1986) and 10 years later showed that contamination in the upper layer of soil had dropped to less than a half, and the ^{137}Cs had already penetrated into the lower levels. The heaviest contamination at time of the accident was found at foothills of the Alps due to high precipitation (50-70 kBq/m^2), while the range in the central Slovenia was around 20-25 kBq/m^2.

Radioactive waste

At the end of 2001 the entire quantity of low and intermediate level radioactive waste, excluding mine waste, was around 2300 m^3, and spent fuel amounted to around 90 m^3 or 260 tons of heavy metal. Since there is no repository for radioactive waste, all radioactive waste and spent fuel are stored temporarily in storage. Low and intermediate level radioactive waste generated during the operation of the nuclear power plant is stored in adjacent on-site storage. All other low and medium level radioactive waste from the various small-scale producers is stored in the Central Radioactive Waste Storage at Brinje near Ljubljana. Only low level radioactive waste from the closed uranium mine of Žirovski vrh has been disposed of on the tailings dumps.

From the aspect of long-term management of radioactive waste and spent fuel, the most important thing is selection of permanent solution. The siting of a repository is an extremely challenging project because of low public acceptance. The evaluation of the environment and selecting potential zones was concluded in 2001. The confirmation of the suitability of the location is much more challenging due to participation of the local communities. According to optimistic projections this could be concluded by 2005, when the construction of the disposal site would also be started.

Natural and other disasters

This chapter deals with major natural and other disasters – those that might endanger or affect human life or health, might damage the environment or cause large-scale damage to property.

More than 300,000 ha of Slovenian territory is in danger of flooding. Major and extensive flooding can be expected across 94,000 ha of surface area. Furthermore, over 2500 ha of urban area is also prone to flooding. More than half (54 %) of all the flood-prone area is in the Sava River basin, with 42 % lying in the Drava basin and 4 % in the Soča and tributaries basin. Over a quarter of Slovenia's inhabitants live in areas where catastrophic floods are possible (floods with a return period of 50 years and more). There are frequent landslides, occurring on a third of the country's territory. The forests most at risk from fire are in the sub-Mediterranean part of the country, in the Sežana forest management area. In this area 90 % of all forest areas destroyed are the result of fire. The areas most at risk of earthquakes are Ljubljana, Idrija, Tolmin and Krško-Brežice. Around a third of all inhabitants live in areas where earthquakes of the 8^{th} and 9^{th} level on the EMS scale are possible.

Of the accidents linked to industrial activities and transport, those most dangerous for the environment and human health are accidents involving dangerous chemicals. In 2002 new legislation came into force, and in order to reduce the risk to people and the environment from major accidents involving dangerous chemicals it defines obligatory measures for the operators of "hazardous industrial activities". The measures cover reporting sources of risk to the competent bodies, elaborating a safety report and planning measures to be taken in the event of accidents and informing the residents in their vicinity of possible major accidents.

Each year on average one traffic accident occurs involving spillage of a major quantity of hazardous substance, most commonly petroleum or its derivatives, and in addition to petroleum, in recent years there have been minor spills of acetic acid, hydrochloric acid, various paints and varnishes.

Electromagnetic radiation (EMR)

In comparison with natural radiation, the intensity of artificially created radiation through the technological revolution has increased dramatically. On the 22 existing high tension electricity cables (seven cables of 400 kV, five of 220 kV and ten of 110 kV), thus far limit values have not been exceeded. It is estimated that owing to low frequency electromagnetic radiation from cables, around 130 km^2 of territory is unsuitable for residences, and this represents 0.6 % of Slovenia's entire territory.

High frequency electromagnetic radiation in the environment, which is a consequence of telecommunications equipment, radio and television emitters and radars, is always found at high-altitude locations, so there are no residential and other buildings in their vicinity and there is no possibility of excessive exposure to EMR.

In Slovenia as at 10 May 2002 a total of 436 permits had been issued for setting up base stations for mobile telephones. The radiation loading is under the permitted limit values, and is excessive only in the direct vicinity of antennae at the base stations in the main beam of the antenna's radiation characteristic. Results of measurements in the surroundings of base stations show that nowhere does the loading of the residential and natural environment with EMR exceed the limit values set out in the regulation.

3. Human health

The quality of drinking water

The quality of drinking water is regularly monitored. In the majority of cases public water supply is appropriate and adequate. In 2000 almost 155,000 (7.8 %) citizens still had no drinking water supplied from the public water supply. Hydric epidemics appear in systems that are unmanaged, without water protection zones arranged, and where the state of catchments and equipment is poor.

Drinking water microbiological research has shown that there are more unsuitable samples where there are also relatively more medium and small-scale public water supply systems. In 2000 the most frequently exceeded recommended value (0.1 µg/l) was for the pesticide atrazine. Another cause of unsanitary drinking water is the excessively high concentration of nitrates, particularly where groundwater in agricultural areas is used as the drinking water source. In 2000 there were four public water supply systems with permanently excessive nitrate concentrations (50 mg/l as NO_3), all in the area of supervision of the Murska Sobota Health Protection Institute.

Quality of natural bathing water

In 2000 a total of 170 bathing locations were recorded and inspected, most of them in running water (suitable water quality in the Kolpa and Soča rivers, fecal pollution identified in the bathing sites along the Sora, Sava Bohinjka and Sava Dolinka, the Savinja and partly the Krka), followed by bathing locations in still water (all samples suitable) and coastal bathing areas (75 % of bathing areas attained criteria of good quality bathing water).

This chapter also deals with the health suitability of foodstuffs, the influence of polluted air on human health, and exposure to solar radiation, while an estimate is also made of the costs of the harmful effects of the environment in Slovenia in 2000.

4. Integration of environmental protection considerations into sectoral policies

Agriculture, forestry, hunting and fishing

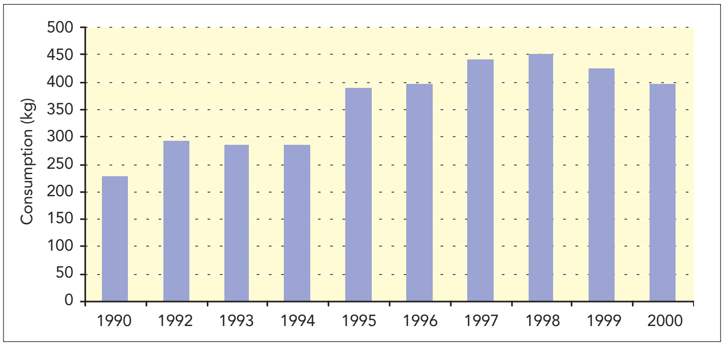
In the last five years the consumption of mineral fertilisers has eased off, and in 2000 amounted to 174,620 tons (or 397 kg/ha of arable land). Nitrogen nutrients predominate, and account for 45 % of all inputs. From 1990, with 27,169 t, nitrogen consumption grew to 34,847 t, but in recent years this has eased off (figure 12). Despite recent measures, this easing off does not yet seem to be sufficiently established.

Livestock herd sizes have not changed significantly in the last five years, with increases only in the numbers of horses and sheep. The application of nitrogen through livestock manure amounts to 154 kg/ha of agricultural land. Slovenia is therefore still characterised by a 1:2 ratio between nitrogen from mineral and animal fertiliser. The annual application of nitrogen through livestock manure is limited to 210 kg/ha, but a new limit value as of 1 January 2003 sets a limit of 170 kg/ha; this value is also provided by EU directives.

Figure 12

Consumption of mineral fertiliser in kg per hectare of arable land in Slovenia from 1990 to 2000

Source: Statistical Yearbook of the Republic of Slovenia 2001, SORS



In recent years the use of pesticides has continued to increase, from 1495 t in 1995 to 1602 t in 2000. Total consumption amounted to 3.6 kg/ha of arable land, placing Slovenia among the bigger users in Europe.

April 2001 saw the adoption of the Slovenian Agri-Environmental Programme (Slovenski kmetijsko okoljski program – SKOP), the intention of which is to popularise agricultural production that will meet the needs of consumers, protect their health, ensure sustainable use of natural resources and facilitate the preservation of biodiversity and the characteristics of the Slovenian landscape. A total of 23,298 applications for subsidy have been submitted, the greater part for sustainable livestock, organic farming and Alpine pasture. Measures were approved for 83 % of the area requested, and this represents 5.6 % of all agricultural land in use.

Taking account of the increased area under forests over the last 50 years, forest timber stocks have increased 2.5 times. An important feature is that in the growth of the timber stocks of Slovenia's forests, each year more than 3 million tons of CO_2 are extracted from the air.

Defoliation in forest stands point in particular to the effect of polluted air on trees. There are high levels of defoliation among fir, pine and oak trees. Beech trees have the highest share of healthy crowns, and they are also the species showing the least signs of damage (figure 13). Owing to the major lag of felling behind new growth in the past decade, forestry plans envisage an increase in the possible felling, although this should in total not exceed 65 % of the stands of evergreens and 53 % of deciduous trees.

This chapter also sets out the main characteristics of hunting and fishing in Slovenia.

Figure 13

Share of trees in defoliation classes by tree species in 2000

Source: Forest Institute of Slovenia, 2002

Energy

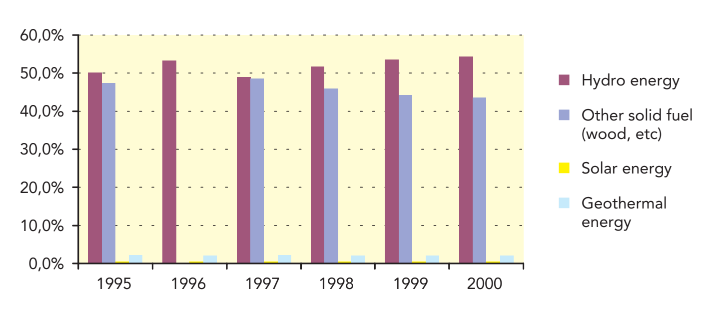
The work done thus far in the area of economical energy consumption, technological renovation and modernisation of industry is already bringing positive effects in both the environmental and economic aspects. Slovenia is improving its energy intensiveness and its energy efficiency.

In comparison with 1995, the production of available primary energy in 2000 was 3.1 % higher, with the reduction in the use of coal and an increase in the use of gas fuels and in the share of hydro power. The share of all renewable energy sources (RES) in the available primary energy is slowly growing, and in 2000 reached 9.4 % (the highest share held by hydro power and other solid fuels) (figure 14). Since the share of RES is also less than 7 % in the EU energy balance, under the EU energy policy a precise strategy and action programme have been determined for achieving the 12 % share of renewable energy in satisfying the total energy requirements of the EU by 2010.

Figure 14

Structure of renewable sources (1995-2000)

Source: Statistical Yearbook of the Slovenian energy sector



The quantity of total final energy is growing, primarily in the transport and in the sector of other consumption, while in the industrial sector consumption of final energy has fallen.

As part of the efforts for long-term reduction of emissions, rehabilitation was finished on the Šoštanj thermal power plant, involving flue gas desulphurisation. This meant a 60 % reduction in SO_2 emissions at Šoštanj from 2000 to 2001. Rehabilitation work is also under way at the Ljubljana power station and heating plant to reduce NO_x emissions at block 3.

Transport

Environmental loading from transport is becoming increasingly intensive. The transportation infrastructure physically encroaches on the environment, while the traffic upon it burdens the environment through potential hazards for people and the environment (accidents, spills) and through emissions of harmful substances. Transport consumes a third of all primary energy and is one of the biggest and most widespread consumers of non-renewable energy sources.

Despite the technical improvements to motor vehicles, owing to the increased need for mobility, greenhouse gas emissions into the atmosphere are growing. The situation is being made worse by the changing structure of transport, since the share of road traffic is continuously growing and that of rail transport is not. Freight transport, especially on the roads, is increasing in its entirety, although the share remains below the average for the EU countries.

In passenger transport the trend of diminishing use of public transport is becoming more pronounced, both in urban and intercity passenger transport. The reduction in the number of passengers has a consequent effect on the economy of public transport, and makes it more difficult to upgrade the fleet of vehicles. The comparative advantages of private transport are therefore increasing. Given the growth in the number of motor vehicles and increased mobility, there has been a concomitant rise in the consumption of motor fuel and along with it emissions of CO_2, the major greenhouse gas. The age structure of vehicles is favourable (the average age of vehicles is 6.8 years), and there is also a growing proportion of motor vehicles equipped with catalytic converters.

Industry

Industrial pollution touches on all areas of environmental protection. This chapter shows the air and water emissions from industry, from which it is clear that almost all emissions (more than 90 %) are generated in so-called large industrial plants. For these facilities, in line with the IPPC directive (on the integrated prevention and pollution control) a standard environmental permit will be introduced, and this may only be obtained if the company fulfils the determined criteria.

In Slovenia there are 10 active industrial waste dumps and one hazardous waste dump. In addition to the active waste dumps there are also a range of abandoned dumps created by inappropriate land filling of industrial waste. These are the tar dump at Maribor, the industrial waste dump of Globovnik near Ilirska Bistrica, and the iron hydroxide and ash dump at Kidričevo. These old burdens require special technical solutions and major investment, and their rehabilitation is envisaged in the strategic guidelines for waste management.

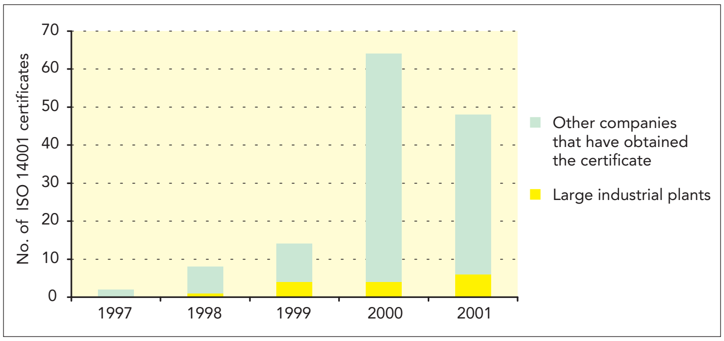
Voluntary participation by organisations in the system of environmental management is enabling industry and other organisations to exercise more effective control over their own impact on the environment, and this is reflected in various activities of individual organisations, such as continual improvements in environmental management, consistent observance of environmental protection regulations and so forth. In the area of environmental management Slovenia has brought in the ISO 14001 series standard. The number of ISO 14001 series certificates awarded in the period from 1997 to 2001 has grown (figure 15). A total of 136 certificates were awarded, of which large industrial plants received 15. By industrial activity most certificates were gained in the area of metals and metal products production, and in the production of chemicals, chemical products and synthetic fibres.

Building upon the ISO 14001 standard through implementation of the EMAS system and the awarding of an environmental label for products by the competent Slovenian bodies will be enabled upon Slovenia's accession to the EU.

Figure 15

Number of ISO 14001 certificates received in the period from 1997 to 2001 by all companies and in particular by large industrial plants

Source: Slovenian Chamber of Commerce, 2002



Tourism

Tourism generates environmental stress primarily through travel, accommodation and infrastructure. The greatest pressures are during the high points of the tourist season, when tourists crowd into small areas (mainly during the holidays in the seaside and mountain resorts). At this time in Slovenia's coastal municipalities there are 50 % more people than the permanent population, and there is an equal rise in the generation of solid waste. In this zone the quantity of available drinking water is lowest in the summer months, while the estimated consumption of water for tourism purposes is at least 3 times higher. The quantity of waste water increases, and this adds to the undesired eutrophication of the already very shallow Slovenian sea. Similar problems are also encountered at Bled.

In the mountains, the environment is seriously stressed by ski resorts and their accompanying infrastructure. The arranging of ski resorts involves construction work which contributes to the changing extent of forests and water regimes. In the areas of ski resorts it is the timid animal species that are most affected (e.g. the capercaillie). For example, in the area of Pohorje and Kozjak in the 80's a total of 37 active capercaillie breeding grounds were known, and in 2000 there were only 16 left. The surface area of the ski resorts had in this time grown significantly. Tourism, and even more so certain forms of recreation, exert great stress on sensitive habitat types (such as caves), and on areas where sensitive species breed (such as the lynx, owls and birds of prey, the black stork and bird nesting colonies).

5. Financing environmental protection

Fulfilling the targets and measures set out in the National Environmental Action Programme has in recent years been pursued mainly through the provision of public sources of funding. Increasingly, and particularly over the past year, private capital interests in investing in the area of environmental protection have become more developed, and this is reflected in the rise in the current and capital costs of commercial companies and in the gradual expansion of the number of partnership agreements concluded for the cooperation of the public and private sectors in constructing municipal infrastructure and providing public services for environmental protection.

In 2000 the Environment Ministry's budget amounted to 17.3 billion SIT, in 2001 it was 21.7 billion SIT, and in 2002 it was 31.7 billion SIT, which is a consequence of taking over the sector of energy from the Ministry of Economy. In recent years the greatest growth has been in the share of capital transfer funds for construction of municipal infrastructure, owing largely to an increase in funds from foreign donations and a corresponding increase in the share of proprietary participation in co-financing of the foreign donation, and owing to increased subsidies to private operators and private companies for interventions in renewable energy sources.

The share of funds earmarked for environmental protection in the total expenditure of municipalities rose from 4.19 % in 2000 to 5.76 % in 2001. The value of disbursed loans from the national Environmental Development Fund, the public fund for financing the construction of local infrastructure, grew from 1.6 billion SIT in 1999 to 2.6 billion SIT in 2001. There was also a growth in the value of disbursed loans from the Environmental Development Fund in financing environmental investments by commercial companies; from 1.9 billion SIT in 1999 it rose to 2.3 billion SIT in 2002.

In recent years, implementation of the "polluter pays" principle has become a major source of financing environmental protection policy measures, and both a positive trend and a continuously increasing scope has been recorded. The share of contributions attributable to environmental loading has been rising year-on-year in all tax revenues of the Slovenian budget. In 2002 it was expected to account for 3.4 % (figure 16).

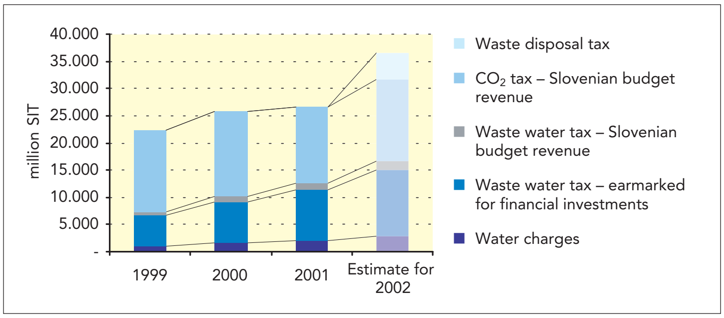


Figure 16
Financial effects of environmental loading contributions
Source: Ministry of Finance (Balance sheet of national budget expenditure and revenues), General Customs Office, internal data of the Environment Ministry and EARS (Water payments, taxes and concessions database, Sources of pollution database, Waste management database), 2002

6. Local public services for environmental protection

Providing local public environmental protection services (mains drinking water, collecting, discharging and treating of urban waste water, municipal waste management, public sanitation and cleaning of public areas, arranging of public paths, pedestrian zones and green areas, inspection, oversight and cleaning of heating facilities, smoke flues and ventilation shafts for air protection) is the task of local communities, i.e. the municipalities. An average of 62 contractors perform the local public services of mains drinking water, collecting, discharging and treating of urban waste water, municipal waste management and disposal of the remainder of municipal waste. The majority of them are organised as public companies, owned entirely by the municipalities, or they are state public works companies.

It has been established that the organisation to date of public environmental protection services has not been appropriate, something particularly evident in the irrational level of organisation and the excessive number of companies, which for the most part are involved in all local commercial public services, but at the same time with activities outside the system of public services. With the reform of local self-government the situation deteriorated, since the smaller new municipalities started establishing their own public companies or public works units for performing all the public environmental protection services. The majority of problems can at least be mitigated or in fact entirely eliminated by linking up municipalities and merging financial and personnel resources.

7. Accession to the EU and international cooperation

This chapter deals with the negotiation process and the securing of transition periods, institutional strengthening as part of the alignment with the European Union and certain tasks in connection with this, such as reporting to the EU. In the area of the environment Slovenia is ready for the duty to report, since with this in mind test reports have already been drafted, the institutions bound to report have been determined and the reporters appointed.

The chapter presents Slovenia's cooperation in the European Environment Agency, which was the first EU body to accept into its ranks the candidate countries before their actual accession to the EU. It also describes the available EU financial resources for carrying out capital projects in the associate member states.

Within the context of international cooperation, the most important international activities of the Environment Ministry are listed. These include cooperation with the Global Environmental Facility (GEF) and the United Nations (Slovenia was elected a member of the UN Commission on Sustainable Development for the period 2001-2003). In recent years Slovenian representatives have been in numerous high-profile positions in international organisations, such as members of the Environmental Policy Committee of the UN Economic Commission for Europe, the European Environment Agency, the UN Framework Convention on Climate Change, and in particular its Kyoto Protocol on reducing greenhouse gas emissions.

The chapter provides a list of all signed international agreements. In recent years numerous international agreements have been ratified, including the CITES Convention on International Trade in Endangered Species of Wild Flora and Fauna, the Convention to Combat Desertification, which is the fundamental UN convention for soil protection, and the Kyoto Protocol.

8. Education, information and public cooperation

In the period 1997-2002 approximately 113 million tolars were allocated to providing environmental information, awareness raising and education, via annual public tenders. Numerous projects were supported, such as the Water Detective, the European mobility week, Geotrip, and the Eco-school as a way of life. Communication projects were carried out in support of waste management and nature protection, and in preparation for the World Summit on Sustainable Development a special information campaign was carried out under the banner "Slovenian initiative for sustainable development – Today I am shaping the future". Numerous publications have also been produced (newsletters, handbooks, posters and so forth).

In 2001 there were 105 environmental non-governmental organisations registered in Slovenia, numbering 25,549 members and around 150,000 sympathisers. The Ministry of the Environment is co-financing NGO programmes and projects through public tenders. Funds are growing each year, and this year NGO programmes and projects were co-financed to the tune of 30 million SIT. In April 2001 at the first environmental forum a programme of cooperation was adopted between the Ministry and environmental NGO's under the banner "Partnership for the Environment", involving a three-year cooperation plan between the partners.

9. Implementing the National Environmental Action Programme

This chapter deals in detail with the implementation of the National Environmental Action Programme (NEAP), with an explanation being given for the implementation of each individual measure in all areas of the NEAP (pursuing an improved state of the aquatic environment, waste, conservation of biological diversity, protection of the air and climate, the soil, noise, risk, radiation and measures to support implementation of the programme). Upon analysis of the implementation it was determined that certain measures are no longer relevant, since the area is arranged differently, or rather certain measures are not in harmony with the requirements of EU directives.

Owing to the limited availability of data on spending for environmental protection, the chapter on financing implementation of the NEAP is abridged. What is significant is that spending, both by the public and the private sector, for the purpose of implementing the NEAP is growing from year to year. The largest portion of funds have been invested in the areas of water protection and management, waste management and air protection, which have been identified in the NEAP as being more costly. Public sector funds are also growing as a result of the influx of the foreign donations that Slovenia has succeeded in obtaining, for the most part precisely in the area of environmental protection. Another key instrument is concessions on tax payments for waste water, which those public sector organisations liable to pay have channelled entirely into the construction of collecting systems and treatment plants. A positive trend of growth is indicated by the volume of loans taken by private commercial companies from the Environmental Development Fund.

The majority of spending has been in the public sector. Private sector funds have been evident primarily in the area of investments in reducing emissions into water, reducing air pollution and in measures to modernise production and reduce waste, as well as in rehabilitation of waste disposal sites.

The Ministry of the Environment, Spatial Planning and Energy has determined that there are no major deviations from the programme, and that the programme is being implemented in all areas and within the framework of available funds.

Environment in Slovenia 2002

Environmental Indicators

Environmental indicators		Period
State and changes in the environment		
Water		
1. Water use	😐	1997-2001
2. Urban waste water treatment	😐	1998-2001
3. River water quality index	😐	1992-2000
4. Nitrates in groundwater	😐	2000
5. Pesticides in groundwater	☹	2000
Air		
6. Sulphur dioxide emissions	☺	1990-1999
7. Nitrogen oxide emissions	☹	1990-1999
8. Exceedance days of sulphur dioxide threshold values	☺	1992-2000
9. Exceedance days of ozone threshold values	☹	1995-2000
Ozone and climate change		
10. Consumption of ozone depleting substances	☺	1989-2000
11. Greenhouse gas emissions	😐	1999
Soil		
12. Land use and land cover change	☹	1995
13. Nitrate directive implementation	😐	2002
Nature and biodiversity		
14. Protected areas	😐	1992-2002
15. Forest decline and tree defoliation	😐	1985, 1991-2001
Waste		
16. Generation of municipal waste	☹	1995-1999
17. Generation of hazardous waste	☹	1998-2001
18. Transboundary movements of hazardous waste	☺	1995-2001
Integration of environmental considerations into sectoral policies		
Agriculture, forestry, hunting and fishing		
19. Agri-environmental measures	☺	2001
20. Pesticide consumption	☹	1992-1999
21. Fertiliser consumption	😐	1990-2000
Energy		
22. Final energy consumption	☺	1990-1999
23. Renewable electricity	☺	1990-1999
Transport		
24. Average age of vehicle fleet	☺	1995-2002
25. Vehicles meeting emission standards	☺	1990-1999
26. Freight transport – modal split	☹	1995-2001
Health		
27. Drinking water quality	☺	1999-2001
28. Bathing water quality	😐	1996-2001
Financing and economic instruments of environmental protection		
29. Environmental expenditure	☺	1999-2001

1. Water use

The water exploitation index in Slovenia is determined as the ratio between the mean entire annual consumed water and the long-term average of available water. It describes how the overall required amount of water affects (exerts pressure) on the available amount of water.

