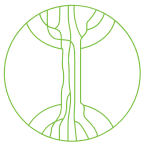
Estonian Environmental Strategy 2030



MINISTRY OF THE ENVIRONMENT

List of the members of working groups and the initiative group engaged in the preparation of the Environmental Strategy 2030:

Initiative group

Eva Kraav	*Ministry of the Environment*
Mari Lahtmets	*Ministry of the Environment*
Henn Pärnamets	*Ministry of the Environment*
Aivar Küttim	*Ministry of the Environment*
Erik Kosenkranius	*Ministry of the Environment*
Silja Lüpsik	*Ministry of the Environment*
Jüri Truusa	*Ministry of the Environment*
Aare Kasemets	*Ministry of the Environment*
Jaak Tambets	*Nature Conservation Centre, non-profit association*
Madis Metsur	*AS Maves*
Andres Jagomägi	*Estonian Association of Engineers*
Peep Mardiste	*Estonian Green Movement*

Working group 1: Health and quality of life

Juhan Ruut	*State Agency of Medicines*
Liis Keerberg	*Estonian Green Movement*
Triin Rand	*Saue Rural Municipality*
Annika Soa	*Ministry of Social Affairs*
Merle Looring	*Häädemeeste Rural Municipality*
Veljo Kimmel	*Institute of Environmental Physics*
Ants Tammepuu	*Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences*
Tuuli Tang	*Ministry of Internal Affairs*
Siret Tappo	*Ministry of Agriculture*
Jüri Ruut	*Health Protection Inspectorate*
Jaak Järvekülg	*Hendriksson & Ko*
Marit Seepõld	*Tallinn University of Technology*
Kadri Auväärt	*AS Kobras*
Ilmar Peeter Part	*Estonian Green Movement*
Tõnu Paasoja	*Tartu County Rescue Service*
Urmas Uri	*AS Kobras*
Silvia Lotman	*Estonian Seminatural Community Conservation Association, non-profit association*

Working group 2: Landscapes and biological diversity

Henn Pärnamets	*Ministry of the Environment*
Jaak Tambets	*Nature Conservation Centre, non-profit association*
Toomas Kokovkin	*Archipelago Research Centre, non-profit association*
Kalev Sepp	*Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences*

Working group 3: Sustainable use of natural resources and reduction of waste generation

Evelin Urbel-Piirsalu	*SEI Tallinn Centre*
Andres Onemar	*State Forest Management Centre (SFMC)*
Endla Reintam	*Estonian University of Life Sciences*
Enno Reinsalu	*Tallinn University of Technology*
Karin Kroon	*Ministry of the Environment*
Taavi Nuum	*Estonian Green Movement*
Ene Kadastik	*Ministry of Research and Education*
Indrek Tamm	*AS Maves*
Robert Kiviselg	*Ministry of the Environment*
Kalev Sepp	*Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences*

Working group 4: Climate change mitigation and quality of ambient air

Tõnis Meriste	*AS Eesti Energia*
Mari Jüssi	*SEI Tallinn Centre*
Madis Laaniste	*Ministry of Economic Affairs and Communications*
Ando Leppiman	*Ministry of Economic Affairs and Communications*
Arvo Tordik	*AS Narva Elektrijaamad*
Tiit Kallaste	*SEI Tallinn Centre*
Reigo Lehtla	*AS Eesti Energia*
Jüri Teder	*AS Entec*

Working group 5: Environmental management

Heikki Kalle	*Hendrikson & Ko*
Ruuta Ruttas-Küttim	*Public Administration Development Centre, non-profit association*
Maila Kuusik	*Ministry of Internal Affairs*
Kuido Kartau	*Sole proprietor, environmental expert*
Kaarel Relve	*University of Tartu*
Andres Onemar	*State Forest Management Centre (SFMC)*
Jüri Truusa	*Ministry of the Environment*