The principle holds true that the demand for water must be equal to its abstraction from water resources. The majority of abstracted water is not consumed, after processing or natural purification is returned to the aquatic cycle and becomes available for renewed use. Heavy demand in comparison with available resources leads to the emergence of problems owing to excessive exploitation of water resources.

The long-term average quantity of available water in Slovenia is obtained from the long-term mean quantities of precipitation, minus the long-term average quantity of evapotranspiration, and plus the long-term mean quantity of water flowing into the country. This is comparable to the long-term average quantity of water flowing out of the country, to which is added the long-term average quantity of consumed water that is not returned to the water cycle at the place of abstraction (losses).

Users of water are grouped into sectors, which are determined in view of the manner of supplying water, and using the records deriving from this:

- public water supply (households and public institutions);
- agriculture (irrigation);
- industry (industrial facilities, health resorts);
- energy (cooling water for thermal and nuclear power stations).

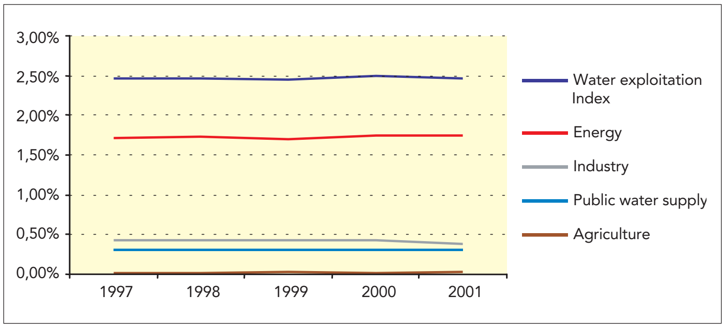


Figure 1-1
Water exploitation index in Slovenia by sector
Source: Hydrological Data Bank, EARS, 2002; Database of water payment, taxes and concessions, EARS, 2002

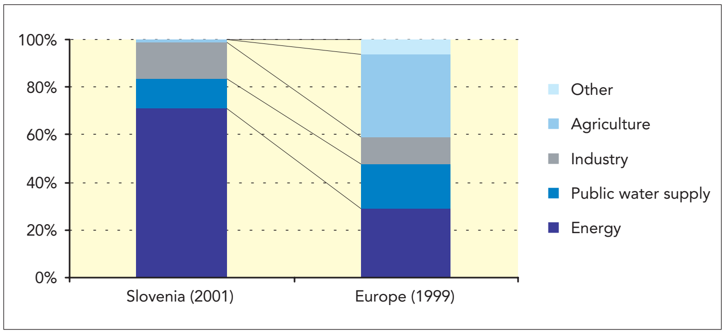
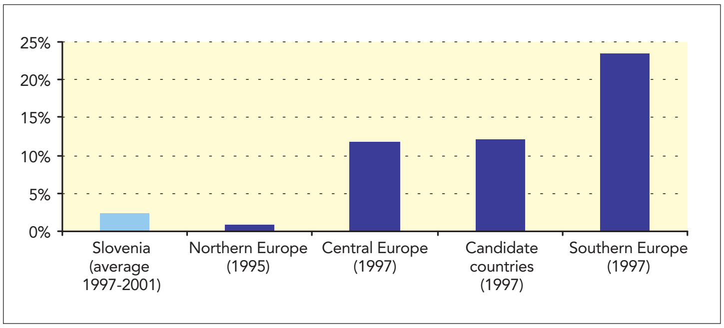


Figure 1-2
Structure of water use by sector in Slovenia and Europe
Source: data for Slovenia: Hydrological Data Bank, EARS, 2002; Database of water payment, taxes and concessions, EARS, 2002; data for Europe: Water Exploitation, Indicator fact sheet, (EEA), 2002

Slika 1-3

Water exploitation index in Slovenia and European regions

Source: data for Slovenia: Hydrological Data Bank, EARS, 2002; Database of water payment, taxes and concessions, EARS, 2002; data for Europe: Water Exploitation, Indicator fact sheet, EEA, 2002



Targets

One of the aims of the Water Framework Directive (WFD) is to promote such use of water that in the long term will protect available water resources. A balance is required between abstraction and replenishing of groundwater, with the ultimate goal of ensuring a good state of groundwater. The conditions for efficient exploitation of water must include consideration of an economic analysis of water use on the level of river basins (catchments). Equally, the member states must take into account the principle of reimbursing the costs of the public services operating in the water sector, and the costs of protecting the environment and water resources.

The sixth EU Environmental action programme (2002-2012) is focused on reduced consumption of raw materials in the production and supply of goods and services. Since water is also considered to be a raw material, more efficient use of water should be encouraged according to the principle that the abundance of the resource can sustain exploitation. For this reason one of the aims in water use is to ensure such quantities of water abstraction which in the longer term the resource can sustain.

Assessment of trend

In order to achieve this goal we must implement measures for more efficient water use in all sectors, on the national, regional and also local levels. In the period under review (1997/2001), the index of water use has shown practically no change, since in comparison with what is consumed, available water is plentiful in Slovenia. Given the trend in annually available water, which indicates a reduction in available annual quantities that are unfavourable for use in individual sectors (climate change) and its appearance in periods of the year, the indices of water use by individual sector will increase in the coming period. In terms of annual consumption of water, Slovenia ranks among the European countries with the lowest water use.

Data and sources:

Data for Slovenia:

The long-term average quantity of available water (Q; in m^3/s) in the period 1961-2000 is determined for Slovenia as the mean value of annual quantities Q = O + l

- *O (outflow) is the average annual quantity of water flowing out of the country (determined by hydrometric measurements and observations at selected hydrological profiles; for areas not covered by hydrological profiles (around 10 % of the country's territory), the values are estimated taking into account the surface area of the zone and outflow from comparable hydrological profiles);*
- *l (loss) is the average annual quantity of water which in the annual cycle does not flow out of the country, or is not returned to the water cycle at the point of abstraction, and is not counted in O outflow.*

Given the negligible losses, an average annual quantity of available water determined in this way (Q) is comparable with the available quantity of water determined according to the balance sheet method (Q = P(precipitation) - E(evapotranspiration) + D(inflow into the country)).

Data on the long-term average quantity of available water derive from the state monitoring service for measuring, observing and determining basic hydrological parameters (EARS). Data on the water table are recorded continuously (hourly and daily values) and enable a determination of hourly and daily flows. Hydrometric measurements in profiles are carried out in compliance with international standards around 6 times a year. The state monitoring service for basic hydrological parameters is aimed at monitoring the quantities of water, their distribution in space and time, at monitoring the water regime, drawing attention to extraordinary hydrological phenomena and so forth. In compliance with international hydrological standards (WMO) and the actual conditions, water measuring stations cover around 18,000 km^2 of the national territory. On average, one water measuring station covers around 120 km^2 of territory. Aggregation of data for the national territory requires an estimate for those areas not covered by the water measuring stations (approximately 1800 km^2 or 10 % of Slovenia's territory).

Our assessment is that data on flow may deviate from the actual values by +/- 5 %. One weakness in estimating the data on the average annual quantity of available water for the country as a whole stems from the fact that water measuring stations do not cover the entire territory, and for this reason the quantity for a part of the territory is only estimated. The quality of the estimated data for territory without water measuring stations is not known. Data on flow at water measuring stations are not compared and harmonised with the meteorological data on precipitation and evapotranspiration.

Data on flow is kept at the Hydrological Data Bank (BHP) at the national Environment Agency as mean daily flow in cubic metres per second (m^3/s).

Data on water use derives from two sources: statistical records on the consumption of water for irrigation in Slovenia, Statistical Office of the Republic of Slovenia (SORS) and the database of water payments, taxes and concessions (EARS). The database of water payments, taxes and concessions has been created on the basis of declaration of the bases for calculating water payments on the basis of the Water Act (Official Journal of the Republic of Slovenia – OJ RS 67/02) and the Regulation on water payments (OJ RS 41/95, 84/97, 124/00, 110/01). Those liable are municipal water supply companies, and industrial plants and facilities.

Data in the base relate to 1997 and up to 2001. The new Regulation on water payments (OJ RS 100/02) binds certain other water users to make declarations also.

Data for Europe:

The structure of water use by sector in Europe represents the total for the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Ireland, Iceland, Italy, Latvia, Lithuania, Luxembourg, Hungary, Malta, Germany, Norway, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom (England and Wales only).

The European countries (for which data are available) are grouped into the following regions:

- *Central Europe: Austria, Belgium, Denmark, Germany, Ireland, Luxembourg, Netherlands, United Kingdom (England and Wales only),*
- *Northern Europe: Finland, Iceland, Norway, Sweden,*
- *Southern Europe: France, Greece, Italy, Portugal, Spain,*
- *Candidate countries: Czech Republic, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia*

Data on the quantities of consumed water in individual sectors by individual country in the last year, for which data were available, are pooled together and compared with the total quantity of consumed water in Europe.

The source of data is Water Exploitation, Indicator fact sheet, EEA, 2002.

The original data used in the indicator fact sheet are summarised according to the Eurostat New Cronos Database (Eurostat-OECD JQ 2000), from the EEA data warehouse (as at 26 July 2002) and the OECD Environmental Data Compendium, 1999. The data were gathered using so-called Joint Questionnaires (JQ 2000) which Eurostat and the OECD provide to countries (national statistical offices) every two years.

2. Urban waste water treatment

The methodology for categorising treatment plants into the aforementioned three levels of treatment (primary, secondary and tertiary treatment) is determined by a directive of the European Council (Council Directive 91/271/EEC concerning urban waste water treatment – UWWD). This methodology is also adopted in Article 2, paragraph 3 of Slovenia's Regulation on emission of substances in discharge of waste water from waste water treatment plants, OJ RS 35/96 (Treatment Regulation).

Roughly speaking the methodology determines that primary treatment is mechanical and/or chemical treatment which removes a lesser portion of the organic loading and part of the loading with sedimentary matter. Secondary treatment is in general biological treatment, which removes the major portion of the organic loading and part (20 % - 30 %) of the nutrient loading. Tertiary treatment is treatment which in addition to the organic loading removes the major portion of the nutrient loading.

The accompanying diagrams (Figure 2-1 and Figure 2-2) include a presentation of data on urban waste water treatment via cesspools. According to the Report on the state of the environment of 1996, as much as 45 % of urban waste water from households in Slovenia is treated via cesspools. Such treatment can be ranked among facilities for the primary level of treatment. The quantity of waste water treated in cesspools is estimated to be 0.2 m^3/day per inhabitant.

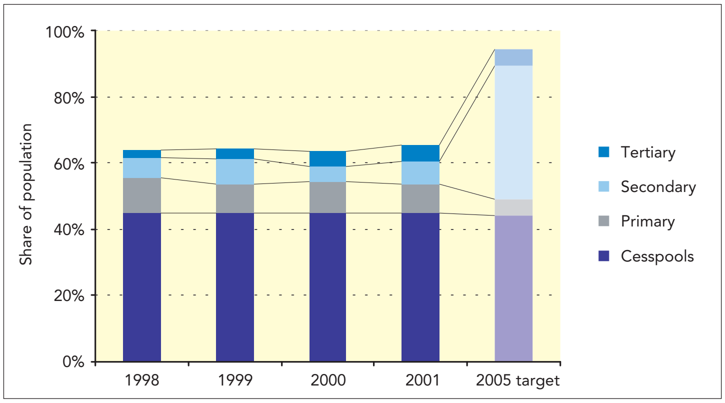


Figure 2-1
Share of Slovenian population whose urban waste water is treated in waste water treatment plants and cesspools and the target share envisaged for 2005
Source: Waste water treatment plants data base, EARS 2002; expert estimate

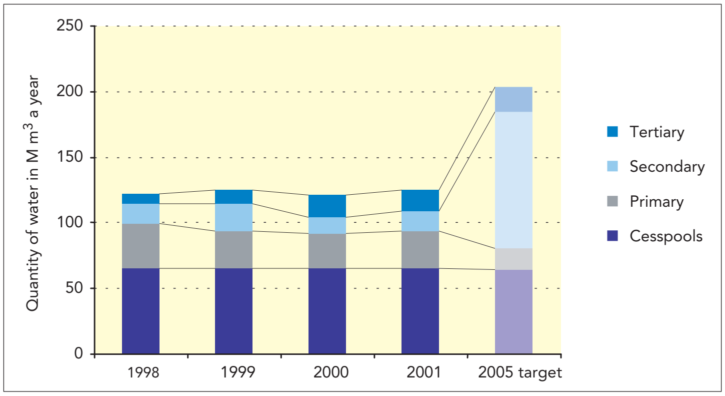


Figure 2-2
Quantity of waste water treated in waste water treatment plants and cesspools and the target quantity set for 2005
Source: Waste water treatment plants data base, EARS 2002; expert estimate

Targets

The targets which the EU seeks to attain in the area of urban waste water treatment are set out in the UWWD. In their pre-accession negotiations with the EU in this area the Slovenian negotiators were able to secure an agreement that Slovenia would meet these targets with a certain deferment. This is chiefly a consequence of the fact that in order to reach the targets set out by the UWWD; Slovenia would need major financial input and time to build the infrastructure.

The targets in this area in Slovenia are noted in the Treatment Regulation, which sets out precisely by which year we will construct the necessary treatment facilities in specific agglomerations. These targets are operationalised in the Decision on the action programme of discharge and treatment of urban waste water with the programme of water supply projects (OJ RS 94/99). This document also defines precisely which treatment facilities will be constructed/improved, under what timetables and how much financial input will be needed for this.

Assessment of trend

The action programme is being implemented according to the plan and dynamic envisaged. In illustration of its effects, figures 2-1 and 2-2 present the envisaged situation in the area of waste water treatment in 2005, when the programme will already be partly carried out. By that time we envisage the construction of the great majority of the treatment facilities, so the share of treated water being produced will increase significantly in comparison with the current situation. After 2006 only smaller treatment facilities will be constructed, and no major increase in treated water output can be expected thereafter.

Data and sources:

Data on the quantities of treated water (except data on cesspool treatment) and population data are taken from reports on operational monitoring of urban waste water treatment plants. The duty to perform monitoring of facilities and to issue reports on monitoring is defined in Article 24 of the Regulation on emission of substances and heat in discharge of waste water from pollution sources (OJ RS 35/96). The actual form of treatment facility monitoring is defined in the Rules on first measurements and operational monitoring of waste water and on the conditions for its implementation (OJ RS 35/96, 29/00, 106/01). Data are collected in written and electronic form. They are processed in the Waste Water Treatment Plants database database at the EARS.

*According to the Report on the state of the environment in Slovenia 1996, 45 % of the population is served by cesspools. In order to estimate the quantity of waste water in treatment via cesspools we took 0.2 m^3/day per population unit, that is, for 900,000 people 65,700 *1000 m^3/year.*

3. River water quality index

In Slovenia watercourses are ranked into four quality brackets. The complete assessment of quality is made on the basis of basic physical and chemical analyses, analyses of heavy metals (Hg, Zn, Cr, Pb, Cd, Ni, Cu), organic micropollutants, microbiological and saprobiological analyses (saprobic index).

Based on the results of the aforementioned individual analyses, an overall assessment of the quality of the surface watercourse is made for each measuring point for a given year, taking into account the hydrometeorological conditions during sample-taking. The threshold values among the quality classes for basic physical and chemical, bacteriological and saprobiological parameters have been determined by regulations from 1976 and 1978: the Regulation on classification of water in inter-republic watercourses, international waters and waters of the Yugoslav coastal sea (OJ SFRJ 6/78) and the Decision on maximum permissible concentrations of radionucleides and hazardous substances in inter-republic watercourses, international waters and waters of the Yugoslav coastal sea (OJ SFRJ 8/78). For classification in the first and second classes of quality, which in the regulation are defined as drinking water, we also took into account the drinking water regulations in relation to heavy metals and organic toxins: the Rules on hygienic suitability of drinking water and amendments, (OJ RS 46/97, 52/97, 54/98, 7/2000), and for other threshold values foreign regulations, chiefly directives 75/440/EEC, Council Directive of 16 June 1975, concerning the quality required for the abstraction of drinking water in the Member States, 80/778/EEC, Council Directive of 15 July 1980, relating to quality of water intended for human consumption, the German rules for surface watercourses, Allgemeine Güteanforderungen für Fliessgewässer (AGA)-Entscheidungshilfe für die Wasserrechtbehörden in Wasser-rechtlichen Erlaubnisverfahren, Ministerium für Umwelt, Raumordnung und Landwirtschaft of 14 May 1991 (MBI.NW S. 863) and the recommendation of WHO (the World Health Organization) Regional Office for Europe, Revision of the WHO Guidelines for Drinking Water Quality, Report on the First Review Group Meeting on Pesticides, Italy, June 1990.

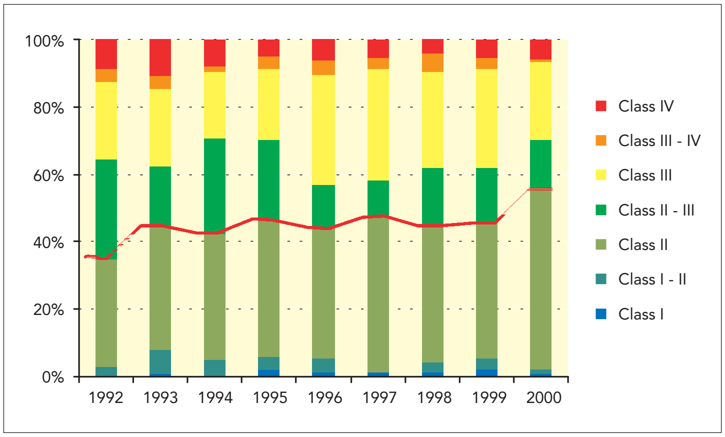


Figure 3-1
River water quality index – share of sampling points in a specific quality class
Source: Standardised database for water quality monitoring, EARS 2002

Targets

The aim of the Water Framework Directive (2000/60/EC), which we will need to implement in their entirety in Slovenia, is the good status of all bodies of surface water by the year 2015. In addition to this, another primary goal of this guideline is to prevent a deterioration in quality, in other words to maintain a good status.

In order to assess the state of quality in line with the Water Framework Directive, biological, physical and chemical, and hydromorphological parameters will be taken into account.

Assessment of trend

The share of sampling points ranked in individual quality classes in Slovenia from 1992-2000 is shown in Figure 3-1. Ranked in the first quality class are unpolluted surface watercourses, from which with possible disinfecting the water is suitable for drinking. Approximately 1 % of sampling points in Slovenia meets this criterion, and includes occasionally the Kamniška Bistrica at its source, Koritnica Kal and the Soča in Trenta.

The threshold between a good and poor status of quality is the boundary between quality classes 2 and 2-3. From 1992 to 2000 a trend of quality improvement was observed. There has been a marked increase in the share of sampling points ranked in the second quality class, with a corresponding reduction in heavily polluted watercourses. The share of surface watercourses ranked in quality class 4 has not changed in the last four years, and accounts for around 5 % of sampling points.

Flowing water in Slovenia makes up a very dense network of rivers, with its density averaging at as much as 1.33 km/km^2. Owing to Slovenia's highly varied landscape and its rocky composition, watercourses are short. Of the total length of 28 398 km of river network, as much as 15 656 km (around 55 %) are rivers or canals that are occasionally without water. Only 46 watercourses are longer than 25 km, amounting to only 22 % of the entire network. Only the Sava, Drava, Kolpa and Savinja rivers are longer than 100 km.

Data and sources:

National monitoring of surface watercourse quality is established on rivers with an average flow greater than 1 m^3/s. The length of surface watercourses on which monitoring is carried out amounts to 2141 km. The share of watercourses being monitored, calculated relative to the total length of all watercourses in Slovenia, amounts to only 7.5 %, given the large proportion of impermanent watercourses. Relative to the total length of watercourses wider than 5 m, however, the share of watercourses on which monitoring is carried out amounts to 96 %.

Data from analyses of samples are collected and processed in the standardised database for water quality monitoring at EARS.

4. Nitrates in groundwater

Pollution of groundwater by nitrates is presented through the share of measuring points on aquifers with granular and karstic-fissured porous strata, where the threshold values of NO_3 concentrations have been exceeded always, occasionally or never. In 2000 at each measuring point two samples were taken and analysed, except at the source of the Rižana, where several samples were taken and analysed. The threshold value of NO_3 concentrations in groundwater in Slovenia is set out in the Regulation on groundwater quality (OJ RS 11/02) and amounts to 25 mg NO_3/l. In order to provide a comparison with other European countries, the indicators use a threshold value for drinking water of 50 mg NO_3/l (98/83/EC and OJ RS 7/00).

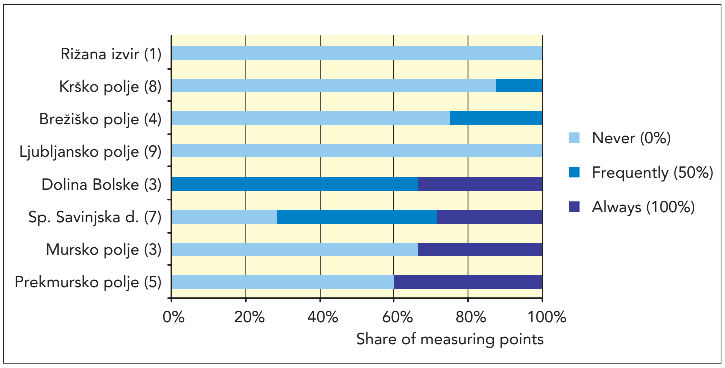


Figure 4-1

Frequency of exceeding threshold value for nitrates (50 mg NO_3/l) on eight Slovenian aquifers in 2000 (numbers in brackets indicate number of measuring points on individual aquifer)

Source: Standardised database for water quality monitoring, EARS 2002

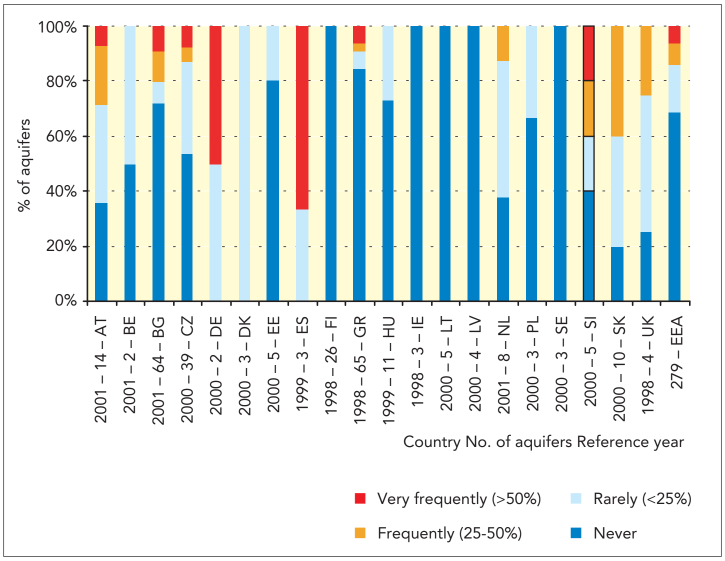


Figure 4-2

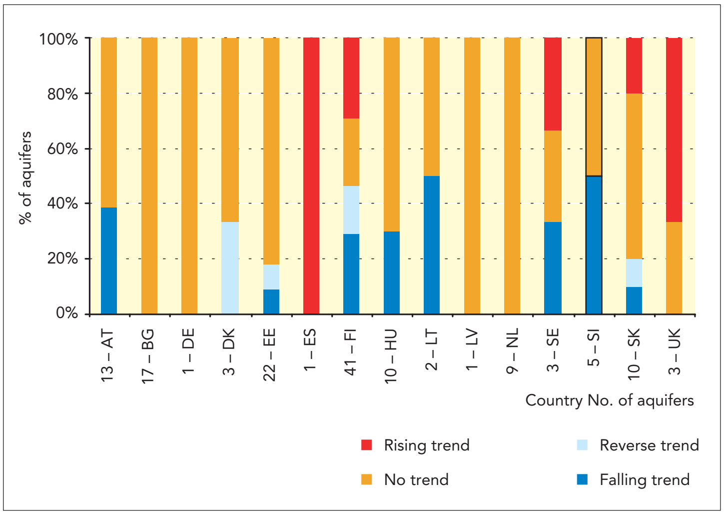
Frequency of exceeding threshold value for nitrates – comparison of Slovenia with certain European countries

Source: Standardised database for water quality monitoring, EARS 2002; Nitrates in Groundwater, Indicator fact sheet, EEA, 2002

Figure 4-3

Aquifers where statistics show long-term trend shifts in nitrate concentrations in groundwater – comparison of Slovenia (period from 1993 to 2000) with certain European countries

Source: Standardised database for water quality monitoring, EARS 2002; Nitrates in Groundwater, Indicator fact sheet, EEA, 2002



Targets

The National Environmental Action Plan (NEAP) envisages a halt to nitrate pollution of groundwater. This area is governed by the Regulation on groundwater quality (OJ RS 11/02), and indirectly also by the Rules on the health suitability of drinking water (OJ RS 46/97, 54/98 and 7/00). EU guidelines in this area are provided by the Drinking Water Directive (98/83/EC).