Experts

Kaia Oras	*Statistics Estonia*
Eneli Niinepuu	*Statistics Estonia*

Persons participating in the work of the Steering Committee:

CHAIRMAN:

Annika Uudelepp	*Secretary-General of the Ministry of the Environment*

MEMBERS:

Allan Gromov	*Deputy Secretary-General for International Cooperation of the Ministry of the Environment*
Harry Liiv	*Deputy Secretary-General for Environmental Management of the Ministry of the Environment*
Ivar Sikk	*Head of the State Budget Department of the Ministry of Finance*
Ivi Normet	*Deputy Secretary-General for Health of the Ministry of Social Affairs*
Toomas Kevvai	*Deputy Secretary-General for Rural Development and Fisheries Policy of the Ministry of Agriculture*
Kalev Timberg	*Deputy Secretary-General for Internal Security of the Ministry of Internal Affairs*
Ahti Kuningas	*Head of the Economic Development Department of the Ministry of Economic Affairs and Communications, in the capacity of Deputy Secretary-General*
Martin Hurt	*Deputy Secretary-General for Defence Resources of the Ministry of Defence*
Margus Ots	*Adviser / Project Manager of the Ministry of Research and Education*
Tarmo Kollo	*Association of Municipalities of Estonia, Illuka Rural Municipality Governor*
Valdur Lahtvee	*Representative of the Estonian Council of Environmental NGOs*
Urmas Tartes	*Chairman of the Nature Protection Commission of the Estonian Academy of Sciences*
Marek Strandberg	*Network of Estonian Non-profit Organisations*
Aavo Mölder	*Chairman of the Estonian Chamber of Agriculture and Commerce*
Juhan Telgmaa	*Estonian Society for Nature Conservation*
Jüri Võigemast	*Acting Executive Director of the Association of Estonian Cities*
Urmas Männa	*Estonian Chamber of Commerce and Industry*
Aivar Küttim	*Adviser to the Strategies and Investments Department of the Ministry of the Environment*

The Riigikogu approved the Estonian Environmental Strategy 2030 on 14 February 2007 (RT I, 01.03.2007, 19, 96).
Available on the Internet: *http://www.envir.ee/2959.* Printed: 100% recycled paper.
ISBN 978-9985-881-51-4

THE ENVIRONMENTAL STRATEGY HELPS TO PRESERVE OUR COMMON WEALTH

The nature of Estonia is unique. Forests, swamps, bogs, rivers, lakes and the sea – these comprise our common wealth. We have a well-preserved natural environment to which we are so accustomed that in our everyday lives we sometimes even forget to value and cherish it in the way it deserves. The hurrying lifestyle and values promoting consumption play their role in this regard. So that we and our posterity can enjoy the environment surrounding us, efforts must be made now and they cannot be postponed any more.

It would already be of great help if each of us knew how to behave in a manner that is friendly towards the environment – consume sparingly, pay respect to nature when in a forest or bog, make sure that we do not leave our garbage behind and pass on the right ways of conduct to our children. Yet protection of the (living) environment needs longer-term directions and goals, as well.

The Ministry of the Environment works for the benefit of the Estonian living and natural environment in conjunction with other ministries and organisations. The Ministry of the Environment has coordinated the preparation of the Estonian Environmental Strategy 2030, which builds upon the principles of the National Strategy on Sustainable Development "Sustainable Estonia 21" and serves as the basis for the preparation of all sector-specific development plans within the sphere of the environment as well as for the allocation of environmental funds from the state budget.

The Environmental Strategy determines the long-term goals and directions observing which should ensure the preservation and improvement of the Estonian living and natural environment and which provides a solid basis for the cooperation of different organisations with a view to accomplishing these goals. Among other things, the Environmental Strategy specifies long-term goals in the areas of reduction of waste, disused hazardous sites and the pollution load; sustainable use of water and mineral resources; energy, transport, forestry, fisheries and hunting; and preservation of the diversity of nature and landscapes.

A detailed implementation plan has been drawn up for carrying out the Environmental Strategy – the Estonian Environmental Action Plan 2007-2013. The Operational Programme for the Development of the Living Environment has also been prepared which determines the ways of using the amount of EEK 11.2 billion to be received from the structural funds of the European Union for the purpose of developing the sphere of the environment.

The Environmental Strategy was drawn up by working groups formed for the purpose of preparation of the Strategy and consisting of the specialists of relevant areas. The representatives of seven ministries, academic circles (the Nature Protection Commission of the Estonian Academy of Sciences), associations of local governments (the Association of Estonian Cities and the Association of Municipalities of Estonia) and other non-governmental organisations (the Estonian Council of Environmental NGOs, the Network of Estonian Non-profit Organisations, the Estonian Chamber of Agriculture and Commerce, the Estonian Chamber of Commerce and Industry, and the Estonian Society for Nature Conservation) were engaged.

Jaanus Tamkivi
Minister of the Environment

CONTENTS

1. INTRODUCTION 5
2. MAIN TRENDS 7
2.1. Natural resources and waste 7
2.1.1 Waste 7
2.1.2 Groundwater 7
2.1.3 Surface water 8
2.1.4 Mineral resources 8
2.1.5 Forest 9
2.1.6 Fish 9
2.1.7 Game 10
2.1.8 Soil and use of land 11
2.2. Landscapes and biological diversity 12
2.3. Climate change mitigation and quality of ambient air 12
2.4. Health and quality of life 14
2.4.1 Outdoor environment 14
2.4.2 Interior space 14
2.4.3 Food 15
2.4.4 Drinking and bathing water 15
3. VISION AND SCENARIOS 16
3.1. Vision 2030 16
3.2. Scenarios 17
4. MAJOR PROBLEMS AND STRATEGIC CHOICES 18
4.1. Natural resources and waste 18
4.2. Landscapes and biological diversity 19
4.3. Climate change mitigation and quality of ambient air 20
4.4. Health and quality of life 23
5. OBJECTIVES AND MEASURES (LINES OF ACTION) 23
5.1. Sustainable use of natural resources and reduction of waste generation 23
5.1.1 Waste 23
5.1.2 Water 24
5.1.3 Mineral resources 25
5.1.4 Forest 25
5.1.5 Fish 26
5.1.6 Game 27
5.1.7 Soil and use of land 27
5.2. Preservation of the diversity of landscapes and biodiversity 28
5.2.1 Landscapes 28
5.2.2 Biodiversity 29
5.3. Climate change mitigation and quality of ambient air 30
5.3.1 Energy 30
5.3.2 Energy consumption 31
5.3.3 Protection of the ozone layer 32
5.3.4 Transport 32
5.4. The environment, health and quality of life 33
5.4.1 Outdoor environment 33
5.4.2 Interior space 34
5.4.3 Food 34
5.4.4 Drinking and bathing water 35
5.4.5 Disused hazardous sites 35
5.4.6 Safety and protection of the population 35
6. CONNECTION WITH THE STRATEGIC DOCUMENTS OF OTHER SPHERES 37
7. MONITORING AND UPDATING OF THE ENVIRONMENTAL STRATEGY 38
8. ESTIMATE OF THE COST OF THE ENVIRONMENTAL STRATEGY 39
Annex 1. Vision and scenarios 41

1. INTRODUCTION

The Environmental Strategy 2030 is a strategy for developing the sphere of the environment which builds upon the principles of the National Strategy on Sustainable Development "Sustainable Estonia 21" and serves as the basis for the preparation and revision of all sector-specific development plans within the sphere of the environment. The sphere of the environment comprises various sectors that differ from each other materially in terms of contents, scope and specific features. Therefore, in order to plan the consistent development of these sectors, development plans need to be prepared for the sectors even if an environmental strategy as a general framework document exists.