Assessment of trend

In 2000 the threshold values for nitrate concentrations in groundwater were exceeded chiefly in north-eastern Slovenia (the Mursko and Prekmursko polje areas and the Lower Savinja and Bolska valleys). In Prekmursko polje, the Lower Savinja Valley, the Ljubljansko and Krško polje areas a falling trend was recorded in the nitrate content in the period 1993-2000.

According to the data from the European Environment Agency (EEA), by the number of analysed aquifers and results (% frequency of exceeding and trends) the state of Slovenia's groundwater in terms of nitrate concentrations is comparable with Austria. According to these data, whose comparability is limited owing to the insufficiently precisely determined methodology of selecting aquifers and the unequal number of aquifers covered, the frequency of exceeding threshold values for nitrates is higher only in Germany, Spain and Slovakia. Other countries have less nitrate-loaded aquifers. The long-term trends in Slovenia are comparable to those in Austria, and more favourable than in the majority of other European countries.

Data and sources:

Data for Slovenia:

The quality of groundwater in Slovenia is monitored under the national monitoring system. The national monitoring of groundwater involves monitoring the pollution of shallow alluvial aquifers and karstic-fissured aquifers. The entire network of national monitoring on alluvial aquifers comprises 84 measuring points. The measuring network facilities are wells at drinking water abstraction points (19 %), industrial wells (5 %) and facilities for monitoring the quality (20 %) and quantity of groundwater (boreholes, piezometers and wells). At 56 % of the facilities, both quality and quantity are monitored, while at 20 % of the facilities only quality monitoring is carried out. For a presentation of the indicator, 40 measuring points were taken (wells, boreholes and a karstic spring) on 8 aquifers (7 aquifers with granular porosity and a karstic-fissured aquifer), from which two samples each were taken in 2000. The selected aquifers are those that were included in the report to the EEA and in the European database EUROWATERNET.

The sample analysis results are kept in the Standardised database for water quality monitoring at the Environmental Agency of the Republic of Slovenia (EARS).

Data for Europe:

The data source is Nitrates in Groundwater, Indicator Fact Sheet, EEA, 2002. The original data used in the fact sheet derive from the database EUROWATERNET-Groundwater in 2001. It was not possible from the data to establish what kind of methodology was used for selecting the alluvial aquifers in Europe. The comparison of Slovenia with other European countries is therefore unreliable.

5. Pesticides in groundwater

Pollution of groundwater by pesticides is presented by the share of measuring points on aquifers with granular and karstic-fissured porosity, where the threshold values for concentrations of an individual pesticide or the sum of pesticides were exceeded always, occasionally or never. At each measuring point two samples were taken and analysed in 2000. The threshold value for concentrations of pesticides in Slovenian groundwater, as provided by the Regulation on groundwater quality (OJ RS 11/02), amounts for individual pesticides to 0.06 µg/l, for atrazine and di-ethyl-atrazine 0.1 µg/l, and for the sum of pesticides 0.5 µg/l. In order to provide a comparison with European countries, for all individual pesticides the indicators use the threshold value for drinking water of 0.1 µg/l (98/83/EC and OJ RS 7/00).

Figure 5-1
Frequency of exceeding threshold value for the sum of pesticides (0.5 µg/l) on eight Slovenian aquifers in 2000 (numbers in brackets indicate number of measuring points on an individual aquifer)
Source: Standardised database for water quality monitoring, EARS 2002

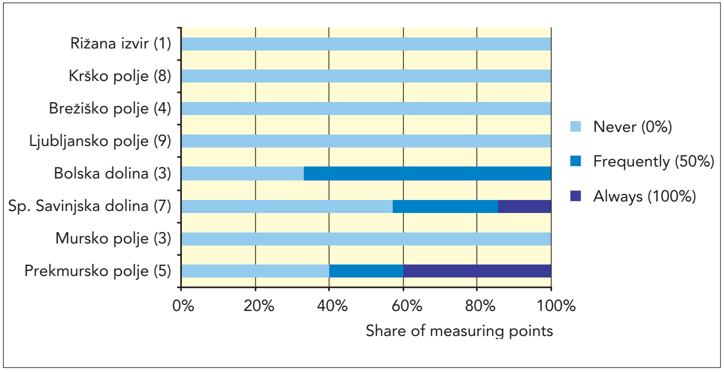


Figure 5-2
Share of measuring points where concentrations of an individual pesticide in 2000 exceeded 0.1 µg/l, and the sum of pesticides 0.5 µg/l
Source: Standardised database for water quality monitoring, EARS 2002

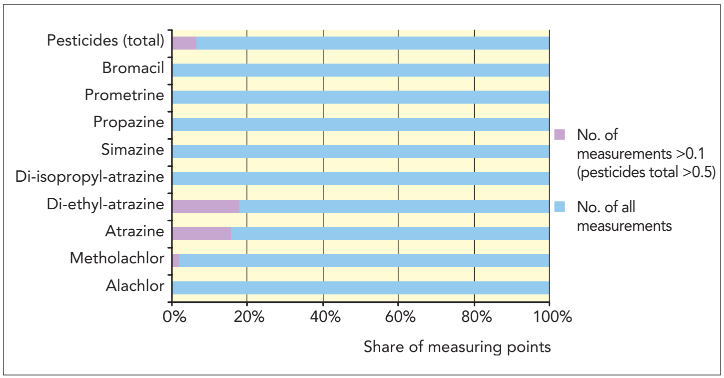
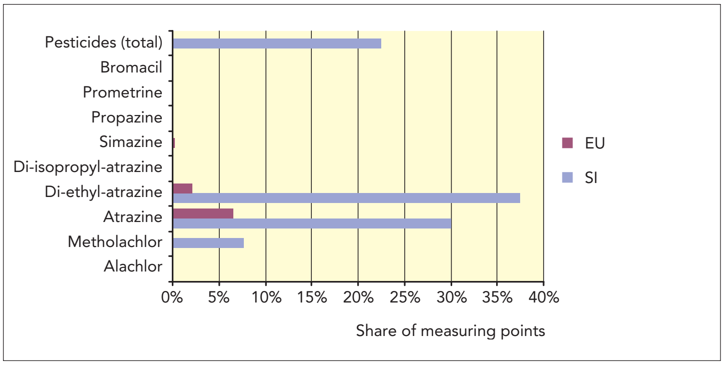


Figure 5-3
Share of measuring points where concentrations of an individual pesticide in 2000 exceeded 0.1 µg/l, and the sum of pesticides 0.5 µg/l – comparison with EU
Source: Standardised database for water quality monitoring, EARS 2002



Targets

The NEAP envisages a halt to the pollution of groundwater by pesticides. The legal basis for achieving this goal is provided by: the Regulation on groundwater quality (OJ RS 11/02), Regulation on determining status owing to pesticides of an endangered area of aquifers and their hydrographic hinterland and on measures for complete rehabilitation (OJ RS 97/02), the Decision on areas of aquifers and their hydrographic hinterland endangered by pesticides (OJ RS 97/02), the Rules on the health suitability of drinking water (OJ RS 46/97, 54/98 in 7/00) and the EU Drinking Water Directive (98/83/EC).

Assessment of trend

In 2000 the threshold values for the sum of pesticides were exceeded in the Mursko and Prekmursko polje areas and the Lower Savinja and Bolska valleys. The highest share of exceeded threshold values at the measuring points was observed for atrazine and its metabolite di-ethyl-atrazine. In the period 1993-2000 in the Prekmursko and Krško polje areas a downward trend was observed for the content of the sum of pesticides, while at the other aquifers no trend could be determined. According to these data, whose comparability is limited owing to the insufficiently precisely determined methodology for selecting aquifers, at the selected aquifers in Slovenia the share of measuring points where atrazine and d-ethyl-atrazine exceed the threshold value of 0.1 µg/l is much higher than the European average according to EEA data (atrazine: EU – 7 %, SLO – 30 %; di-ethyl-atrazine: EU – 2 %, SLO – 38 %), while the share of points where simazine is exceeded is somewhat lower in Slovenia (EU – 0.2 %, SLO – 0 %). Alachlor was not exceeded at any point either in Slovenia or in Europe.

Data and sources:

Data for Slovenia:

The quality of groundwater in Slovenia is monitored under the national monitoring system. The national monitoring of groundwater involves monitoring the pollution of shallow alluvial aquifers and karstic-fissured aquifers. The entire network of national monitoring on alluvial aquifers comprises 84 measuring points. The measuring network facilities are wells at drinking water abstraction points (19 %), industrial wells (5 %) and facilities for monitoring the quality (20 %) and quantity of groundwater (boreholes, piezometers and wells). At 56 % of the facilities, both quality and quantity are monitored, while at 20 % of the facilities only quality monitoring is carried out. For a presentation of the indicator, 40 measuring points were taken (wells, boreholes and a karstic spring) on 8 aquifers (7 aquifers with granular porosity and a karstic-fissured aquifer), from which two samples each were taken in 2000. The selected aquifers are those that were included in the report to the EEA and in the European database EUROWATERNET.

Sample analysis results are kept in the Standardised database for monitoring water quality at the Slovenian Environment Agency (EARS).

Data for Europe:

The data source is Pesticides in Groundwater, Indicator Fact Sheet, EEA, 2002. The original data used in the fact sheet derive from the database EUROWATERNET-Groundwater in 2001. It was not possible from the data to establish what kind of methodology was used for selecting the alluvial aquifers in Europe. The comparison of Slovenia with other European countries is therefore unreliable.

6. Emissions of sulphur dioxide (SO_2)

This indicator represents the total emissions of SO_2 in Slovenia, divided up into main source categories (sectors). They are calculated according to the methodology for elaborating National Emission Records, which are based on CORINAIR methodology.

Figure 6-1
SO_2 emission trends for Slovenia and 2010 target value
Source: National Emission Records, EARS 2002

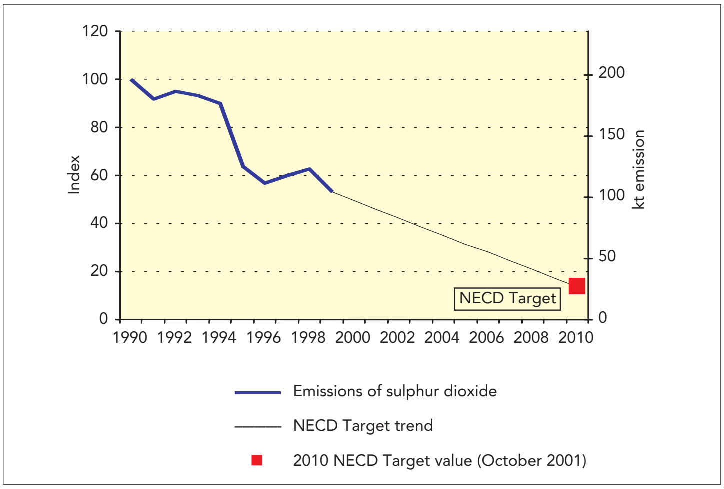


Figure 6-2
SO_2 emissions for Slovenia divided into sector in 1999
Source: National Emission Records, EARS 2002

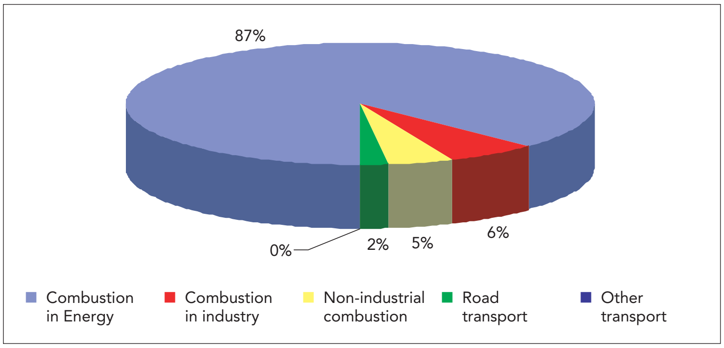


Figure 6-3
Changes in SO_2 emissions by individual sector in the period 1990-1999
Source: National Emission Records, EARS 2002

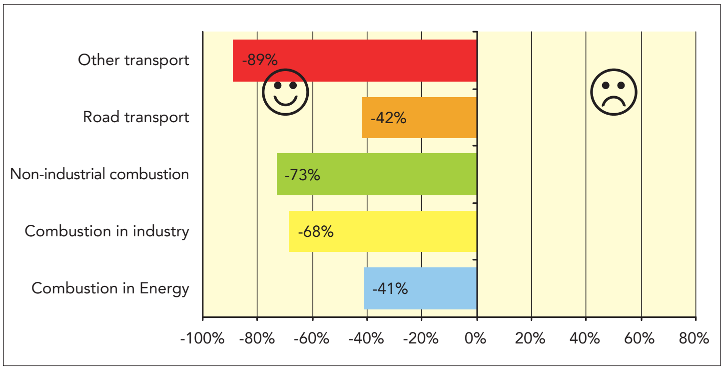


Figure 6-4

Contribution to changes in SO_2 emissions for individual sectors in the period 1990-1999

Source: National Emission Records, EARS 2002

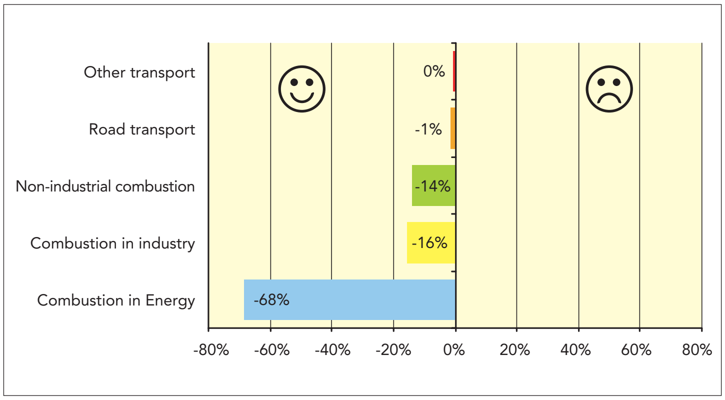


Figure 6-5

Changes in SO_2 emissions since 1990 in comparison with the NECD target value

Source: Total EEA18 SO_x emissions, Indicator fact sheet, EEA, 2002; National Emission Records, EARS 2002

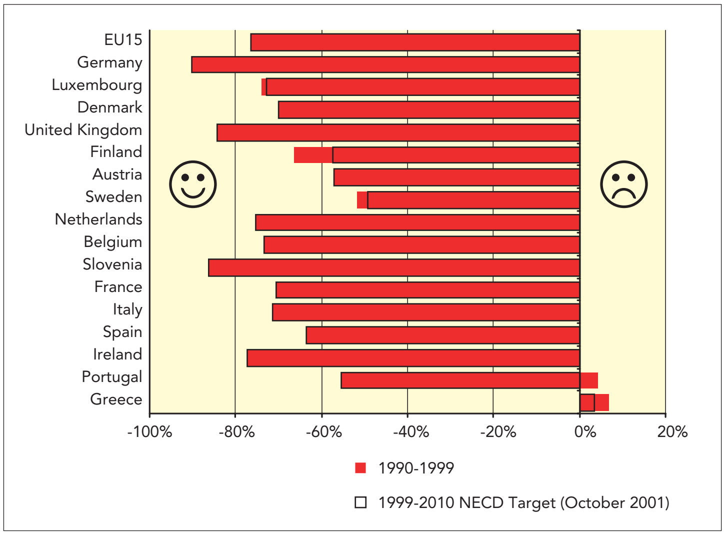


Figure 6-6

Indicators for approaching the NECD target value for 2010

Source: Total EEA18 SO_x emissions, Indicator fact sheet, EEA, 2002; National Emission Records, EARS 2002

Targets

The aim is to reduce SO_2 emissions to the target value of 27 kt, as required by the Protocol on reducing acidification, eutrophication and low-level ozone and directive 2001/81/EC on national emission ceiling into the air for certain substances (NECD).

Assessment of trend

Emissions of SO_2 in Slovenia fell by 47 % compared to 1990. This drop may be ascribed to the start-up of the desulphurisation unit on block 4 of the Šoštanj power station, and to the introduction of natural gas and liquid fuels with lower sulphur content.

In 1999 SO_2 emissions were 8 % lower than the predicted target trend, which is leading to the target emission value for Slovenia (27 kt), as required by the 1999 Protocol to the CLRTAP convention on reducing acidification, eutrophication and low-level ozone, and Directive 2001/81/EC on national emission ceiling of specific substances.

Data and sources:

Data for Slovenia:

Data are taken from the National Emission Inventory. This database, managed at the national Environment Agency (EARS), has been set up on the basis of an estimate of emissions obtained from statistical data (on fuel sold, industrial production, agriculture etc) with the application of emission factors.

Data for Europe:

Data source is Total EEA18 SO_x emissions, Indicator fact sheet, EEA, 2002.

The original data used in the indicator fact sheet, were taken from official country reports in accordance with the Convention on Long-Range Transboundary Air Pollution (UNECE/CLRTAP/EMEP).

7. Emissions of nitrogen oxide (NO_x)

This indicator presents the total NO_x emissions in Slovenia, divided up into the main categories of source (sectors). They are calculated according to the methodology for elaborating the National Emission Records, which is based on CORINAIR methodology.

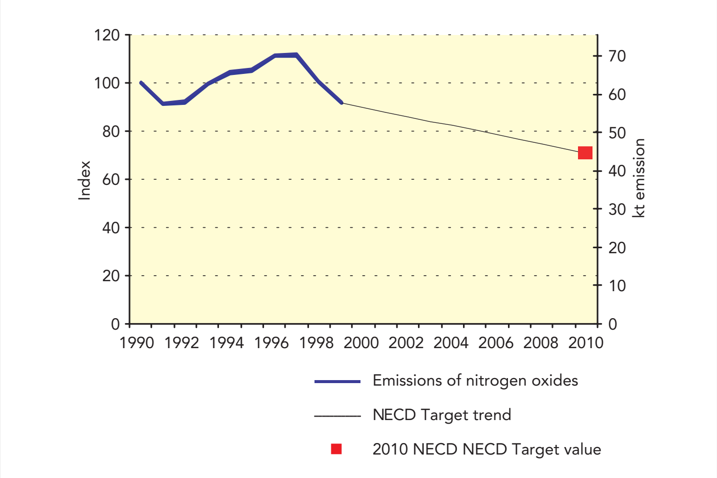


Figure 7-1
Trends of NO_x emissions for Slovenia and 2010 target value
Source: National Emission Records, EARS 2002

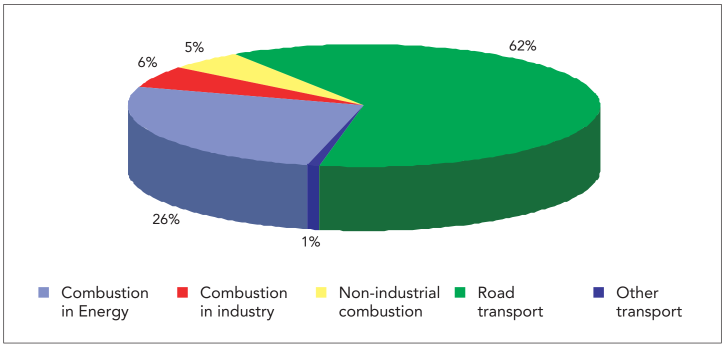


Figure 7-2
Emissions of NO_x for Slovenia by sector in 1999
Source: National Emission Records, EARS 2002

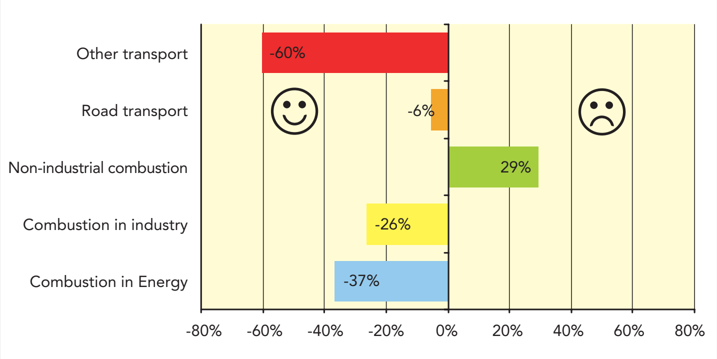


Figure 7-3
Changes in NO_x emissions by individual sector in the period 1990-1999
Source: National Emission Records, EARS 2002

Figure 7-4

Contribution to changes in NO_x emissions for individual sectors in the period 1990-1999

Source: National Emission Records, EARS 2002

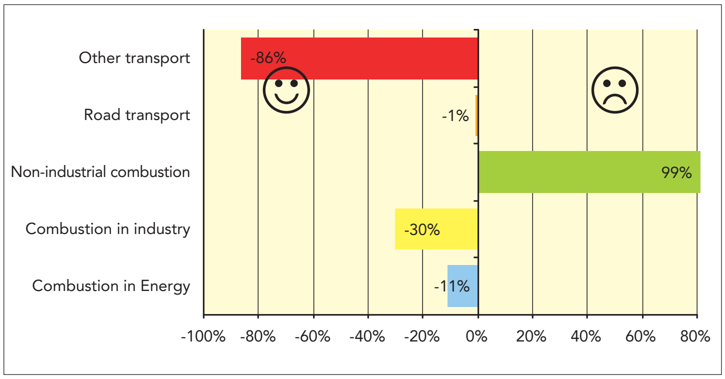


Figure 7-5

Changes in NO_x emissions from 1990 compared to the NECD target value

Source: Total EEA18 NO_x emissions, Indicator fact sheet, EEA, 2002; National Emission Records, EARS 2002

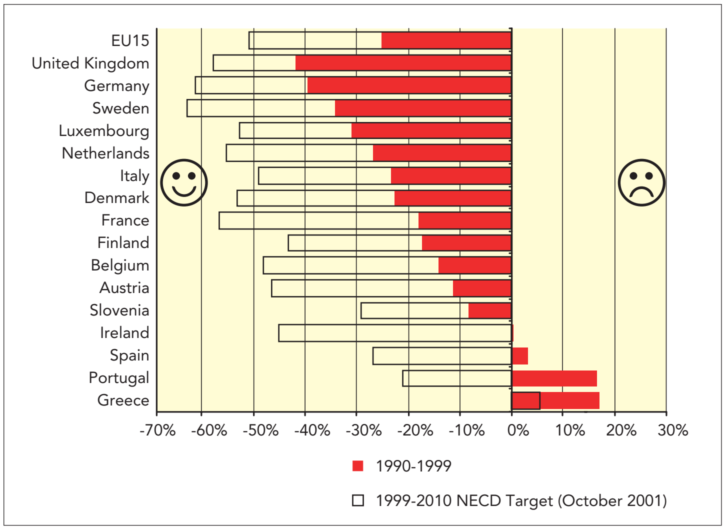
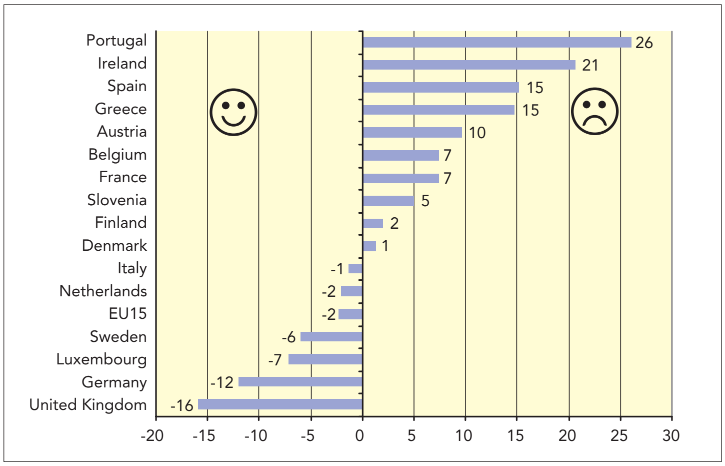


Figure 7-6

Indicators for approximating the NECD target value for 2010

Source: Total EEA18 NO_x emissions, Indicator fact sheet, EEA, 2002; National Emission Records, EARS 2002



Targets

The main goal is to reduce NO_x emissions to the target value of 45 kt, as required by the Protocol on reducing acidification, eutrophication and low-level ozone (and Directive 2001/81/EC on national emission ceiling of specific substances (NECD)).

Assessment of trend

Emissions of NO_x in Slovenia in 1999 fell by approximately 8 % relative to 1990. This reduction is a consequence of the increased proportion of vehicles with catalytic converters.

In 1999 NO_x emissions were a little above the envisaged target trend leading to the target value of emissions for Slovenia (45 kt), as required by the Protocol to the CLRTAP convention on reducing acidification, eutrophication and low-level ozone of 1999 and Directive 2001/81/EC on national emission ceiling of specific substances.

Data and sources:

Data for Slovenia:

Data are taken from the National Emission Inventory. This database, managed at the national Environment Agency (EARS), has been set up on the basis of an estimate of emissions obtained from statistical data (on fuel sold, industrial production, agriculture etc) with the application of emission factors.