The Estonian Environmental Strategy 2010 (approved by the Riigikogu on 26 October 2005) focused primarily on the shorter-term tasks to be performed by the state. The formulation of the long-term environmental strategy was occasioned by the need to establish a general framework for consistent and balanced development of the various sectors within the sphere of the environment and to define general cross-generation development goals and lines of action and integrate these with developments in other spheres.

The Estonian Environmental Strategy 2030 aims at defining long-term development trends for maintaining a good status of the natural environment, while keeping in mind the links between the sphere of the environment and economic and social spheres and their impact on the natural environment and people. As the Environmental Strategy has been prepared for a long term (25 years), the connections between causes and consequences (causal relations) and the recommended measures (lines of action) suggested by working groups, set out in the Environmental Strategy, can be taken into account when updating the development plans of other spheres. Following the lines of action necessary for achieving long-term development goals has an impact on the various sectors of the state both now and in the future and requires consistency and concordance between the activities of the legislative and executive powers. The Environmental Strategy is an essential national issue and must pursuant to subsection 12 (6) of the Sustainable Development Act (RT I 1995, 31, 384; 2005, 15, 87) be approved by the Riigikogu.

Experts from all the relevant sectors participated in the formulation of the Environmental Strategy. Representatives of the Ministries of the Environment, Social Affairs, Internal Affairs, Economic Affairs and Communications, Agriculture, and Education and Research were involved as members of working groups and consultants (the list of working groups is available on the website of the Ministry of the Environment at www.envir.ee).

To start up the process, an initiative group was formed whose task was to elaborate the terms of reference for formulation of the Strategy, specify the role of the Strategy within the framework of strategic documents relating to the environment, and make proposals concerning the number of working groups and areas covered by them.

According to the terms of reference, the working groups of the Environmental Strategy had to deal with the areas specified in the Sixth Environmental Action Plan of the European Union. The areas are:

"The environment, health and quality of life." The working group mainly dealt with aspects relating to environmental health;

"Preservation of the diversity of landscapes and biodiversity." The working group dealt with issues relating to nature conservation;

"Sustainable use of natural resources and reduction of waste generation." The working group dealt with issues relating to the utilisation of major natural resources, and waste management;

"Climate change mitigation and quality of ambient air." The working group dealt with problems relating to energy and transport.

"Environmental management." The task of the working group was to deal with environmental management questions, methodological instruction of sector-specific working groups and creating links between and harmonisation of the results of these working groups.

The list of the members of the initiative group and working groups of the Environmental Strategy is set out in Annex 1 to the explanatory memorandum.

The first part of the strategy discusses the key environmental development trends in Estonia, Europe and elsewhere in the world (a thorough overview of the current situation and developments of the environment is available on the website of the Ministry of the Environment at www.envir.ee).

The chapter dedicated to vision and scenario describes Estonia in 2030 as pictured by persons who participated in the open forum. Scenarios were derived from the general vision, being based on issues and driving forces relevant to the environment. On the basis of the vision, the driving forces for the implementation of the Strategy were defined as values for society (non-utilitarian values such as, first of all, valuation of nature as opposed to materialistic values) and technological development (capacity and willingness to introduce new technologies as opposed to reluctance or incapacity to introduce new technologies). The natural environment is not a detached realm – it is directly related to and interacts with economic and social spheres. Therefore, the vision is not restricted to a narrow sector-specific picture, but is presented as an integrated visualisation of Estonia in 2030. As the parameters of the status of the environment are primarily influenced by spheres that do not belong in the area of administration of the Ministry of the Environment, possible developments of the status of the environment cannot be viewed separately from developments of those spheres.

On the basis of analyses of the current situation the most important problems of all sectors within the sphere of the environment were identified and alternative courses of action determined on the basis of these problems, which require the adoption of strategic decisions. Long-term objectives and measures (lines of action) were derived from the strategic options suggested. The measures (lines of action) were structured on the basis of management measures and economic mechanisms used in Estonia, such as legislation and regulation, benefits and incentives, development plans, monitoring, supervision and notification.