Data for Europe:

Data source is Total EEA18 NO_x emissions, Indicator fact sheet, EEA, 2002.

The original data used in the indicator fact sheet, were taken from official country reports in accordance with the Convention on Long-Range Transboundary Air Pollution (UNECE/CLRTAP/EMEP).

8. Exceedance days of sulphur dioxide threshold values

This indicator shows the frequency with which the threshold values of average daily concentrations of sulphur dioxide (SO_2) exceeded 125 µg/m^3.

Figure 8-1

Exposure of the urban population in Slovenia (frequency distribution of classes of exposure) to average daily concentration of SO_2 exceeding 125 µg/m^3

Source: Automatic air quality measurement database (ANAS), EARS 2002

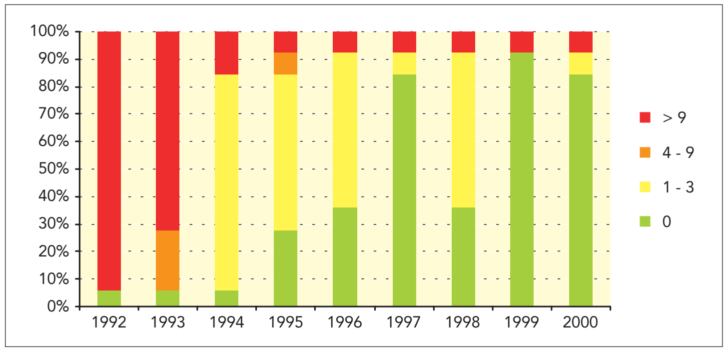
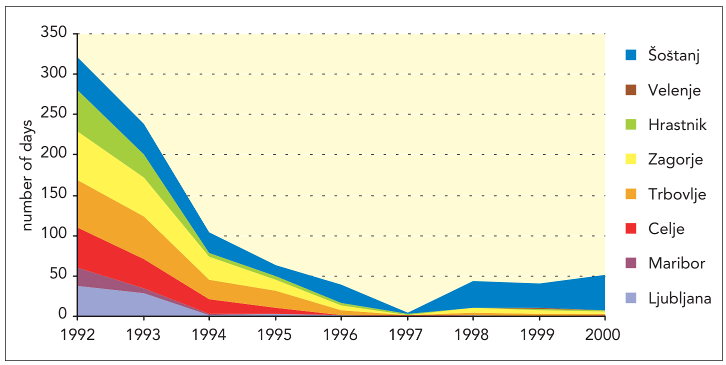


Figure 8-2

Number of days with threshold daily concentration of SO_2 exceeding 125 µg/m^3

Source: Automatic air quality measurement database (ANAS), EARS 2002



Targets

Through the Regulation on sulphur dioxide, nitrogen oxides, particles and lead in the ambient air, Slovenian legislation has been harmonised with the provisions of the EU directive 1999/30/EC, which provides that the average daily concentration of SO_2 can exceed the value of 125 µg/m^3 at the most three times in a calendar year. Our target is to ensure that the requirements of this regulation will be met.

Assessment of trend

From figure 8-1 it is clear that in urban areas we have already attained the required standards. The exception is Šoštanj, where the measuring point is influenced by emissions from the thermal power station, and the established threshold value has been exceeded too frequently. This problem, too, is being resolved, with desulphurisation units having been installed and put into operation on blocks 4 and 5. The rehabilitation programme envisages incorporating blocks 1, 2 and 3 into the functioning desulphurisation system. These works are already under way. In the EU this indicator shows a downward trend.

Data and sources:

The data for Slovenia are taken from the Automatic air quality measuring database (ANAS), at the Monitoring Office of the national Environment Agency. The database is updated monthly, and data become finally available only after the annual inspection.

9. Exceedance days of ozone threshold values

This indicator shows the frequency with which threshold values of 8-hour concentrations of ozone were exceeded beyond 110 µg/m³.

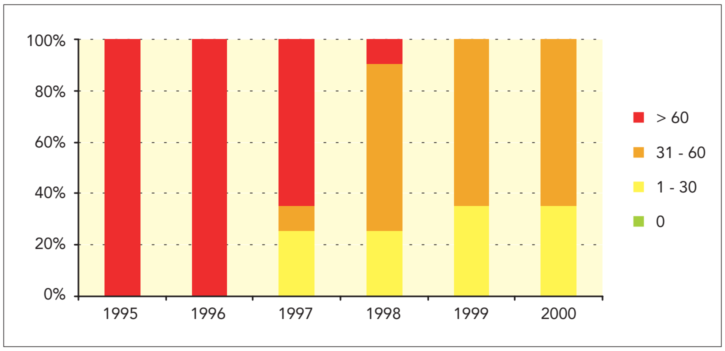


Figure 9-1
Exposure of the urban population in Slovenia (frequency distribution of classes of exposure) to 8-hour concentrations of ozone exceeding 110 µg/m³
Source: Automatic air quality measurement database (ANAS), EARS 2002

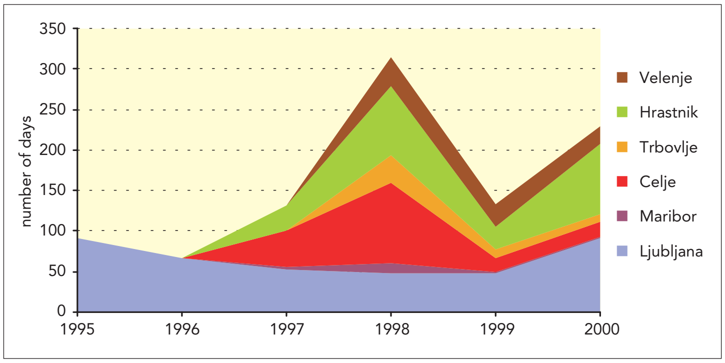


Figure 9-2
Number of 8-hour intervals with ozone concentrations exceeding 110 µg/m³
Source: Automatic air quality measurement database (ANAS), EARS 2002

Targets

Through the proposed Regulation on ozone in the ambient air, Slovenian legislation has been harmonised with the provisions of EU directive 2002/3/EC. According to this directive the target value for protecting human health up to 2010 is determined such that the value of 120 µg/m³ may not be exceeded for more than 25 days in a calendar year, calculated as the average in a period of three years. Our goal is to ensure that the requirements of this regulation are observed.

Assessment of trend

Measurements have not been taken for the entire period at all monitor sites. The weather during summer months also has a major influence on ozone concentrations. High concentrations are generated during stable, sunny weather. The demonstration of a trend is still not possible from these data. There is a similar situation in neighbouring countries. With the Emissions Ceiling Directive the EU has set the limits up to 2010 for emissions of ozone precursors for each country individually. Through this measure ozone concentrations both in Slovenia and around Europe will fall.

Data and sources:

The data for Slovenia are taken from the Automatic air quality measuring database, at the Monitoring Office of the EARS. The database is updated monthly, and data become finally available only after the annual inspection.

10. Consumption of ozone depleting substances

The indicator shows the progress made in abandoning ozone-depleting substances. The indicator is shown as the quantity of ozone-depleting substances used by individual type of substance, expressed in the form of a recalculated value relative to the ozone-depleting potential (ODP).

Figure 10-1

Sales of ozone-depleting substances on the EU market (EEA 18)
Source: Consumption of ozone depleting substances. Indicator fact sheet, EEA 2002

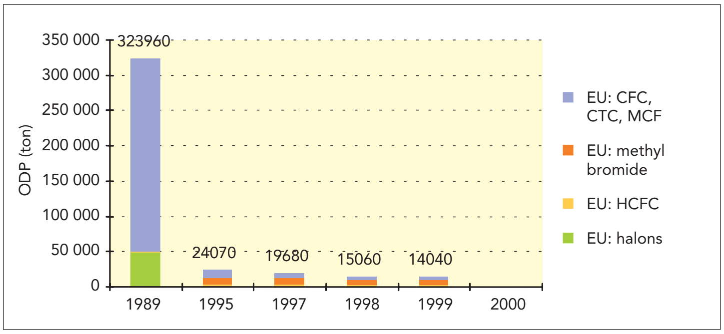
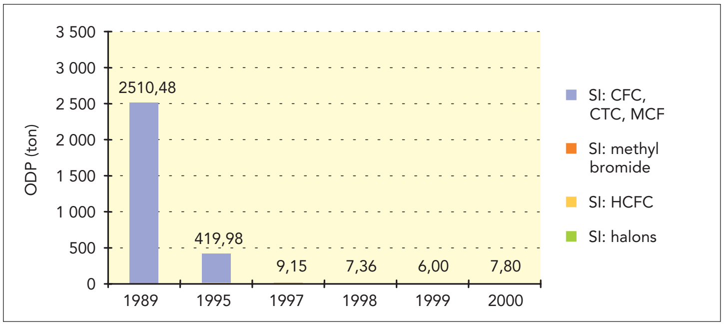


Figure 10-2

Consumption of ozone-depleting substances in Slovenia
Source: Database for substances that deplete the ozone layer, EARS 2002 (data for 1997-2000); Slovenian Chamber of Commerce records (for 1989); Statistical Yearbook 1995



Explanation of terms:
CFC = chlorofluorocarbons,
CTC = carbon tetrachloride,
MCF = 1,1,1-trichloroethane
HCFC = hydro- chlorofluorocarbons
other HCFC – e.g. HCFC 141b, HCFC 142b
"total" means the quantity of substances recalculated using the ODP (ozone depleting potential) for each substances determined in the Montreal Protocol

Targets

The targets in this area are set out by the National Environmental Action Programme and by the need to fulfil international obligations in this field. Both the Vienna Convention and the Montreal Protocol provide basic guidelines for handling substances that deplete the ozone layer.

One of the aims of the National Environmental Action Programme is to ban the emission of ozone-depleting substances into the air and to reestablish the system of recovery and regeneration of waste ozone-depleting substances. The programme envisages implementation of the adopted regulations. Adopted international obligations envisage the coordination of strategies in energy, industry, transport, agriculture, forestry and waste management with the strategy of air protection and the programme for reducing emissions of greenhouse gases. In the area of enacting legislation, a decree has been adopted on handling substances that deplete the ozone layer.

Assessment of trend

Depleting of the ozone layer in the stratosphere is a consequence of the harmful effects of substances that are emitted into the air, primarily CFC's, halons, methyl chloroform, carbon tetrachloride, HCFC's, methyl chloride and methyl bromide. Humans are responsible for as much as 75 % of the emissions of these gases. Since these gases are found in refrigeration and air-conditioning equipment fire protection systems and fire-extinguishers, there are also emissions after several years of use. The gases travel from unmonitored leaks from equipment and products to the upper layer of the atmosphere, and then remain there even for several decades. Since they contain chlorine and bromine atoms, they react with ozone molecules, and in doing so destroy them. Not all the substances damage ozone to the same extent, and their effect on depleting the ozone layer is measured with the ozone depleting potential factor (ODP).

Slovenia does not produce ozone-depleting substances, and the valid regulation from 1998 regulates the prohibitions and restrictions regarding the handling of ozone-depleting substances in the production, import, export, release for circulation and use of substances and products whose emissions into the air deplete the ozone layer.

Throughout the world the consumption of ozone-depleting substances is falling dramatically, as a consequence both of international agreements and of the attitude of individual countries. This trend of abandoning consumption is also evident in the consumption indicator for Slovenia.

Data and sources:

Data for Slovenia:

On the basis of annual reports from those liable according to the Decree on handling with substances that deplete the ozone layer (OJ RS 80/97, 41/01) a database is kept at the EARS. Those liable are clients that have obtained a decision regarding annual imports and at the same time a permit for single importations of substances. Each year they are bound to report to the EARS at the Ministry of the Environment, Spatial Planning and Energy on actual consumption of substances for the preceding year. Data are based on client reporting, cross-checking with other competent bodies (e.g.. customs) and data from inspection services are useful to verify the accuracy of the data. Through data processing an appropriate overview can be obtained for comparison among the competent bodies, as well as a basis for reporting to the UNEP according to the provisions of the Montreal Protocol. Data can be aggregated by types of consumed ozone-depleting substances (permits and reports) and recalculated into ODP tons (recalculated quantity in respect of the ozone depleting potential factor).

Data for 1989 are from Chamber of Commerce records – there are no data for individual substances, only for the total quantity of CFC, MCF and HCFC. For 1995 the data are taken from the Statistical Yearbook (SORS). For 1997-2000 data derive from UNEP annual reports drafted at the Slovenian Environment Agency.

Data for Europe:

Data source is Consumption of ozone depleting substances. Indicator fact sheet, EEA, 2002.

11. Greenhouse gas emissions

This indicator shows the annual emissions of greenhouse gases from Addendum A to the Kyoto Protocol (CO_2, CH_4, N_2O, HFC, PFC, SF_6) by individual gas or gas group (HFC, PFC) and the sum of gases in units of CO_2 equivalent by individual sector according to the IPCC methodology and for all sectors together, per inhabitant and per km^2.

Figure 11-1

Emissions of direct greenhouse gases (CO_2, CH_4, N_2O, CF_4, C_2F_6, HFC, SF_6 – equivalents of CO_2) by sector of pollution in 1999

Source: Records of greenhouse gas emissions for 1986 and 1990-1996, processed by: Dr. Janko Seljak, 2002

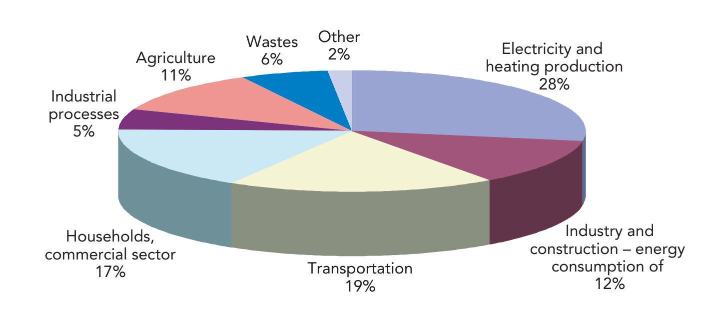
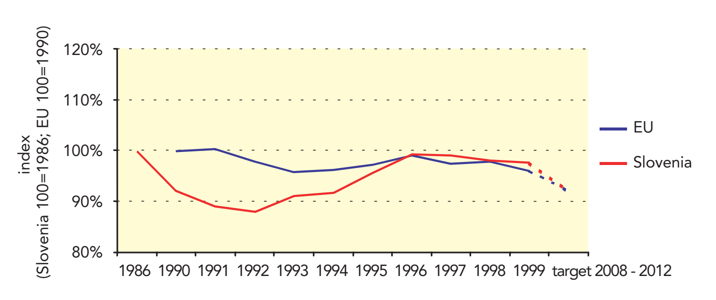


Figure 11-2

Index of greenhouse gas emissions relative to the targets set for 2008-2012 (Slovenia 8% reduction from the 1986 value, EU 8% since 1990)

Source: Records of greenhouse gas emissions for 1986 and 1990-1996, Total EU greenhouse gas emissions, Indicator Fact Sheet, EEA, 2002



Targets

Monitor emission trends and compare with other countries and with the EU, determine the effectiveness of measures for reducing emissions and along with this the success in reducing emissions in line with the obligations from the Kyoto Protocol, fulfil the obligation to report to the UN Framework Convention on Climate Change and the Kyoto Protocol, when/if it enters into force, and to the EU in line with Council decision 93/389/EEC, supplemented with decision 1999/296/EC.

Assessment of trend

Global warming is the consequence of natural causes and human activity. It appears that the majority of the expected consequences of this phenomenon will be unfavourable for humans and natural ecosystems, so in recent years the international community has started making efforts to prevent or at least mitigate these consequences. Since we cannot influence natural causes, we must focus on human activities which cause global warming, these being activities which have the consequence of emitting greenhouse gases. The most important greenhouse gas is steam, although people have no significant influence on it. We do, however, exert great influence on other greenhouse gases, foremost of them being carbon dioxide, which is generated primarily in the burning of fossil fuels in energy production.

Concentrations of greenhouse gases in the atmosphere have been growing since the start of the industrial revolution; carbon dioxide concentrations grew at that time by around 30 %. Projections for these emissions in the coming decades also point to their growth, chiefly in developing countries, where on average they are still relatively low in units per inhabitant. In order to turn the trend around and gradually downwards, the international community adopted at the world summit in Rio de Janeiro in 1992 the UN Framework Convention on Climate Change, and in 1997 in Kyoto, Japan, the Kyoto Protocol to this convention, which binds the industrialised countries to reduce greenhouse gas emissions. Slovenia ratified the convention in 1995, and the protocol in 2002. If the protocol becomes valid (when it is ratified by enough industrialised countries), it will represent the first step towards a global reduction in greenhouse gas emissions, although in itself it will only have a modest effect on emissions. Further steps will be needed to slow down and gradually halt the trend of global warming and the accompanying negative phenomena.

Slovenia contributes a very small share to global emissions of greenhouse gases (around 0.1 %). Despite this, it has accepted the obligation to contribute its relative share to resolving this problem. To this end the Ministry of the Environment, Spatial Planning and Energy has prepared an Action Programme to Reduce Greenhouse Gas Emissions, the draft has been finalised in February 2003, and adopted by the Government in August 2003. The most important sectors for reducing greenhouse gas emissions are energy, industry and waste management, while the most problematic, it would appear, will be the transport sector.

Slovenia's obligation according to the Kyoto Protocol is to reduce greenhouse gas emissions by 8 % in the 5-year period 2008-2012 relative to the start year of 1986. This will be quite a challenging task, since following the decline in the period 1986-1991, emissions again started growing and have already reached the starting level, while projections indicate that without any special measures they should increase by a further 13 % up to 2010.

Data and sources:

Data for Slovenia:

For the needs of reporting to the UN Framework Convention on Climate Change, using IPCC methodology records were made of emissions of greenhouse gases for 1986 and 1990-1996. For the coming year there are plans to make emission records for the missing years and recalculate the existing records according to CRF (Common Reporting Format) instructions. There are also plans to set up a system of continuous records of emissions, so that we might be able to submit data in line with the requirements of the convention and the EU (Council Decision 93/389/EEC and 1999/296/EC).

Data for Europe:

Data are taken from:

- *Total EU greenhouse gas emissions, Indicator Fact Sheet, EEA, 2002*
- *European Community and Member States greenhouse gas emission trends 1990-1999 (EEA) Annual European Community greenhouse gas inventory 1990-2000 and inventory report 2002 (EEA)*
- *Environmental Signals (EEA)*
- *Overview of national programmes to reduce greenhouse gas emissions (EEA)*
- *Assessment of Potential Effects and Adaptations for Climate Change in Europe (European Commission, Research DG)*

12. Land use and land cover change

This indicator shows the characteristics of land use and land cover. It provides an answer to the question, how is the landscape changing and where are the most intensive processes taking place. In the forefront there are the contradictions between various types of use – between urban, agricultural and natural surfaces. It shows the pressures on land use deriving from socio-economic activities, and through population density it shows whether these pressures cover the entire area or are limited locally.

Land use is the exploitation of land caused by human activity in the landscape, and is one of the best indicators of the landscape structure and processes. The basic division distinguishes between countryside and urban use of land. Data derive chiefly from cadastral and statistical records. Land cover indicates the physical aspect of the land surface, irrespective of its purpose. It distinguishes between the following categories: built-up surfaces (including artificial), agricultural surfaces, forests and partly preserved natural surfaces, wetlands and water. Data are gathered from satellite images through remote sensing (CORINE Land Cover – CLC).

Figure 12-1

Composition of the categories of land cover according to CORINE Land Cover 1995 in Slovenia

Source: CORINE Land cover Slovenia 1995, Ministry of the Environment, Spatial Planning and Energy, 1998

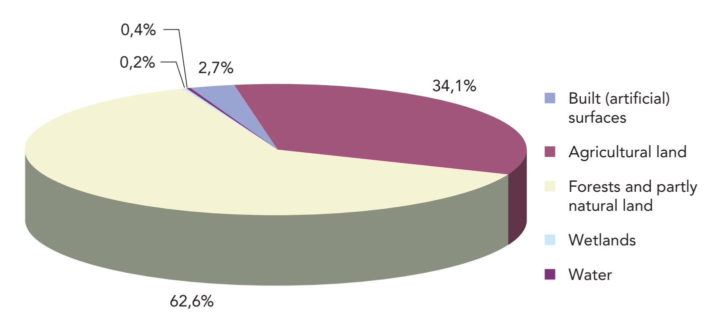
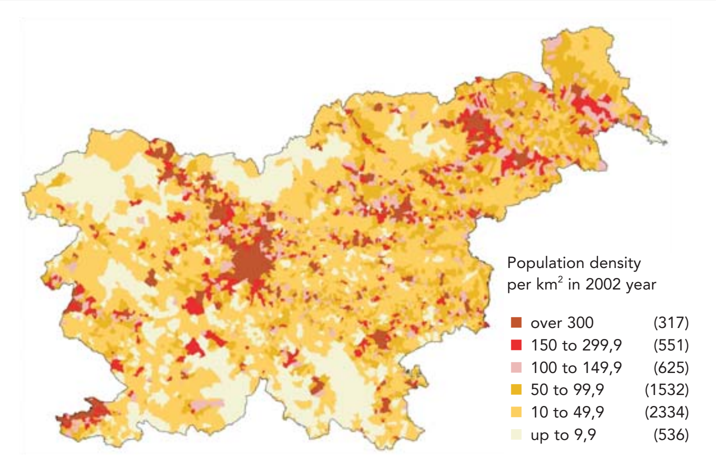


Figure 12-2

Population density in the Republic of Slovenia per km^2 in 2000

Source: Kladnik, Ravbar, Rejec Brancelj: Expert basis for defining typical countryside areas in Slovenia, Ljubljana, 2001



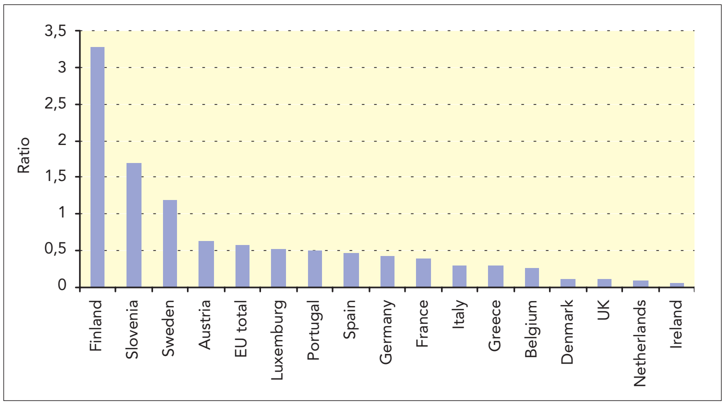


Figure 12-3
Ratio between forest with agricultural and urban land in Slovenia and comparison with certain European countries
Source: Indicators of sustainable development 1997, European Commission 1997. CORINE Land Cover Slovenia 1995, Ministry of the Environment, Spatial Planning and Energy, 1998

Target

The NEAP envisages:

- preservation of unspoilt, large forest ecosystems and ensuring use of forest areas harmonised between forestry, agriculture, the military, transport, water and electricity supply,
- preserving fertile land through moderately intensive, ecologically acceptable farming and
- preserving the settled and diverse cultural landscape for leisure and development of tourism.

Relevant EU documents and the targets defined in them: European Landscape Convention (20 October 2000, signed 7 March 2001, in the process of ratification). The landscape is an important element in realising sustainable development, for its preservation depends on a balance between preserving the natural and cultural heritage and the exploitation of natural resources. Its image is a part of the European identity and diversity. It is an important component of nature and the human environment, so the public must be actively engaged in maintaining the landscape and planning and be aware of the responsibility towards events in the landscape. The convention supplements the measures that are defined in other conventions in the area of nature protection.

Assessment of trend

According to the CLC, the proportions between the basic land categories are 63 % forest, 34 % agricultural land and 2.7 % urban surfaces (Figure 12-1). Since the CLC 2000 is in preparation, trends are not yet available, but we may draw conclusions regarding the ongoing processes from the data in cadastral and statistical records. These show that the share of forest and built-up surfaces is growing, while the share of agricultural land is diminishing in favour of the expansion of forest cover and construction. The most intensive processes of change in land use are under way on the plains and in valley bottoms and basins, where intensification of agricultural land and urbanisation are at the forefront (Figure 12-2). In the hilly and mountainous areas the expansion of forest and decline of settlement levels are taking hold. Slovenia ranks among those European countries with the smallest share of agricultural and cultivable land, by surface area of individual land categories per inhabitant it ranks in the European average, and by forest surface per inhabitant among the most forested European regions, similar to, say, Finland and Sweden (Figure 12-3). The proportions of forest and agricultural and built-up land indicate "stocks" of forest in comparison with other land categories, and in the value of this indicator Slovenia comes just behind Finland and Sweden.

Data and sources:

Data for Slovenia:

Data are taken from the database CORINE Land Cover Slovenia 1995, which is kept at the Surveying and Mapping Authority of the Republic of Slovenia (SMA). It was created through remote sensing of satellite images from 1995. Data on land cover are ranked into 44 classes, merged into 3 levels. Data are available to the public at the SMA website: www.gov.si/gu. Updating of the database for 2000 is in progress, and new data will be accessible during 2003.

Data on population density in Slovenia are taken from Kladnik, Ravbar, Rejec Brancelj: Expert bases for defining typical countryside areas in Slovenia, Geographical Institute, Ljubljana, 2001 – calculated using data from the SORS for 2000.

Data for Europe:

Data source is Indicators of sustainable development 1997, European Commission 1997.

13. Nitrate directive implementation

In 1991 the EU member states adopted the Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (the Nitrate Directive). The Directive requires that member states designate vulnerable zones and implement action programmes and prescribed measures for reducing pollution by nitrates from agriculture in these areas. The indicator shows an assessment of the implementation of measures set out in Annexes II and III of the Directive, on the basis of specific methodology (see Data and sources).

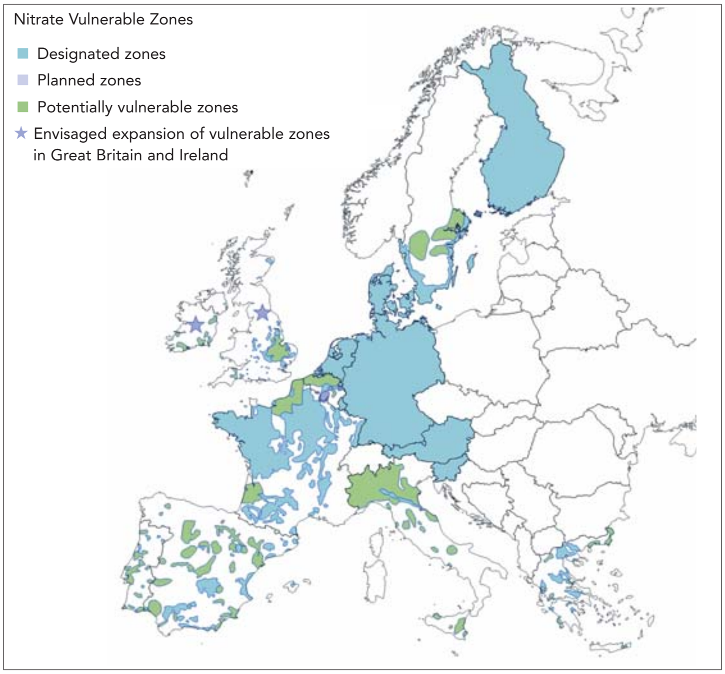


Figure 13-1
Vulnerable zones in Europe according to the Nitrate Directive
Source: Nitrate Vulnerable Zones and related Action Programmes (Signals 2002 YIR02AG13). Indicator Fact Sheet, EEA, 2002. For Slovenia: Ministry of the Environment, Spatial Planning and Energy, EARS

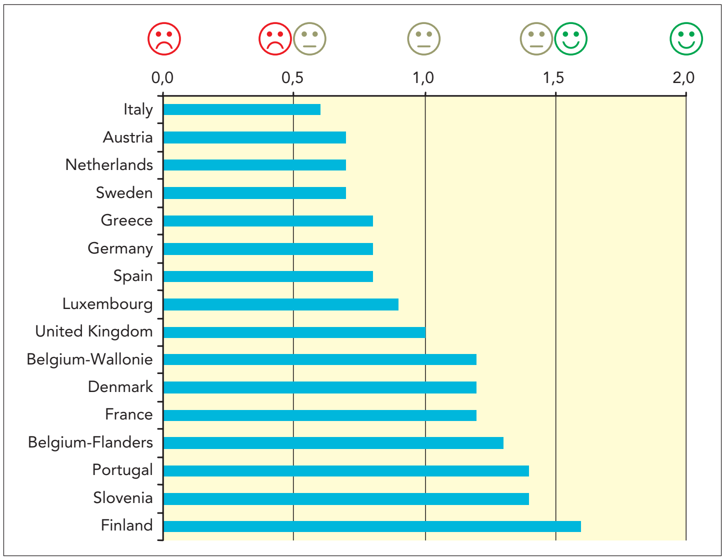


Figure 13-2
Harmonisation of national action programmes under the Nitrate Directive: average points for 12 measures from national action programmes
Source: Nitrate Vulnerable Zones and related Action Programmes. Indicator Fact Sheet, EEA, 2002. For Slovenia: expert estimate of the Ministry of the Environment, Spatial Planning and Energy, EARS

Targets

The National Environmental Action Programme has defined concern for a better state of the aquatic environment and reduction of emissions from diffuse sources (agriculture). To this end the following legal basis has been adopted:

1996 adoption of the Decree on input of dangerous substances and plant nutrients into the soil through measures in respect of preventing pollution of water by nitrates from agriculture.

2000 adoption of the Instructions for implementing good farming practices in fertilising through measures in respect of preventing pollution of water by nitrates from agriculture.

2001 adoption of an amendment to Decree on the input of dangerous substances and plant nutritients into the soil (OJ RS 68/96, 35/01), which designated the entire territory of the Republic of Slovenia as a vulnerable zone, as well as determining the content of the Action Programme.

Assessment of trend

With regard to implementation of measures to protect water against pollution by nitrates from agricultural sources, the situation for Slovenia is that to a great extent the measures fulfil the requirements of the Nitrate Directive, although it will be necessary to ensure their more effective implementation. Slovenia ranks among five EU member states which have scored most according to the points system, that is, more than 1 point (partly satisfactory), which indicates inadequate implementation of the Nitrate Directive within the EU.

The indicator in question involves a points system relating to 12 measures for individual countries, primarily on the basis of formal fulfilment of the Nitrate Directive provisions, but it also represents a highly subjective assessment of individual measures. In the same way, in the selection of the measures in question there is a deficiency, since the problem of pollution can also be resolved by measures which are not set out within the Nitrate Directive, or such measures are implemented that do not contribute sufficiently to reducing pollution from agriculture. It has been established overall, however, that awareness is growing and that it is essential to protect water against pollution through the implementation of environment-friendly agriculture.

In line with the Nitrate Directive, each member state of the EU must designate vulnerable zones and draw up action programmes of measures for protecting water against pollution by nitrates from agriculture for the vulnerable zones. With regard to the action programmes, the situation in Slovenia is a little different relative to the provisions of the Nitrate Directive, which defines in Annexes II and III the content of the action programmes. In Slovenian legislation these measures are set out in the Decree on input of dangerous substances and plant nutrients into the soil (OJ RS 68/96 and 35/01) and in the Instructions for implementing good farming practices (OJ RS 34/00), although implementation of these measures is still not satisfactory. For this reason work is in progress to draft an action programme which will relate chiefly to the storing of animal manure and to resolving the problems linked to this, primarily in terms of financial implementation.

Pollution of surface and groundwater by excess nutrients from agriculture represents a major problem in Europe. In the period 1950-2000 the consumption of mineral nitrogen increased about tenfold, while the quantity of total nitrogen in animal manure rose to 9 million tons. The input of nitrogen into the soil far exceeds the uptake by crops and vegetation and this poses a threat to water and affecting its quality. Excess of nitrogen in 1997 ranged from 24 kg/ha in Portugal to 256 kg/ha in the Netherlands (Eurostat 2000), and in Slovenia stands on average at 64 kg/ha. Slovenia's nitrogen balance is less than 45 kg/ha in 45 % of the investigated agricultural zones, while in 55 % farmers are fertilising excessively. Pollution is highest in those areas where agricultural land is in close contact with shallow-lying groundwater and where production is intensive. Such areas are primarily under shallow brown soil on the levels of Slovenia's major river basins (Mura, Drava, Savinja and Sava). The danger of pollution to groundwater rises towards the east of the country. Given that groundwater in Slovenia is a source of drinking water for more than 90 % of the entire population, the entire national territory has been designated as a vulnerable zone in the Decree on input of dangerous substances and plant nutrients into the soil (OJ RS 68/96 and 35/01).

Data and sources:

The points system has been drawn up on the basis of a European Commission estimate, and the points system for Slovenia through an expert estimate by the EARS, Ministry of the Environment, Spatial Planning and Energy.

Methodology: The EEA drew up the methodology for monitoring implementation of the action programmes on the basis of a points system for 12 measures, which are being implemented under the programme for each member state separately. Based on the average of all points for individual measures, a total estimate is determined for individual countries regarding fulfilment of the Nitrate Directive requirements. The total estimate ranges from 0 (unsatisfactory) to 2 (satisfactory) points:

☹ *= 0 (no measures)*

☹ / 😐 *= 0,5*

😐 *= 1 (partly satisfactory measures)*

😐 / ☺ *= 1,5*

☺ *= 2 (satisfactory measures)*

Table 13-1

Implementation of measures set out in Annexes II and III of the Nitrate Directive by EU member states and Slovenia in the Action Programme for vulnerable zones.

Source: Nitrate Vulnerable Zones and related Action Programmes. Indicator Fact Sheet, EEA, 2002. For Slovenia: Ministry of the Environment, Spatial Planning and Energy, EARS

MEASURE / COUNTRY	Slovenia	Belgium-Flanders	Belgium-Wallonie	Denmark	Germany	Greece	Spain	France	Italy	Luxembourg	Netherlands	Austria	Portugal	Finland	Sweden	Great Britain
Period of fertiliser prohibition	😐 2.0	😐 / 😊 1.5	😐 / ☹ 0.5	😐 / 😊 1.5	😐 / ☹ 0.5	😐 1.0	☹ 0.0	😐 / ☹ 0.5	☹ 0.0	😐 1.0	😐 1.0	😐 / ☹ 0.5	😐 / ☹ 0.5	😊 2.0	😐 / 😊 1.5	😐 1.0
Restricting use of fertiliser on steep slopes	😊 2.0	😐 / 😊 1.5	😐 / ☹ 0.5	😐 / ☹ 0.5	😐 / ☹ 0.5	☹ 0.0	☹ 0.0	😐 / 😊 1.5	😐 1.0	😐 / ☹ 0.5	☹ 0.0	☹ 0.0	😊 2.0	😐 1.0	☹ 0.0	☹ 0.0
Restricting use of fertiliser on soil saturated with water and frozen or snow-covered soil	😊 2.0	😊 2.0	😐 / ☹ 0.5	😐 / ☹ 0.5	😊 2.0	😐 / 😊 1.5	☹ 0.0	😐 / 😊 1.5	😊 2.0	😐 1.0	😐 1.0	😐 / ☹ 0.5	😐 / 😊 1.5	😊 2.0	😐 / 😊 1.5	😐 / 😊 1.5
Restricting use of fertiliser in proximity of water bodies	😊 2.0	😐 / 😊 1.5	😊 2.0	😐 / ☹ 0.5	😐 / ☹ 0.5	☹ 0.0	😐 / ☹ 0.5	😐 / 😊 1.5	😐 1.0	😐 / ☹ 0.5	😐 / ☹ 0.5	😐 / ☹ 0.5	😐 / 😊 1.5	😐 / 😊 1.5	☹ 0.0	😐 1.0
Effluent from livestock manure storage	😐 1.0*	☹ 0.0	😊 2.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	😊 2.0	☹ 0.0	☹ 0.0
Livestock manure storage capacities	😐 1.0*	😐 / ☹ 0.5	😐 / 😊 1.5	😊 2.0	😐 / ☹ 0.5	😊 2.0	😐 / 😊 1.5	😐 / ☹ 0.5	😐 / 😊 1.5	😐 / 😊 1.5	😐 / ☹ 0.5	☹ 0.0	😊 2.0	😊 2.0	😐 / 😊 1.5	😐 / ☹ 0.5
Rational fertilising	😐 1.0	😊 2.0	😐 / 😊 1.5	😊 2.0	😊 2.0	😐 1.0	😐 / 😊 1.5	😊 2.0	☹ 0.0	😐 1.0	😐 1.0	😊 2.0	😐 1.0	😊 2.0	😐 1.0	😐 / 😊 1.5
Rotation, maintaining permanent crops	☹ 0.0	☹ 0.0	😊 2.0	☹ 0.0	😐 / ☹ 0.5	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	☹ 0.0	😊 2.0
Vegetation cover in rainy periods and winter	😊 2.0	😐 1.0	☹ 0.0	😊 2.0	☹ 0.0	☹ 0.0	☹ 0.0	😐 / 😊 1.5	☹ 0.0	😐 / ☹ 0.5	😐 / ☹ 0.5	☹ 0.0	😊 2.0	😐 1.0	😐 1.0	😊 2.0
Fertiliser plans	😐 1.0*	😐 1.0	☹ 0.0	😊 2.0	😐 / 😊 1.5	☹ 0.0	😊 2.0	😐 / 😊 1.5	☹ 0.0	😐 / 😊 1.5	😊 2.0	😊 2.0	😊 2.0	😊 2.0	☹ 0.0	☹ 0.0
Other measures	😐 1.0	😊 2.0	😊 2.0	😐 / 😊 1.5	😐 / 😊 1.5	😐 / 😊 1.5	😊 2.0	😊 2.0	😐 1.0	😐 / 😊 1.5	😊 2.0	😐 1.0	😊 2.0	😊 2.0	😊 2.0	😐 1.0
Specific date and limit value of nitrogen application through livestock manure 210/170 kg N/ha/year	😊 2.0	😊 2.0	😊 2.0	😊 2.0	😐 / ☹ 0.5	😊 2.0	😊 2.0	😊 2.0	😐 1.0	😊 2.0	☹ 0.0	😊 2.0	😊 2.0	😊 2.0	☹ 0.0	😐 / 😊 1.5
Total points	17	15	14.5	14.5	10	9	9.5	14.5	7.5	11	8.5	8.5	16.5	19.5	8.5	12
Average of points	1,42	1.25	1.2	1.2	0.83	0.75	0.79	1.2	0.625	0.92	0.71	0.71	1.375	1.625	0.71	1.0

* Measure provided by regulation, unsatisfactory implementation

14. Protected areas

Development of protected areas is measured by the share occupied by areas protected by national or municipal acts over the entire surface area of Slovenia. In terms of the type of protection, Slovenia distinguishes between large scale protected areas which are landscape, regional and national parks and small scale protected areas which are natural monument, nature reserve and strict nature reserve. For the purposes of standardising the system of protected natural areas on the world scale, the International Union for the Conservation of Nature (IUCN) ranks protected areas into the following management categories:

I. strict nature reserve/wilderness area: protected area managed mainly for science of wilderness protection,
II. national park: protected area managed mainly for ecosystem protection and recreation,
III. natural monument: protected area managed mainly for conservation of specific natural features,
IV. habitat/species management area: protected area managed mainly for conservation through management intervention for the needs of individual species and maintaining their habitats,
V. protected landscape/seascape: protected area managed mainly for landscape/seascape protection and recreation,
VI. managed resource protected area: protected area managed mainly for the sustainable use of natural ecosystems (covers mainly unchanged natural ecosystems that are protected to ensure sensible use of natural resources).

Figure 14-1
Development of protected areas
Source: Protected areas database, EARS 2002

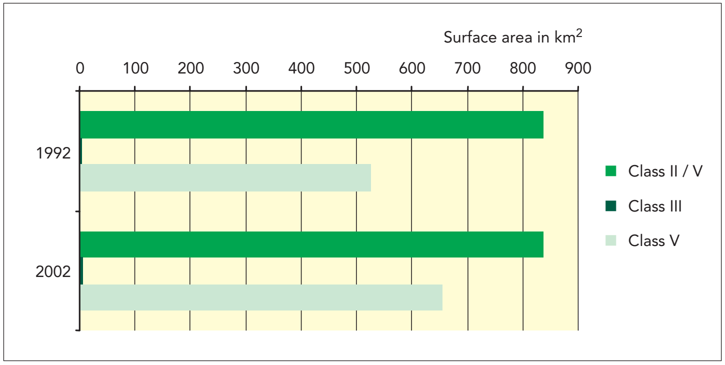
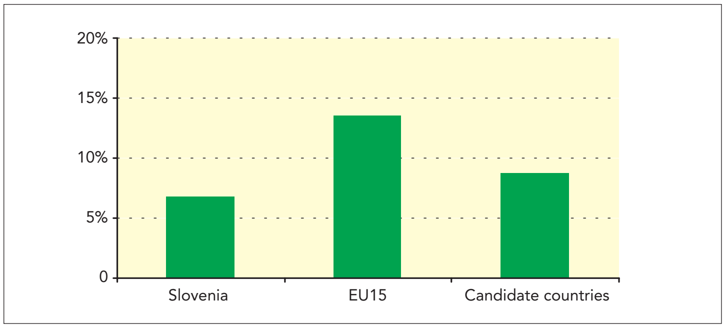


Figure 14-2
Surface of protected areas according to IUCN categories in Slovenia
Source: Protected areas database, EARS 2002

Figure 14-3
Surface of protected areas in Slovenia, the EU and candidate countries in 1997
Source: Protected areas database, EARS 2002



Targets

The NEAP envisages that the extent of protected areas will increase its surface area by 30 % up to 2008.

Assessment of trend

The established measure for preserving biodiversity *in situ* is the setting up of protected areas. The trend evident in the graph Share of protected areas (by category) indicates that in all probability it will not be possible to attain the target set for 2008. Likewise, the comparison with Europe (figure 14-3) is not satisfactory.

Account must be taken of the fact that in the presentation there are 623 natural monuments and 59 nature reserves missing, although the surface area is estimated at less than 1 %. Protected areas expanded, in 2003, when the Goričko Landscape Park was protected, and through association with the EU Slovenia will be obliged to designate and maintain NATURA 2000 sites. Owing to inaccessibility of data on the surface area of natural monuments and nature reserves in the graph Surface area of protected areas by IUCN category there is no category I, and the surface area for category III is smaller.

Data and sources:

Data for Slovenia:

The Protected areas database, maintained by the EARS, comprises data from protection acts and their cartographical annexes. The following categories of protected area are defined:

SMALL SCALE PROTECTED AREAS

category	IUCN category
Strict nature reserve	I
Nature reserve	I or IV
Natural monument	III

LARGE SCALE PROTECTED AREAS

category	IUCN category
National park	II and II/V
Regional park	V/III
Landscape park	V

Data on surface areas are partly incomplete owing to a lack of or inappropriate map material (scale too small). The data for the 623 natural monuments and 59 nature reserves will be collected in 2003.

International comparison is possible, although it must be taken into consideration that for Slovenia no account has been taken of the surface area of natural monuments and nature reserves, and that the international comparison only considers areas greater than 10 km^2.

Data for Europe:

Taken from the United Nations List of Protected Areas (http://www.wcmc.org.uk/data/database/un_combo.html).

15. Forest decline and tree defoliation

Defoliation is the share, expressed in percentages, of needles/leaves lacking as compared to the normal foliage of a tree from the same species in the same growing area. It serves as a basic indicator for assessing the state of health or vitality of the tree. A damaged tree is considered to be one whose level of defoliation is greater than 25 %.

Figure 15-1
Changes in the share of damaged trees with more than 25 % defoliation
Source: Forest Institute of Slovenia, 2002

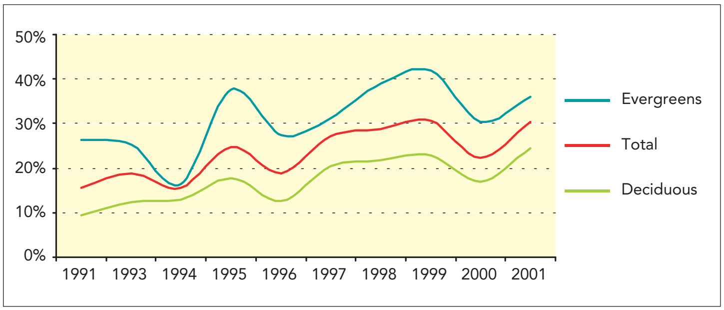
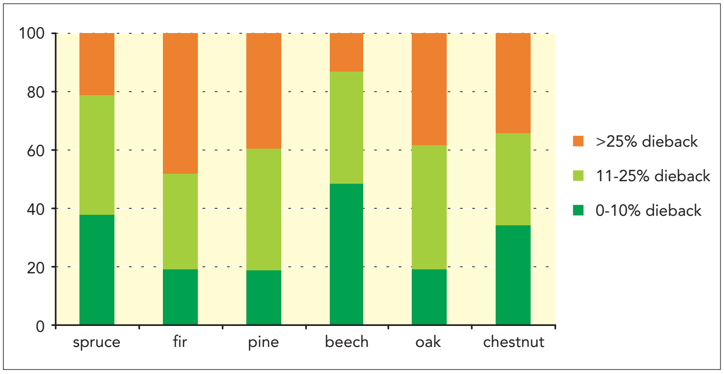


Figure 15-2
Share of trees in defoliation classes by tree species in 2000
Source: Forest Institute of Slovenia, 2002



Targets

The NEAP envisages the conservation and re-establishment of the natural composition of forest communities and the strengthening of forest resistance.

There is a certain share of damaged trees permanently present in forests. Continued recording will indicate what quantity is still normal.

Assessment of trend

In the period from 1985 to 2000 the share of damaged trees did not increase in a statistically significant way. The state of evergreens is still worse than the state of deciduous trees, but the long-term trends differ: the state of evergreens is improving, while the state of deciduous trees is deteriorating. The most damaged species remains the fir, while there is an alarming deterioration in the state of oaks. The state of forests in nearby Central European countries is similar to that in Slovenia. A direct comparison of numbers is not advisable, however, since despite a 15-year international programme the methodological differences between individual countries still have not been eliminated.

Data and sources:

Data for Slovenia:

The Forest Institute of Slovenia makes an annual census of tree dieback. The methodology for the census and data collection is prescribed in the Regulation on forest protection (OJ RS 92/2000).

Data for Europe:

Data collected according to the internationally applied methodology (ICP-Forests) and therefore comparable with the data from other countries, but in Slovenia the census also includes undergrowth trees, for which dieback is significantly higher.

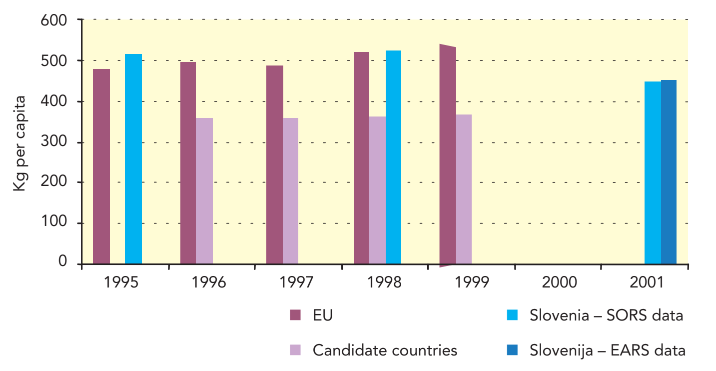
16. Generation of municipal waste

Municipal waste is waste from households and other waste which by its nature and composition is similar to household waste. The Environmental Protection Act (OJ RS 32/93) defines municipal waste management as an obligatory local public service. Handling of separate fractions of municipal waste is governed by the Ordinance on handling separately collected fractions in performing the public service of municipal waste management (OJ RS 21/01). Separately collected fractions are that part of municipal waste which is generated within the boundaries of the local community as waste in households and by its nature and composition is similar to waste in industry, crafts and services.

Figure 16-1

Generation of municipal waste per capita

Source: Waste Management database, EARS, 2002; (Slovenian) Statistical Yearbook 2000, Statistical Yearbook 2001, SORS; Municipal waste generation per capita, Indicator fact sheet, EEA, 2002



Targets

The NEAP envisages a reduction in the quantity of municipal waste generated.

This area is governed by the Ordinance on handling separately collected fractions in performing the public service of municipal waste management (OJ RS 21/01).

Assessment of trend

Both the EARS and SORS data show that in Slovenia around 450 kg of municipal waste is generated annually per capita. According to SORS data, in 1995 and 1998 the generation of municipal waste was somewhat higher (512 and 523 kg/capita per annum). But the methodology for collecting data on waste generated was slightly different, so it would be hard to conclude that the quantity of waste generated had fallen. We will be able to observe a real trend of municipal waste generation only in the coming years, when we have used the same methodology for several years and the system of separate municipal waste collection will be set up completely.

According to EEA data the trend of municipal waste generation is rising in the EU member states. The 5th Environment Action Programme set out the goal of needing to stabilise the generation of municipal waste across the EU by 2000 at 300 kg/capita per annum. In 1999 the average quantity of municipal waste generated within EU member states was around 500 kg/capita per annum.

Data and sources:

Data for Slovenia:

The Ministry of the Environment, Spatial Planning and Energy – Environmental Agency of the Republic of Slovenia (EARS) – has monitored *the generation of municipal waste since 2001. In line with the Ordinance on handling separately collected fractions in performing the public service of municipal waste management (OJ RS 21/01) the providers of the public service of municipal waste collection report once a year (31 March) on prescribed EARS forms about the collected quantities of municipal waste.*

Data from the reports are entered into the Waste Management database. Here checks are made of the completeness and quality of data. The quantity of municipal waste generated was arrived at from data on quantities collected.

The quantities of municipal waste generated are also monitored by the SORS through three-year research programmes. In 1995 and 1998 the SORS monitored the generation of municipal waste in accordance with the EUROSTAT definitions. In 2001 the SORS carried out research on the generation of municipal waste in line with the provisions and reporting prescribed by the Ordinance on handling separately collected fractions in performing the public service of municipal waste management.

Data for Europe:

Data were used for those EU countries for which they were available (Belgium, Denmark, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom) plus data for the following candidate countries: Czech Republic, Estonia, Hungary, Lithuania, Poland and Romania.

Data source is Municipal waste generation per capita, Indicator fact sheet, EEA, 2002. Original data used in the indicator fact sheet have been taken from the Eurostat New Cronos Database (Eurostat-OECD JQ 2000). Data were collected by means of so-called Joint Questionnaires (JQ 2000) and the study Household and Municipal Waste: Comparability of Data in EEA Member Countries, Topic report No 3/2000, European Environment Agency, European Topic Centre on Waste, 2000, which was made on the basis of questionnaires and national reports to the EEA and of Eurostat data.

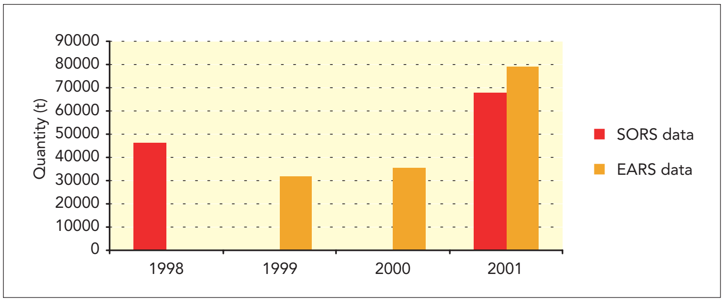
17. Generation of hazardous waste

Hazardous waste has one or more hazardous properties which are harmful to health and/or the environment (e.g. inflammable, irritant, poisonous, mutagenic and so forth). The waste list is published in the annexe to the Rules on waste management (OJ RS 84/98, 45/00, 20/01). Hazardous waste is waste marked in the waste list with a star next to the waste classification number.

Figure 17-1

Generation of hazardous waste

Source: Waste Management database, EARS 2002; Statistical Yearbook 2000 and 2001, SORS (Statistical Office of the Republic of Slovenia) 2001



Targets

One of the main NEAP targets in this area is reducing the quantity of hazardous waste and the hazard potential of waste at source. This area is governed by the Rules on waste management (OJ RS 84/98, 45/00, 20/01).

Assessment of trend

The quantities of hazardous waste are growing according to data from both EARS and the SORS. EARS data show in particular a large increase in the generation of hazardous waste in 2001 over 2000, by 43,503 t. The data held by the SORS also indicate an increase in the generation of waste from 1998 to 2001 (21,257 t). From this it is possible to conclude that the generation of hazardous waste has increased. In part the increase can also be ascribed to the changed methodology of reporting, since in 2001 the waste classification list changed, there was also an increase in the number of those liable (by 64) who reported, which is linked to the implementation of waste management regulations. At the same time we have observed that the export of hazardous waste has also grown, with an increase in 2001 of 3,000 t over 2000.

According to EUROSTAT and EEA data, the member states and associate members hold incomplete data on hazardous waste generation (Hazardous waste generation in the European countries. Indicator fact sheet, EEA, 2002). There was a modest improvement in the situation after 1995. The data show that in the EU member states hazardous waste generation is growing.

Data and sources:

The Ministry of the Environment, Spatial Planning and Energy – Environmental Agency of the Republic of Slovenia – has monitored the generation of hazardous waste since 1999. Those liable first reported on hazardous waste generation for 1999. Data are collected on the basis of the Rules on waste management (OJ RS 84/98, 45/00, 20/01), which provides that:

- *waste producers where in an individual calendar year at least 20 kg of hazardous waste are generated, must submit a report on the waste produced and its handling for the previous calendar year and*

– collectors must submit a report on collected hazardous waste and its handling for the previous calendar year.

– Processors and removers of hazardous waste must submit a report on waste processing carried out in the previous calendar year.

The above report must be sent by those liable by 31 March of the current year on a prescribed form to the EARS.

In 2001 the waste classification list was changed in line with the change in European legislation, which introduced a new waste list. In this way, those liable sent reports on hazardous waste generation in line with the new classification list.

Data from the reports are entered into the Waste Management database. Here checks are made of the completeness and quality of the data.

The quantities of hazardous waste are also monitored by the SORS in three-year research programmes. In 1998 the SORS monitored the generation of hazardous waste in accordance with the waste classification list published in the Rules on waste management in 1998. In 2001, however, the Statistical Office conducted research on hazardous waste generation in line with the classification list published in 2001.

18. Transboundary movements of hazardous waste

The purpose of this indicator is to show the progress in connection with reducing the transits of hazardous waste across borders and the self-sufficiency of the country in terms of ensuring processing and disposal of hazardous waste as close as possible to the location of its production, and to the greatest possible extent limiting the generation of hazardous waste (in quantity and also in terms of the degree of harmfulness).

The indicator is shown as a total amount:

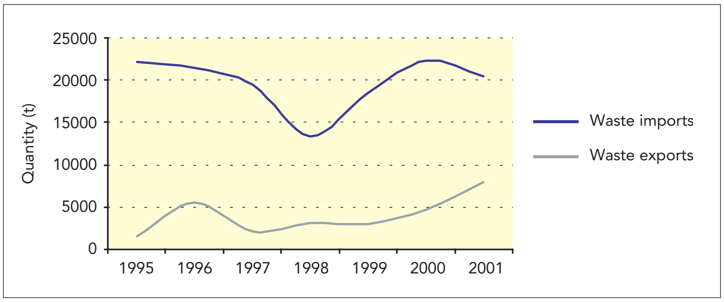
- hazardous waste (kg) imported from other countries and
- hazardous waste (kg) exported to other countries with the intention of processing or disposal

Hazardous waste, in the case of import and export, and in accordance with the Act Ratifying the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal (OJ RS-MP 15/93 and 2/00) is:

- waste falling into any category set out in addendum I to the Basel Convention, except if it has no characteristics set out in addendum III to the Basel Convention (does not demonstrate hazardous properties) and
- waste not covered by the first point but determined as such or deemed to be hazardous waste according to the national legislation of the country of export, import or transit.

In the area of transit of hazardous waste across borders, Slovenia is implementing the provisions of the Basel Convention, having ratified this convention. In the event of an EU member state being affected, then account must also be taken of the European Council Regulation on the supervision and control of waste shipments within, into and out of the European Community, which governs this area, and has a broader framework, since it incorporates the Basel Convention, the OECD Council Decision on transboundary transport of waste and the recommendations of the Lome conference. The regulation also governs in part the transport of non-hazardous waste.

Figure 18-1
Quantity of hazardous waste imported into and exported out of Slovenia
Source: International waste traffic database, EARS, 2002



Targets

The NEAP envisages consistent implementation of international and bilateral obligations (Basel Convention).

This area is regulated in detail by: the Act Ratifying the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal (OJ RS-MP 15/93 and 2/00), the Ordinance on export, import and transit of waste (OJ RS 39/96, 45/96, 1/97, 59/98, 1/00 and 94/00) and the Decision on determining border crossings across which hazardous waste may be brought in, taken out or transported in transit across the customs territory of the Republic of Slovenia (OJ RS 11/97).

Assessment of trend

In Slovenia only the transport of hazardous waste is monitored. Every shipment of hazardous waste must be declared in advance and must have all appropriate permits from the exporting country, importing country and countries of transit. The import of hazardous waste for the purpose of disposal is prohibited. The import of hazardous waste into Slovenia is permitted only if the waste will be processed in an environmentally safe way and the exporting country consents to the intended transit of the hazardous waste. The export of hazardous waste from Slovenia is only permitted, among other things, if the technical capacities and necessary facilities for the disposal of such waste in an environmentally safe way do not exist in the territory of the Republic of Slovenia.

The quantities of hazardous waste imported in recent years have, with the exception of 1998, remained fairly constant. The largest quantity has been imported waste lead batteries for processing at Rudnik Mežica MPI, and has come from Croatia, Hungary and some from Romania and Bosnia-Herzegovina. In recent years a certain amount of acids and base solutions have also been imported for processing at the Celje zinc works.

The export of hazardous waste has grown slightly in recent years. Exports have been predominantly of paint and varnish sludge, followed by halogenated organic solvents, non-halogenated organic solvents, waste paints and varnishes, while a small share has been taken by sludge from the mechanical surface working of metals, used batteries, ash and residue from thermal metallurgy, waste edible oil and transformers and condensers containing PCB's and PCT's.

Data and sources:

A party that has obtained a permit for import or export of hazardous waste (importer, exporter) must no later than 180 days from the day the individual shipment of hazardous waste was delivered to the disposer in the country of import, submit to EARS confirmation from the disposer (confirmed transport form) on its disposal. The transport form shows the date of transportation, the delivery and receival of the hazardous waste at the disposer's location and the date of disposal of the waste and quantity of transported, delivered, received and disposed hazardous waste.

The data from the transport forms on the effected disposal of hazardous waste is entered into the International traffic in waste database, which also records all permits issued. The data allow us to keep records on the effected quantities of hazardous waste imported and exported for individual issued permits and for reporting to the Secretariat of the Basel Convention in compliance with articles 13 and 16 of the convention. Data thus obtained on permitted transits of hazardous waste across the border are reliable and accurate. We have no data regarding illegal transport.

19. Agri-environmental measures

This indicator shows the spread of agricultural environmental measures in Slovenia adopted under the Slovenien Agri-environmental Programme (SAEP) of the Ministry of Agriculture, Forestry and Food. The measures are joint into three groups, the purpose of which is to reduce the negative effects of agriculture on the environment, preserve natural features, biodiversity, soil fertility and the traditional cultural landscape, and the protection of protected areas.

Figure 19-1

Share of agricultural land covered by regulation 2078/92 1998 in European countries and through the Slovenian Agricultural Environmental Programme for Slovenia 2001

Source: Area under agri-environmental management contracts, Indicator fact sheet, European Environment Agency, 2002 – Objective 1 means areas where 75 % of costs are EU budget financed, and in other areas this share is 50 % of costs; data for Slovenia: Agency for Agricultural Markets and Rural Development, 2002

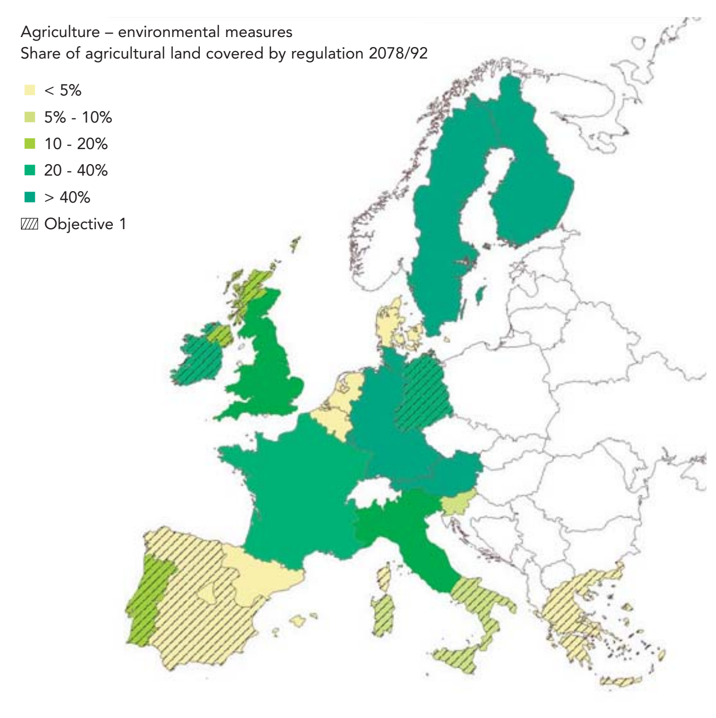
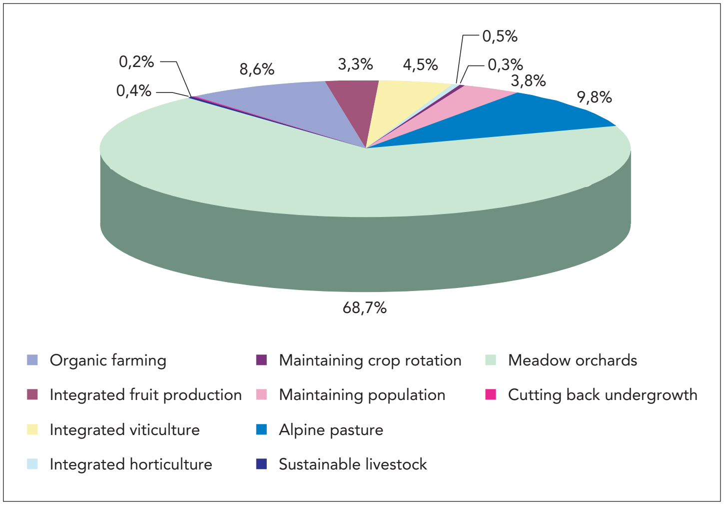


Figure 19-2

Share of area under agri-environmental measures under the SAEP in 2001

Source: Agency for Agricultural Markets and Rural Development, 2002



Targets

The NEAP envisages a reduction in the use of mineral fertilisers and pesticides, the introduction of ecological farming and the prevention of further loading from point and diffuse sources. In 2001 the Ministry of Agriculture, Forestry and Food allocated for the first time subsidies under the Slovenien Agri-environmental Programme.

Assessment of trend

Subsidies under the Slovenien Agri-environmental Programme were allocated for the first time in 2001, and the programme should be implemented in its entirety by 2006. In 2001 measures were approved on 83 % of the area requested, and this represents 5.6 % of all agricultural land in use. The largest portion of subsidy was allocated for sustainable livestock, 10 % was land under the measure for Alpine pasture and 8.6 % was land for ecological farming. Only a small share of the area approved relates to integrated fruit production (3 %), integrated viticulture (4 %) and preservation of the cultivated and settled landscape in protected areas (4 %).

Data and sources:

Data for Slovenia:

The data source for Slovenia is the collected data of the Slovenian Agency for Agricultural Markets and Rural Development, which is produced within the framework of the annual allocation of subsidies under the Slovenien Agri-environmental Programme. From 2001, annual collection is envisaged. Data are comparable for Slovenia, but for the other EU countries only conditionally, since certain measures are entirely specific to Slovenia

Data for Europe:

Taken from the fact sheet Area under agri-environmental management contracts, Indicator fact sheet, European Environment Agency, 2002.

20. Pesticides consumption

This indicator shows the intensiveness of agricultural production in Slovenia through the consumption of pesticides. It shows the total quantities of substances consumed and the consumption per hectare of arable land. Pesticides are chemical compounds for suppressing diseases and pests. Existing records give the values for fungicides and bactericides, herbicides, insecticides and other agents.

Figure 20-1

Consumption of pesticides in Slovenia in the period 1992 to 1999

Source: Statistical Yearbook 2001, SORS

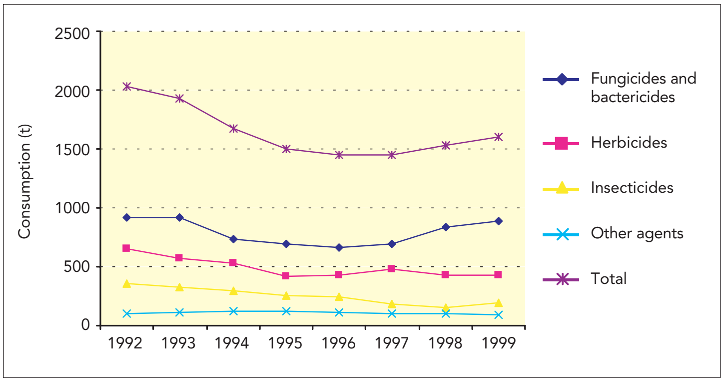
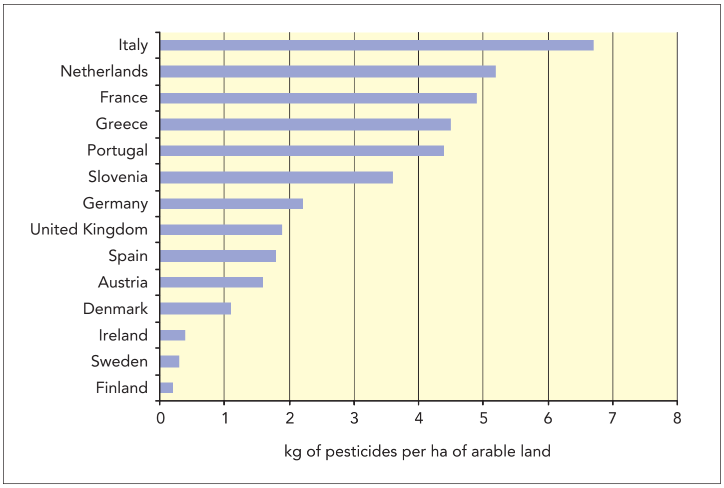


Figure 20-2

Consumption of pesticides per ha of arable land by country

Source: Statistical Yearbook 2001, SORS; Agriculture eco-efficiency. Indicator Fact Sheet, EEA, 2002



Targets

The NEAP envisages a reduction in the use of pesticides, the introduction of ecological farming and prevention of further loading from point and diffuse sources. In vulnerable areas of aquifers and their hydrographic surroundings, the Slovenian Government has through a regulation prohibited the use of pesticides containing active substances because of which the individual area has been designated as vulnerable. In the accompanying decision it defined the areas of aquifers and their geographic hinterland vulnerable to pesticides.

Assessment of trend

The consumption of pesticides was greatest in 1992 and 1993. Then between 1994 and 1996 it fells, and since 1997 it started to rise again. The largest share of pesticides is taken by fungicides – 55 %, with herbicides taking 26 %, insecticides 11 % and other agents 5 %. Consumption of pesticides has been growing since 1997. A comparison of results with other EU countries shows that with a consumption of 3.6 kg per hectare of arable land, Slovenia falls within the group of major users. This includes Portugal, Greece, France and the Netherlands with their consumption of between 4.4 and 5.2 kg, while Italy stands out with the highest consumption – 6.7 kg per hectare of arable land. In 2001 there were 215 active substances in registered pesticides in Slovenia.

Data and sources:

Data for Slovenia:

Data used are from the SORS and published in the Statistical Yearbook of the Republic of Slovenia on the consumption of pesticides in proprietary production by agricultural companies and cooperatives and on the sale of such agents to private users. The data relating to family farms indicate available agents which may or may not have been used. Quantities mean commercial quantities and not quantities of active substances. Consumed quantities are shown per hectare of arable land or agricultural land in use.

Data for Europe:

Data source is Agriculture eco-efficiency , Indicator Fact Sheet, EEA, 2002. Original data used in the fact sheet are taken from Statistics in Focus,1998/3, Eurostat.

21. Fertiliser consumption

This indicator shows the intensiveness of agricultural production in Slovenia through the consumption of mineral fertilisers. It shows the total quantities of substances and the consumption per hectare of arable land. Mineral fertilisers are substances that contain chemical elements necessary for plant growth, especially nitrogen, phosphorus and potassium (N, P, K). The existing records at the SORS give their individual values and total quantity.

Figure 21-1

Consumption of plant nutrients in Slovenia from 1992 to 2000

Source: Statistical Yearbook of the Republic of Slovenia 2001, SORS

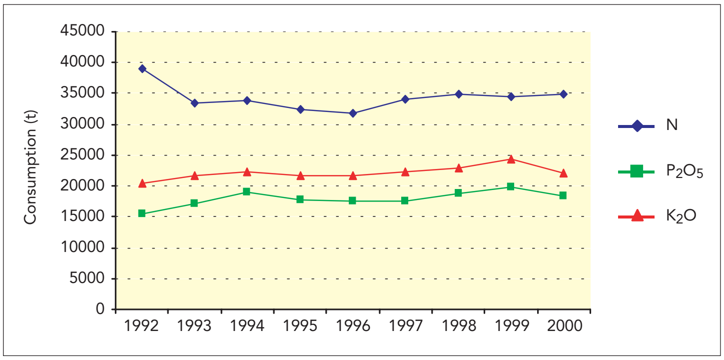


Figure 21-2

Consumption of mineral fertilisers in kg per hectare of arable land in Slovenia from 1990 to 2000

Source: Statistical Yearbook of the Republic of Slovenia 2001, SORS

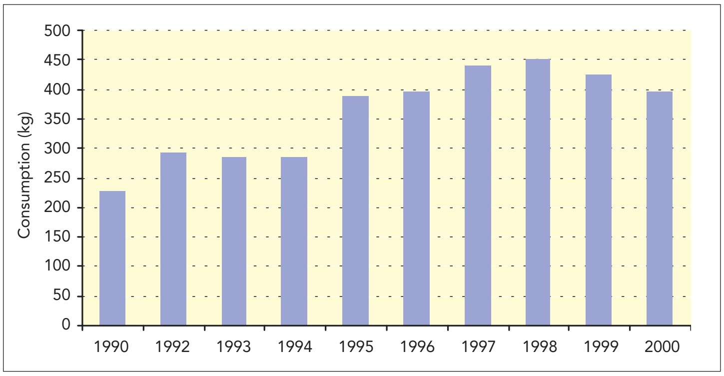
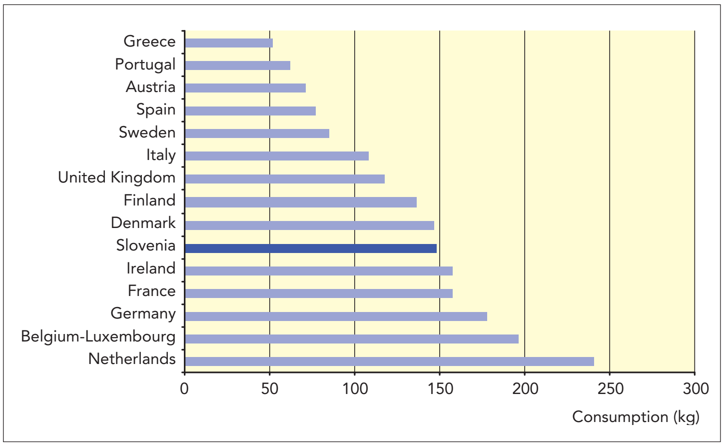


Figure 21-3

Consumption of plant nutrients per hectare of arable land in some European countries for 1999 and in Slovenia in 2000

Source: for Europe: Agriculture eco-efficiency, Indicator fact sheet, EEA, 2002; for Slovenia: Statistical Yearbook of the Republic of Slovenia, 2001



Targets

The NEAP envisages a reduction in the use of mineral fertilisers, the introduction of ecological farming and prevention of further loading from point and diffuse sources. In compliance with the nitrate directive, through the Decree on the input of dangerous substances and plant nutritients into the soil (OJ RS 68/96, 35/01) the entire territory of Slovenia was designated a vulnerable zone and the content of the action programme was defined.

Assessment of trend

Consumption of mineral fertilisers in Slovenia in the period in question rose by 15 %, although owing to a reduction in the area of arable land, consumption per hectare of arable land doubled, from 229 kg/ha in 1990 to 451 kg/ha in 1998. After that year it fell slightly, and in 2000 amounted to 397 kg/ha. The composition of plant nutrient use is dominated by nitrogen fertilisers with a 46 % share of all nutrients. Yet it must be pointed out that mineral fertilisers in Slovenia are used primarily in the function of top-up fertilising, since there is still the prevalent practice of combined fertilising with organic and mineral fertiliser. Two thirds of the nitrogen is applied through livestock manure, and one third with minerals. In the lowland plains this ratio is even, while on slopes and hills the share of nitrogen from livestock manure rises to 80 %.

The comparison of results with other European countries has been done on the basis of data on consumption of plant nutrients per hectare of arable land, and this has shown that Slovenia ranks among the medium to large consumers of nutrients.

Data and sources:

Data for Slovenia:

All consumed quantities and consumed quantities per hectare of arable land are shown. Data used are from the SORS, and published in the Statistical Yearbook 2000. Since 1992 the SORS has calculated data on consumption of mineral fertilisers on family farms from data on imports, exports and production of mineral fertilisers, from data on stocks and from data on mineral fertilisers used in agricultural companies and cooperatives. Data is collected annually. For arable land we used data on agricultural land in use.

Data for Europe:

Data source is Agriculture eco-efficiency, Indicator Fact Sheet, EEA, 2002. The original data used in the fact sheet are taken from FAOSTAT, the database of the UN Food and Agriculture Organisation (FAO).

22. Final energy consumption

Final energy denotes various forms of energy which enter the facility of use or technological process (such as electricity at the junction box of a residential building or of a machine, petrol at the pump and so forth).

Users are divided into the following sectors:

- industry: we show consumption of energy for primary activities,
- transport: we show consumption of fuel in total transport (land transport, pipeline transport, water navigation, air transport, railways, ships) and
- other consumption: we show consumption of energy for the service and public sectors, households, agriculture and others (e.g. consumption for military purposes).

Figure 22-1

Consumption of final energy by sector, Slovenia, 1990-1999 (PJ)

Source: Statistical Yearbook of the Slovenian energy sector 1990-1999

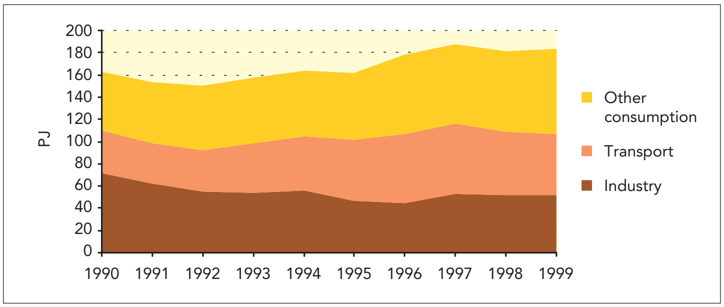
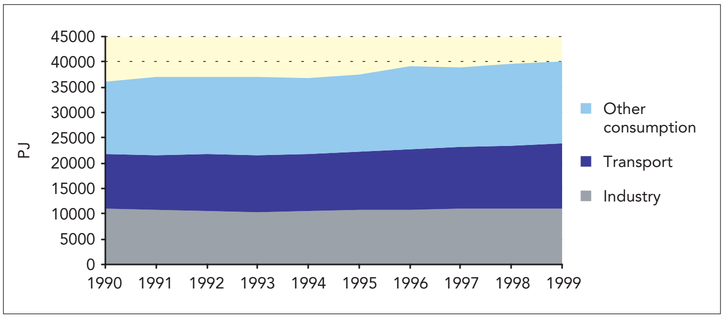
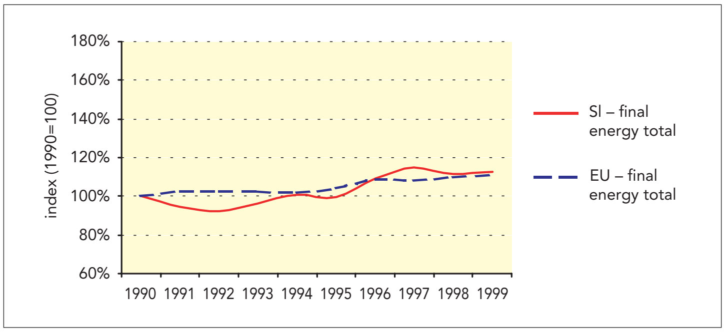


Figure 22-2

Consumption of final energy by sector, EU-15, 1990-1999 (PJ)

Source: Final energy consumption by sector, Indicator fact sheet, EEA, 2002





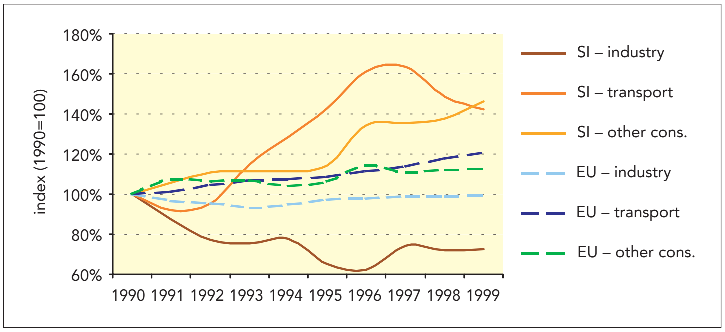


Figure 22-3, 22-4

Index of final energy consumption by sector of use in Slovenia and the EU (basis is value for 1990)

Source: Statistical Yearbook of the Slovenian energy sector 1990-1999, Final energy consumption by sector, Indicator fact sheet, EEA, 2002

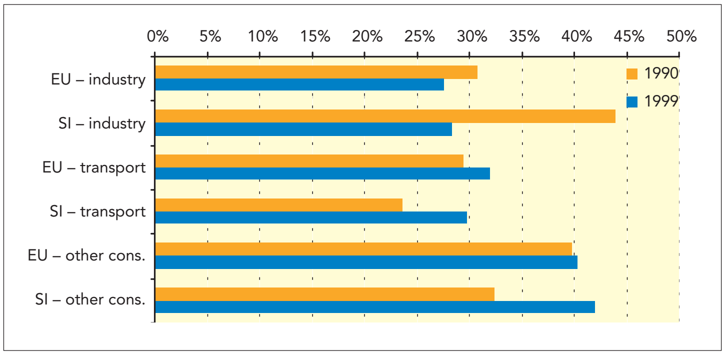


Figure 22-5

Shares by sector of final energy consumption for Slovenia and the for 1990 and 1999

Source: Final energy consumption by sector, Indicator fact sheet, EEA, 2002

Targets

The NEAP envisages a reduction in the consumption of final energy by a fifth in ten years.

Assessment of trend

Consumption of final energy in the industry sector fell in Slovenia from 1990 to 1999 by 19.7 PJ or by 27.4 % (in the EU-15 by 74.1 PJ or 0.7 %) with an average annual rate of reduction of 3.5 % (in the EU-15 by 0.1 %). The high share held by industry in the entire final energy consumption, which in 1990 amounted to over 44 % (EU-15 only 30.8 %) fell in 1990 to just over 28.3 % (in the EU-15 to 27.6 %), which is already comparable with the European Union.

Consumption of final energy in the transport sector grew in Slovenia between 1990 and 1999 by 16.2 PJ or by 42.1 % (in the EU-15 by 2176.3 PJ or 20.5 %) with an average annual growth rate of 4.0 % (in the

EU-15 by 2.1 %). The share of transport in the entire consumption of final energy in Slovenia, which in 1990 amounted to just over 23.6 % (29.4 % in the EU-15) grew in 1990 to 29.7 % (in the EU-15 to 32 %), which is still under the European Union average.

Final energy consumption in the other consumption sector rose in Slovenia from 1990 to 1999 by 24.3 PJ or by 46.1 % (in the EU-15 by 1775.9 PJ or 12.4 %) with an average annual growth rate of 4.3 % (in the EU-15 by 1.3 %). The share of other consumption in final energy consumption in Slovenia, which amounted in 1990 to over 32.4 % (in the EU-15 as much as 39.8 %), grew in 1990 to as much as 41.97 % (in the EU-15 to 40.4 %), which is already on the level of the European Union average.

Data and sources:

Data for Slovenia:

Based on monthly reports by reporting units on the basis of the Energy Act (OJ RS 79/99 and 8/00) on produced, consumed, imported and exported energy. Data are collected in the database at the Ministry of the Environment, Spatial Planning and Energy. They are aggregated in terms of the type of final product. The result of data processing is the annual publication of the Statistical Yearbooks of the energy sector in Slovenia, the Energy Balance Sheet and other expert documents.

Data for Europe:

These relate to the EU member states (EU 15). Data source is EN16: Final energy consumption by sector, Indicator fact sheet, EEA, 2002. The original data used in the indicator fact sheet are taken from the Eurostat New Cronos Database.

23. Renewable electricity

This indicator shows the production of electricity from renewable energy sources. The producers of electricity from renewable sources are those producers of electrical energy that in obtaining electrical energy exploit the following renewable energy sources (RES):

- water energy (hydro potentials),
- biomass (wood, wood waste, energy plants, biodiesels, biogas),
- solar energy (photovoltaic, photothermic),
- geothermal energy (low and high temperature aquifers),
- waste incineration and
- wind energy.

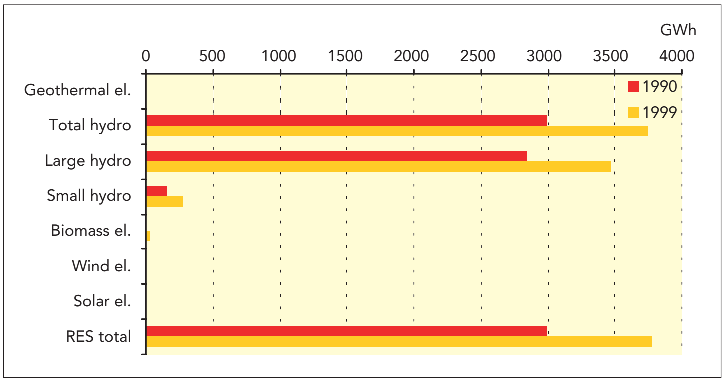


Figure 23-1
Gross production of electrical energy from renewable sources in Slovenia
Source: Statistical Yearbook of the Slovenian energy sector 1990-1999, SORS

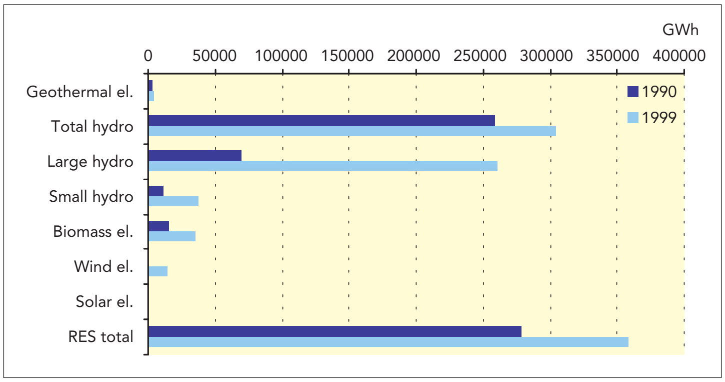


Figure 23-2
Gross production of electrical energy from renewable energy sources in the EU-15
Source: Renewable electricity, Indicator fact sheet, EEA, 2002

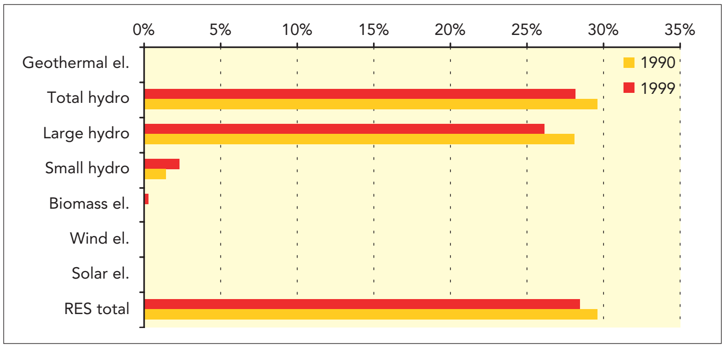


Figure 23-3
Shares of renewable energy sources in the total gross production of electrical energy in Slovenia
Source: Statistical Yearbook of the Slovenian energy sector 1990-1999, SORS

Figure 23-4

Shares of renewable energy sources in the total gross production of electrical energy in the EU
Source: Renewable electricity, Indicator fact sheet, EEA, 2002

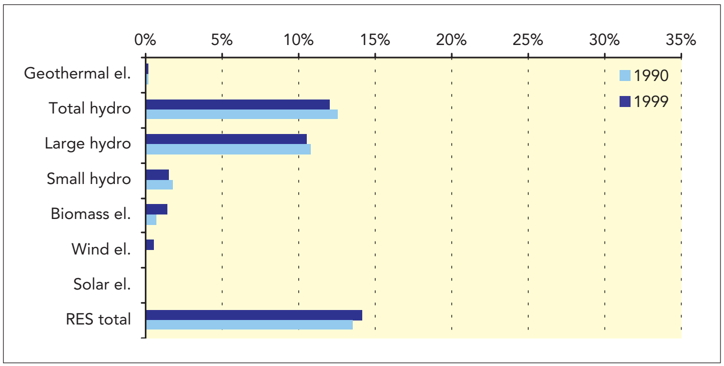


Figure 23-5

Shares of renewable energy sources in the total gross production of electrical energy from renewable energy sources without large hydroelectric plants in Slovenia
Source: Statistical Yearbook of the Slovenian energy sector 1990-1999, SORS

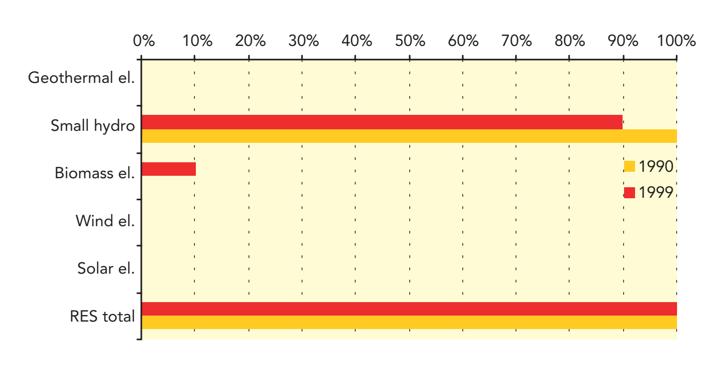
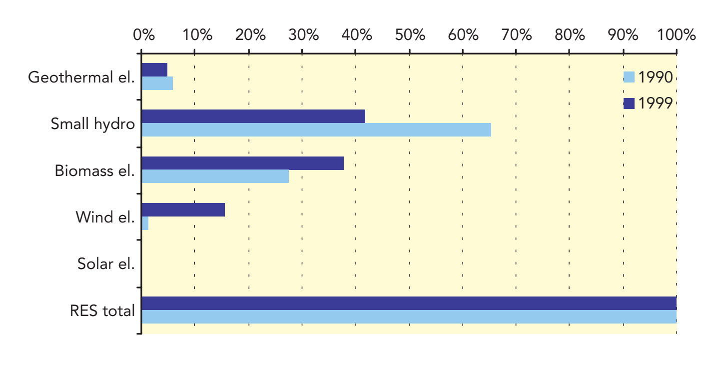


Figure 23-6

Shares of renewable energy sources in the total gross production of electrical energy from renewable energy sources without large hydroelectric plants in the EU-15
Source: Renewable electricity, Indicator fact sheet, EEA, 2002



Targets

The Kyoto Protocol envisages the stimulation and increasing of the share of renewable energy sources, with the aim of reducing CO_2.

Assessment of trend

☺

Production of electrical energy from renewable energy sources (RES) refers in Slovenia primarily to the production of electrical energy from water, and to a lesser extent from biomass (wood, wood waste and so forth) and biogas (landfill gas and gas from water treatment facilities).

The quantity of electrical energy from hydroelectric plants grew in Slovenia in the period 1990-1999 by 742 GWh or 24.7 % (in the EU-15 by 45867 GWh or 17.6 %) with an average annual growth rate of 2.5 % (in the EU-15 by 1.8 %). In this, large hydroelectric plants, with power of over 10 MW, contributed 622 GWh – an increase of 21.9 % (in the EU-15 by 274.4 %), while small hydro plants, under 10 MW, contributed 120 GWh – an increase of 76.6 % (in the EU-15 by 229.5 %). The share of all hydroelectric plants in the total gross production of electrical energy in Slovenia was 29.6 % (in the EU-15 it was 12.6 %) in 1990 and 28.2 % (in the EU-15 it was 12.0 %) and remained practically unchanged. At the same time the share of small hydroelectric plants amounted to 1.4 % (in the EU-15 to 1.7 %) in 1990 and 2.3 % (in the EU-15 it was 1.5 %) in 1999.

In Slovenia this kind of data has been collected (SORS) only since 1995. In the period 1995-1999 production of electrical energy grew from 8 GWh in 1995 to 31 GWh in 1999 with an annual average growth rate of 39 % (in the EU-15 it was also 38.1 %). In this the share of electrical energy production from biogas was 1.8 GWh in 1995 or 21.4 %, and in 1999 it was 12.5 GWh or 66.5 %.

Slovenia still has no wind, geothermal or solar electricity production plants.

Data and sources:

Data for Slovenia:

Taken from monthly reports of reporting units on the basis of the Energy Act (OJ RS 79/99 and 8/00) on produced, consumed, imported and exported energy. Data are collected in the database at the Ministry of the Environment, Spatial Planning and Energy. They are aggregated in terms of the type of final product. The result of data processing is the annual publication of the Statistical Yearbooks of the energy sector in Slovenia, the Energy Balance Sheet and other expert documents. Data on biomass derive from statistical records of the SORS.

Data for Europe:

These relate to the EU member states (EU 15). Data source is EN30: Renewable electricity, Indicator fact sheet, EEA, 2002. The original data used in the indicator fact sheet are taken from the Eurostat New Cronos Database.

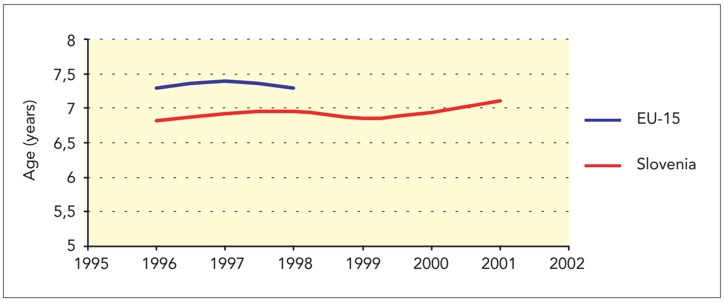
24. Average age of vehicle fleet

This indicator is shown through the average age of private motor vehicles. The age structure of vehicles is directly linked to the structure of vehicles fulfilling the threshold values for emissions of harmful substances in line with EU directives (emission standards EURO I-III).

Figure 24-1

Average age of private motor vehicles in Slovenia and the EU

Source: Ministry of the Interior database, processed by the Energis Energy Institute; Eurostat 2002



Targets

The European Commission and the EU member states, as well as the candidate countries have no specially defined target average age of vehicle fleet, but the common goal – of improving the age structure of the vehicle fleet and replacing old vehicles that place more load on the environment, with new and cleaner vehicles – remains.

In view of the increasingly stringent environmental requirements, newer vehicles are more efficient, place fewer loads on the environment, and are quieter and safer.

In the member states special programmes are being implemented to promote the replacing of old vehicles (abandoning use of old vehicles without buying a new one (monetary bonus), exchanging them for new ones or vehicles that put less load on the environment (monetary bonus in the form of a discount on the price of a new car), administrative measures that have no direct financial consequences, but indirectly influence the decision to replace old vehicles). In Slovenia these programmes came into effect in 1999.

Assessment of trend

In comparison with the EU countries the Republic of Slovenia has a favourable vehicle age structure, with the average age of registered private vehicles in 1999 being 6.8 years, which is less than the average of the member states (7.3 years), although the average age of private vehicles is growing and in 2001 stood at 7.1 years. At the same time we have observed that older vehicles are being used as a second or third vehicle, and for this reason their loading on the environment is smaller.

Data and sources:

Data for Slovenia:

The Slovenian Ministry of the Interior database on the vehicle fleet contains data on the year of manufacture of the vehicle, date of first registration and year of first registration, and the database is updated monthly. The average vehicle age is determined primarily in months, from the month and year of first registration to the observed end of the period. The calculation of average private vehicle age in Slovenia incorporates the Ministry of the Interior vehicle classification of two types of vehicle: OA (osebni avtomobil – private vehicle) and OS (osebno specialno vozilo – private special vehicle). The data are reliable, and in the *event of calculating age on the basis of year of vehicle manufacture, small deviations from the average private vehicle age are possible.*

Data for Europe:

Data source is TERM 2002 33 EU – Average age of the vehicle fleet, Indicator fact sheet, EEA, 2002. The original data used in the indicator fact sheet are taken from Eurostat.

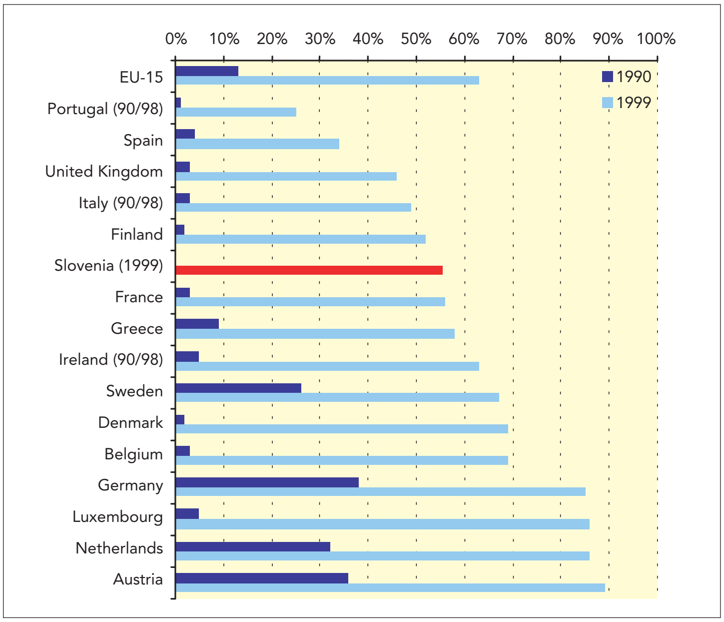
25. Vehicles meeting emission standards

This indicator shows the share of road motor vehicles that meet emission standards (EURO I, EURO II and EURO III). The share of motor vehicles that meet emission standards is linked to specific emissions, the number of registered motor vehicles and the average age of motor vehicles.

Figure 25-1

Share of private petrol engine vehicles with catalytic converters

Source: TERM 2002 34 EU – Proportion of vehicle fleet meeting certain air and noise emission standards, Indicator fact sheet, EEA, 2002; data for Slovenia: Ministry of the Interior database, processed by: Energis Energy Institute



Targets

Increasing the share of vehicles that meet the latest (strictest) emission standards for new vehicles.

Legislation in the area of emissions from new motor vehicles has been in effect in the EU countries since 1970. It is divided into individual types of vehicle (private vehicles, light goods vehicles, heavy goods vehicles) and engine fuel (petrol and diesel), but it does not prescribe the share of vehicles that meet emission standards in the vehicle fleet of individual member states. The latest legislation is defined for private and light goods vehicles in directive 1998/69/EC, for heavy goods vehicles in directive 1999/96/EC and for motor cycles in directive 97/24/EC.

Assessment of trend

The share of motor vehicles equipped with a catalytic converter is growing. The spread of new technology depends on the lifetime of motor vehicles. Owing to the more rapid renewal of the vehicle fleet the structure of motor vehicles in Slovenia is more rapidly approaching the average for the EU countries. Estimates of the share of private vehicles with a catalytic converter confirm that for the implementation of new technology in the entire motor vehicle fleet, at least ten years will be needed.

Data and sources:

Data for Slovenia:

Description of data source: the Ministry of the Interior database on the Slovenian vehicle fleet contains data on the type of vehicle (taking account of private cars and private special vehicles) the engine fuel *(taking account of gasoline) and the year of manufacture of the vehicle, which is the basis for calculating the share of motor vehicles equipped with a catalytic converter.*

The number of motor vehicles with a catalytic converter installed is calculated for individual years from the state of the vehicle fleet as at 31 December. For individual motor vehicles corrections must be made in the Ministry of the Interior database to the data on the type of engine fuel, which affects the final number of motor vehicles running on petrol and in this way the share of petrol-driven vehicles equipped with catalytic converters. In view of the small share of necessary corrections (<1 %) we may assess the data as accurate and of good quality. By changing the calculation of the share of catalytic converters from the year of manufacture of the motor vehicle to the type or subtype of vehicle this would also incorporate those vehicles that already had catalytic converters installed before this was required.

Data for Europe:

Data source is TERM 2002 34 EU – Proportion of vehicle fleet meeting certain air and noise emission standards, Indicator fact sheet, EEA, 2002. The original data used in the indicator fact sheet are taken from the Eurostat Statistical Compendium 2002 (Eurostat, 2002) and are an estimate of the share of vehicles with catalytic converters relative to the age of vehicle.

26. Freight transport – modal split

The development of the method of freight transport is shown as a comparison between the index of growth of gross domestic product and the ton kilometres in freight transport between 1995 and 2001, and with the share of ton km in road freight between total ton kilometres. Ton kilometres are the sums of the products of the quantity of goods and the distances over which these goods were transported.

Figure 26-1
Trends in freight transport in Slovenia and gross domestic product
Source: Statistical Yearbook, SORS

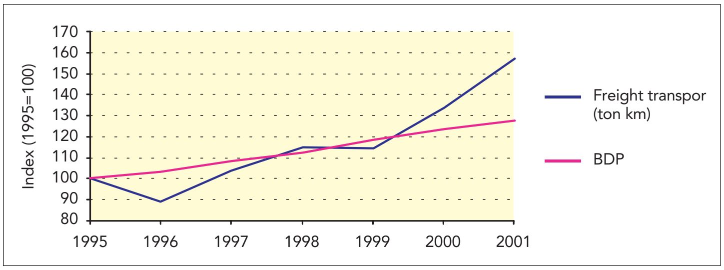
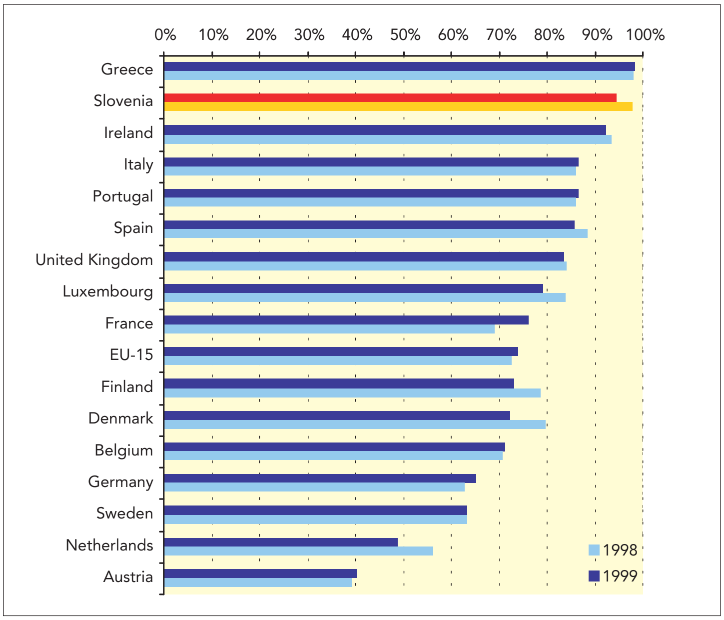


Figure 26-2
Share of road freight in comparison with the EU countries
Source: TERM 2002 13 EU – Freight transport demand by mode, Indicator fact sheet, EEA, 2002; Data for Slovenia: SORS



Targets

The main goal in this area is to reduce the link between economic growth and the demand for freight transport and to increase the share of rail transport.

In the transport policy white paper the European Commission set out measures for an integrated approach to dealing with the issue of transport. The envisaged measures are not directly intended to reduce the connection between economic growth and the growth in freight transport. Their purpose is primarily to create appropriate conditions for establishing competition between the individual forms of freight transport, chiefly through a revitalisation of rail transport, investment in trans-European rail links and an appropriate and effective pricing policy. The aim of these measures is to establish by 2010 the shares of individual forms of transport from 1998.

Assessment of trend

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A reduction in the dependency between economic growth and the extent of freight transport has not been achieved. Recently freight transport has been growing much more rapidly than GDP. Movements in the structure between road and rail freight transport do not indicate a transfer of freight from the roads to the railways.

The share of road freight is rapidly increasing, but is still below the average for the EU countries. In 1999 the share of road freight reached 55 %, which is 19 % less than the EU average. Despite the increased volume, the share of rail freight fell from 53 % in 1996 to 33 % in 2001, but remains well above the EU average (14 % in 1999).

Data and sources:

Data for Slovenia:

Data on ton kilometres in freight transport are collected monthly by the SORS and published in the Statistical Yearbook under the chapter Transport. For freight transport data are available on freight transported by rail, by public road transport, by proprietary road transport and by air. Ton kilometres (tkm) are the sums of the products of the quantity of goods and the distances over which these goods were transported (Methodological explanation – Slovenian Statistical Yearbook - Transport).

Data on gross domestic product are also taken from the Slovenian Statistical Yearbook. GDP is expressed in constant 1995 prices.

Data for Europe:

Data source is TERM 2002 13 EU – Freight transport demand by mode, Indicator fact sheet, EEA, 2002. The original data used in the indicator fact sheet are taken from the Eurostat Statistical Compendium 2002.

27. Drinking water quality

According to Slovenian law, drinking water is water from the systems of public mains drinking water supply and water for bottling intended for human consumption. Each system of public drinking water supply must have an administrator that must ensure the health suitability of the drinking water and the safety of the drinking water supply. The health suitability of drinking water is determined by sampling and testing of samples, while the safety of drinking water supply is determined through an assessment of all the elements of the system of public drinking water supply, which must be constantly monitored and checked, and when needed rectified. The internal monitoring conducted by the administrator based on the HACCP system (Hazard Analysis and Critical Control Point), will in 2003 be established in compliance with Article 17 of the Act Regulating the Sanitary Suitability of Foodstuff, Products and Materials Coming into Contact with Foodstuffs (OJ RS 52/2000). A draft has been made of the new Rules on drinking water quality, which will also be completely harmonised with European Union legislation.

Figure 27-1

Percentage of population supplied from the systems of public drinking water supply serving more than 5000 inhabitants of Slovenia, in which there 5 % or more unsuitable samples of drinking water owing to microbiological and physical-chemical tests in 1999-2001 (for explanations *** see Data and sources)

Source: Collection of data on systems drinking water supply, IPHRS, 2002

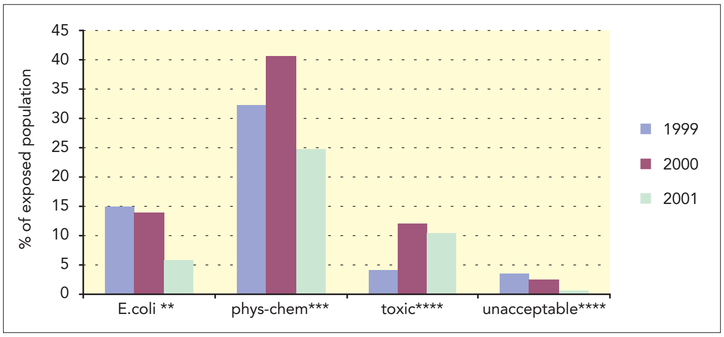


Figure 27-2

Percentage of unsuitable samples of regular and periodical microbiological tests owing to an exceeding of the value of individual parameters in the systems of public drinking water supply serving 5,000 inhabitants or more, 1999-2001 in Slovenia (for explanations *** see Data and sources)

Source: Collection of data on systems drinking water supply, IPHRS, 2002

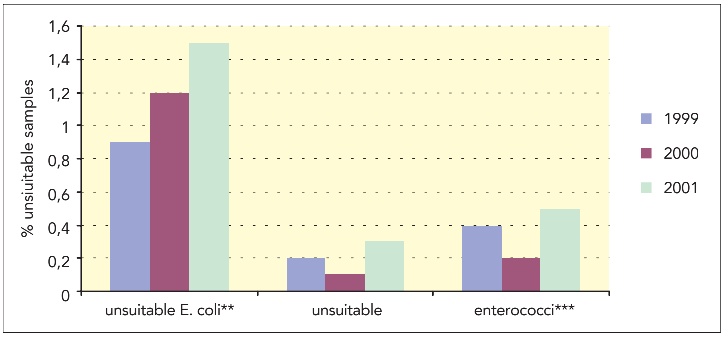
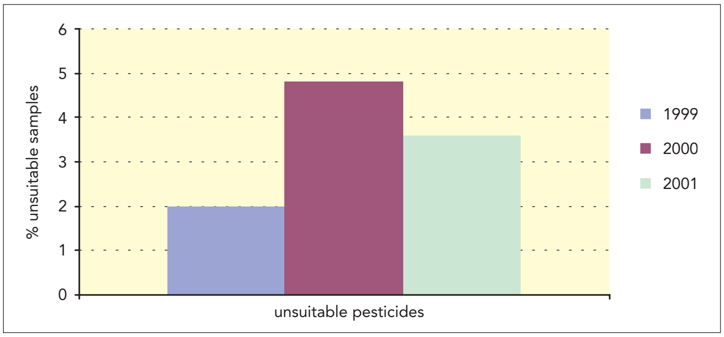


Figure 27-3

Percentage of samples of periodical physical and chemical testing, where at least one sample exceeded the recommended maximum value for pesticides in the systems of public drinking water supply serving 5,000 inhabitants or more, 1999 - 2001 in Slovenia (for explanations *** see Data and sources)

Source: Collection of data on systems drinking water supply, IPHRS, 2002



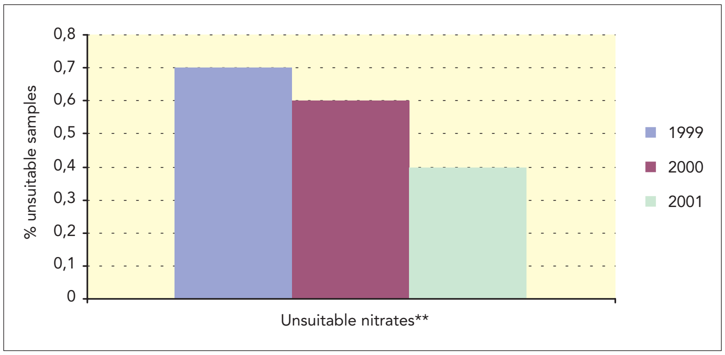


Figure 27-4

Percentage of unsuitable samples from periodical physical and chemical testing owing to exceeded value of nitrate concentration in drinking water, in the systems of public drinking water supply serving 5,000 inhabitants or more, 1999-2001 in Slovenia (for explanations *** see Data and sources)

Source: Collection of data on systems drinking water supply, IPHRS, 2002

Targets

The aim is to establish the actual state in the area of public drinking water supply in Slovenia, to determine values and trends of microbiological and physical-chemical parameters for assessing the health suitability of drinking water and the state of safety elements for drinking water supply, including implementation of protection measures in water protection zones in order to protect public health, and to propose measures for improving the state.

The legal basis is provided by the requirements of the Rules on the health suitability of drinking water (OJ RS 46/97, 52/97, 54/98 and 7/00), which to a large extent is harmonised with the European Union Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.

Assessment of trend

In Slovenia there are few hydric epidemics, and the number of reported illnesses small, too. Nevertheless, it is necessary to strive for regular expert and official oversight of all public systems of drinking water supply. Oversight involves in particular microbiological and physical-chemical testing of drinking water samples in order to assess the health suitability of drinking water and elements of the system to determine the safety of drinking water supply. The problematic area is "small" systems, which supply up to 1000 citizens. These public systems are to a greater extent not properly fitted out (deficient facilities, poor maintenance of equipment, protection measures are not carried out in protection zones, which are not designated everywhere) and have no administrator. Any kind of measure on these systems makes a major improvement to the health suitability of drinking water and the safety of supply.

Of the toxic parameters, it is the maximum recommended values for pesticides that are most frequently exceeded, especially atrazine and its products of degradation. The problem is linked to those systems of dinking water supply that use groundwater as the source of drinking water. The recommended maximum value is 0.1 μg/l. The concentrations observed do not, in terms of the requirements of the rules (threat to health), demand radical measures, but draw our attention again to the already known fact of groundwater pollution from pesticides.

The presence of nitrates in drinking water samples taken from the networks of public systems, have been systematically monitored since 1995. The number of "small" systems in which there is a relatively constant appearance of exceeded concentrations, and the number of citizens served by these systems, has in that time been falling continuously, from 112,498 in 1995 to 1,835 in 2000.

Data and sources:

Data on the health suitability of drinking water are aggregated according to the public drinking water supply systems serving 5000 inhabitants or more, for the territory of Slovenia.

Data source is the Collection of data on systems of drinking water supply, which is updated and amended each year at the Institute of Public Health of the Republic of Slovenia (IPHRS) in line with the data supplied from the regional health protection institutes, and relative to the reporting requirements. Data are supplied by the administrators of public systems to the regional health protection institutes, with which they have a contract, and these institutes forward the data to the IPHRS, which each year drafts a report that is sent to the Ministry of Health.

The source contains data on the administrator, the public system of drinking water supply (type of water, size of system, number of inhabitants served by it), data on safety (arrangement of protection zones and implementation of protection measures within them), and the results of drinking water sample testing, in line with the requirements of the Rules on the health suitability of drinking water (OJ RS 46/97, 52/97, 54/98 and 7/00). From the results of regular and periodical microbiological and physical-chemical testing we determine the health suitability of the drinking water and, relative to the arrangement of protection zones, the safety of drinking water supply. We also determine measures for eliminating deficiencies and improving the state.

Explanations to figure 27-1:

*E.coli**: percentage of inhabitants connected to systems where water sampling shows 5 % or more unsuitable samples owing to identified E. coli;*

*phys-chem***: percentage of inhabitants connected to systems where water sampling shows 5 % or more unsuitable samples owing to physical-chemical parameters (temperature, colour, visible impurities, taste, smell, muddiness, pH, electroconductivity, TOC, conditionally also iron and aluminium;*

*toxic****: percentage of inhabitants connected to systems where water sampling shows 5 % or more unsuitable samples owing to exceeded values for individual toxic parameters (individual pesticide/metabolite; total pesticides; 14,600 inhabitants exposed at the same time to bromate (in 2000));*

*unacceptable*****: percentage of inhabitants connected to systems where water sampling shows 5 % or more unsuitable samples owing to exceeded values for individual unacceptable parameters (nitrates; 31,825 inhabitants. Exposed to trihalomethanes, which are produced in drinking water as by-products (THM) (1999)).*

Explanations to figure 27-2:

*unsuitable E. coli**: percentage of samples unsuitable only or also because of E. coli taken for regular and periodical testing;*

*Unsuitable enterococci***: percentage of samples unsuitable only or also because of enterococci taken for periodical microbiological testing;*

*Unsuitable combination****: percentage of samples unsuitable only or also because of the combination of E. coli and enterococci taken for periodical microbiological testing.*

Explanation to figure 27-3:

*Unsuitable pesticides**: percentage of samples unsuitable only or also because of individual or total pesticides.*

Explanation to figure 27-4:

*Unsuitable nitrates**: percentage of samples unsuitable only or also because of nitrates*

28. Bathing water quality

The natural bathing water is all running or still inland surface waters, transitional waters and coastal waters or parts thereof where bathing is explicitly authorised by the competent authorities, or bathing is not prohibited and is traditionally practised by a large number of bathers. Natural bathing water is determined by the government, and it is shown in the water management plans. A bathing area means any place where natural bathing water is found.

A properly arranged natural bathing pool in a bathing zone must have facilities constructed as set out in the Act Regulating the Protection against Drowning (OJ RS 44/00) and the manager's instructions. All other natural bathing pools are not deemed to be arranged.

Bathing pools are intended for recreational, sports, therapeutic, educational and other activities. By type they are designated as bathing pools and bathing areas by surface water, and they are distinguished in terms of their specifics and requirements.

Data on the health suitability of natural bathing water are aggregated by type of bathing water (the sea and standing and flowing land water), by area of oversight – public health protection institutes, by the frequency of sampling during the season and by microbiological and physical-chemical suitability of samples taken for individual types of bathing water.

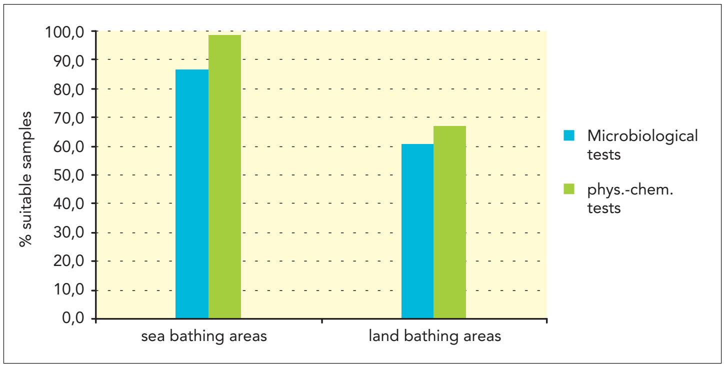


Figure 28-1
Percentage of suitable samples taken for microbiological and physical-chemical tests by type of bathing water in 2001
Source: Collection of data on bathing areas by natural water, IPHRS, 2002

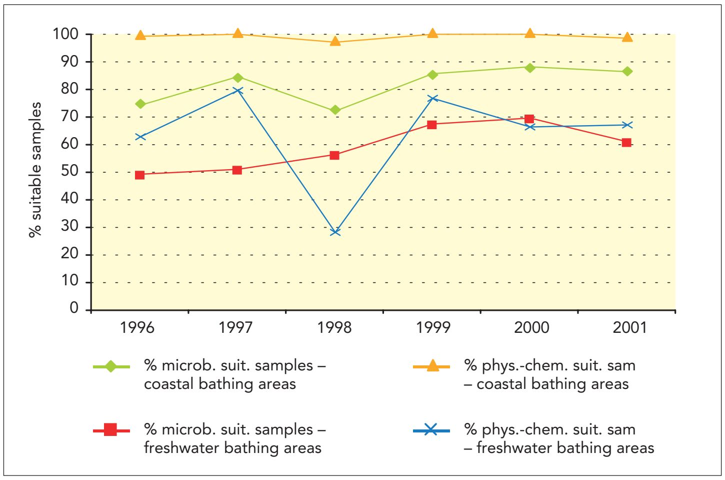


Figure 28-2
Percentage of suitable samples taken for microbiological and physical-chemical tests by type of bathing water: coastal and fresh water, 1996-2001
Source: Collection of data on bathing areas by natural water, IPHRS, 2002

Targets

The target is to establish the actual state of quality of bathing water in Slovenia, to effect oversight of individual bathing locations in order to protect public health, to determine quality trends and to propose measures for improving the state of oversight and quality of bathing water.

Assessment of trend

Oversight of the quality of bathing water at natural bathing areas is not sufficiently covered by law. This area is regulated by already outdated legislation: the Rules on hygiene requirements for bathing water (OJ SRS 9/88) and the Decree on classification of inter-republic watercourses, international waters and waters of the Yugoslav coastal sea (OJ SFRJ 6/78), which for the checking of bathing water quality prescribes only the parameters and their values. None of the bathing areas by rivers, ponds and gravel pits are arranged or have a manager, and partly also by lakes and the sea. According to the valid Slovenian legislation, samples of bathing water should be taken every week, and according to the recommendations of the European Union directive of 1975, every 14 days. At the bathing areas by the sea, the lakes of Bled and Bohinj and the Šobec pond, which all have managers, sampling is done in compliance with the regulations.

Expert guidelines are being drafted for the implementing regulations based on Article 32, point three of the Act Regulating the Protection against Drowning (OJ RS 44/00), which will be harmonised with EU Directive 76/160/EEC and the Water Act (OJ RS 67/2002).

In 2001 an adequate number of samples were taken at 32 bathing areas by the sea, where tests showed 13 % of the samples to be microbiologically unsuitable (half of them owing to total coliform bacteria, a quarter owing to fecal coliform bacteria, a quarter owing to both parameters and 3 samples owing to fecal streptococci) and 1 % of samples to be physically-chemically unsuitable, owing to the presence of ammonia.

Every 14 days samples were taken from Bled and Bohinj lakes, where only one sample from each was microbiologically unsuitable (owing to the presence of only of fecal coliform bacteria) while 1 sample was physically-chemically unsuitable owing to nitrites. At the Šobec pond samples were unsuitable owing to nitrites, and in the Sora river to a large extent owing to total and fecal coliform bacteria and the presence of nitrites. At all other bathing areas along flowing and standing land water where normally in the season a large number of people bathe, in some places only one sample from each location was taken.

Owing to the insufficient number of samples taken, for the majority of bathing areas where it is traditional for people to bathe, it is not possible to offer an assessment of the quality of drinking water. These bathing areas, especially along rivers, gravel pits and ponds are completely unequipped (not arranged), and for the most part only one sample of water was taken, if at all. With regard to the European Union requirements, it will be necessary to report on the quality of bathing water based on the implementation of monitoring. To this end in 2001 we identified bathing areas by natural water where traditionally around 100 people or more bathe on average per day, especially at weekends. In this way we identified around 50 bathing areas, of which the state will select those (or all) for which it will bind itself to report on them.

Data and sources:

Data source is the Collection of data on bathing areas by natural water, which is updated and amended each year at the IPHRS in line with the *data supplied by the regional health institutes and relative to the requirements for reporting. Data is supplied by the managers of public bathing areas to the regional institutes, with which they have a contract, and the institutes forward this to the national Institute, which each year drafts a report which it submits to the Ministry of Health. At certain bathing areas where normally large numbers of people bathe and there is no manager, institutes take samples for testing irrespective of the presence of a manager at the bathing area.*

The source contains data on the location of the bathing area, the name of the water and the bathing area, the type of bathing water, the establishing of oversight, frequency of sampling, the number of samples taken for microbiological and physical-chemical testing, the number of unsuitable samples and the cause of unsuitability in accordance with the Rules on hygiene requirements for bathing water (OJ SRS 9/88). From the results of testing an assessment is given of the hygienic suitability of the bathing water and measures determined for eliminating the deficiencies and improving the state in order to protect public health.

Data are aggregated each year with regard to the reporting of the regional institutes and the IPHRS laboratory, and are published as an annual report for the Ministry of Health.

29. Environmental expenditure

Environmental taxes and other contributions for environmental loading are economic instruments of environmental protection representing a reimbursement of costs for harm caused by the producers of environmental loading. The economic instruments for environmental protection in Slovenia that have been implemented to date are: the CO_2 tax, waste water tax, waste disposal tax, and the tax on use of lubricating oils and fluids, plus the water charges.

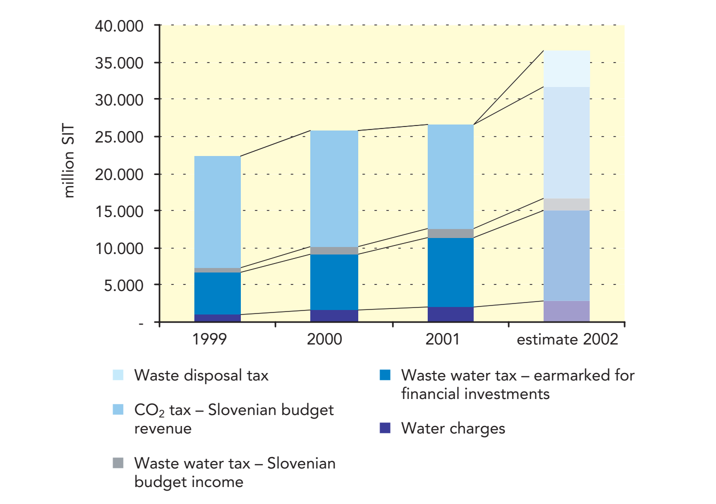


Figure 29-1
Financial effects of contributions from environmental loading
Source: Ministry of Finance (Balance sheet of expenditure and income of the Slovenian national budget), the General Customs Office, internal data of the Ministry of the Environment, Spatial Planning and Energy and EARS (the databases Water payments, taxes and concessions, Sources of pollution, and Waste management), 2002

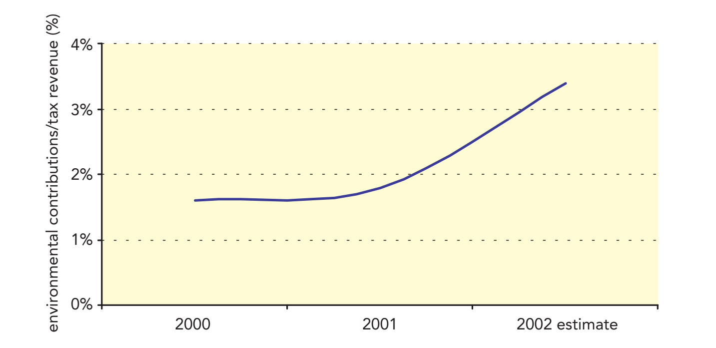


Figure 29-2
Share of contributions for environmental taxes revenue of the Slovenian budget
Source: Public finances newsletter (Ministry of Finance)

Targets

Increasing the share of funds for environmental protection and the increasingly universal implementation of the "polluter pays" principle.

All economic instruments of environmental protection are implemented on the basis of Article 80 of the Environmental Protection Act (OJ RS 32/92, 1/96):

– Regulation on waste water tax (OJ RS 41/95, 44/95, 8/96, 124/00 and 49/01)
– Regulation on water charges (OJ RS 41/95, 84/97, 124/00, 110/01)
– Regulation on CO_2 emissions tax (OJ RS 68/96, 2/97, 5/97, 24/99, 65/98, 51/99, and 42/00)
– Regulation on waste disposal tax (OJ RS 70/01)
– Regulation on tax on use of lubricating oils and fluids (OJ RS 2/02)

The relevant EU documents and the targets set out in them:
In accordance with the basic principle of the environmental protection policy, those causing pollution to environment must cover all the costs of the damage done to the environment. In accordance with the aforementioned principle, those causing environmental pollution are bound to incorporate (internalise) the costs of damage, or rather the costs associated with rehabilitation of the damage, into their production costs and in this way incorporate them into the price of their own products. In as much as the costs of the damage cannot be covered directly by the polluter, the costs must be externalised, meaning that they must be paid by other members of society.

This is required by the provisions of Article 174 of the EC Treaty, and in Slovenian law by the provisions of Article 80 of the Environmental Protection Act (OJ RS 32/93 and 1/96).

Assessment of trend

Implementation of the "polluter pays" principle reveals a positive trend in recent years: it is becoming implemented in all fields (waste water, waste management, efficient energy use), and at the same time is revealing an increasingly large spread. Most importantly in the area of collection and treatment of waste water, the waste water tax represents a primary earmarked source of financing the construction of infrastructure facilities and equipment; the legislator anticipates equally good experiences to be gained in the area of infrastructure building for waste management and in the area of effecting measures for reducing greenhouse gas emissions. Taking into account the policy of state assistance, those liable to pay waste water tax, as well as waste disposal tax and CO_2 tax are exempted from paying these contributions, if they can demonstrate that they have invested funds in measures of rehabilitation or reducing the environmental pollution in the relevant area.

Year on year there is an increasing share of contributions deriving from environmental pollution in all the tax revenues of the Slovenian budget. Estimates put the percentage for 2002 up to 3.4 %, which represents a significant advance towards the start of effecting green budget reform, the aim of which is to reduce the fiscal burden of labour costs by means of increasing the fiscal burden of environmental pollution.

Data and sources:

Ministry of Finance, Section for analysis, methodology and the balance sheet of public finances issues monthly reports on the realisation of the national budget for individual budget years within the framework of the balance sheet of national budget expenditure and income.

The EARS, on the basis of reports from those liable according to these regulations:

- *Regulation on waste water tax (OJ RS 41/95, 44/95, 8/96, 124/00 and 49/01)*
- *Regulation on water charges (OJ RS 41/95, 84/97, 124/00, 110/01)*
- *Regulation on CO_2 emissions tax (OJ RS 68/96, 2/97, 5/97, 24/99, 65/98, 51/99, and 42/00)*
- *Regulation on waste disposal tax (OJ RS 70/01)*
- *Regulation on tax for use of lubricating oils and fluids (OJ RS 2/02) keeps databases (Water payments, taxes and concessions, Sources of pollution, Waste management) which contain information on environmental taxes and other contributions for environmental protection.*

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Phone: +386 1 478 74 00
Fax: +386 1 478 74 22
E-mail: info.mop@gov.si

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Inga Turk, M. Sc.

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Amidas d.o.o.

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