Indicators describing progress made in achieving the objectives were defined in conjunction with the Statistics Estonia, taking guidance from the indicators developed by a group of experts of various spheres for the purpose of monitoring the implementation of the Sustainable Estonia 21 strategy. The results that are expected to be achieved over a shorter period (until 2013) are set out in the National Environmental Action Plan 2007-2013. Indicators that are already being measured were used to the maximum extent possible, but several new indicators must still be formulated for observing changes occurring in the environment and for assessing the progress made in achieving the set objectives. Owing to the long implementation period of the Strategy and for the sake of homogeneity of indicators, the desired trends of changes were set as indicators rather than particular target levels, as it is currently impossible to suggest the initial and target levels for the indicators that still need to be formulated (there is no methodology for setting these levels). The definitions of indicators and materials concerning measurement thereof are available on the website of the Ministry of the Environment at www.envir.ee.

For implementation of the Environmental Strategy, a more detailed implementation plan, i.e. environmental action plan is prepared for the term of seven years (2007-2013), being based on the EU programming period 2007-2013. As since 1997 the implementation plan of the Environmental Strategy has been called the Environmental Action Plan, the current implementation plan is also called the Environmental Action Plan for the sake of clarity and consistency. The current Environmental Action Plan 2007-2013 is the fourth of its kind and the organisations engaged in the preparation and implementation of the Action Plan have become accustomed to that name. Using the term 'National Environmental Action Plan' is also justified internationally (outside of the European Union as well). Annual overviews of compliance with the Environmental Action Plan have been submitted to the Government of the Republic for a long time. Overviews of compliance with the Environmental Action Plan in 2000-2005 are available on the website of the Ministry of the Environment at www.envir.ee.

Monitoring and revision of the Environmental Strategy will be carried out through the monitoring of the Environmental Action Plan. Therefore, thorough monitoring will be carried out every three years. In the case that the results of monitoring of the Environmental Action Plan reveal a need to alter any objectives of the Environmental Strategy, working groups will be formed on the initiative of the Ministry of the Environment, which consist of specialists of the areas of activity that need to be adjusted. The working groups will elaborate proposals for amendment and introduce the amendments to the Strategy. The Riigikogu will approve the amendments to the Environmental Strategy.

The impact of major strategic documents of other spheres on the achievement of the objectives of the Environmental Strategy has been analysed, as well (a detailed table titled "Impact of the strategic documents of related spheres on the objectives of the Environmental Strategy" is available on the website of the Ministry of the Environment at www.envir.ee).

2. MAIN TRENDS

This chapter deals with main trends in the sphere of the environment which can be observed both in Estonia and Europe and which have an effect on our choices and decisions in managing the development of the environment on the level of the state as well as in selecting the measures (lines of action) that are needed for achieving the desired status of the environment (realising the vision).

2.1. NATURAL RESOURCES AND WASTE

2.1.1 Waste

Trends in Estonia

- More and more environmentally sustainable and easily recoverable materials are being used. The volume of municipal waste is increasing. However, as sorting and recovery of waste are pursued on a growing basis, the quantities of waste disposed of in landfills are stabilising and are gradually decreasing rather than increasing.
- Introduction of more efficient oil shale combustion technologies and alternative energy production methods entails a reduction of the generation of oil shale waste.
- People's increasing environmental awareness is contributing to more efficient waste sorting, which, in turn, is reducing the harmfulness of waste.
- Disposal of building and demolition waste in landfills is decreasing, as with a view to economic savings other applications have been found for inert waste.
- More environmentally sustainable and easily recoverable materials are being used in products.
- The principles of producer liability and "polluter pays" are being enforced and implemented on a growing basis.
- The environmental impact of landfills is decreasing, as old landfills that fail to conform to environmental requirements are being closed down and environmentally sustainable technologies are being employed for establishing new landfills.

2.1.2 Groundwater

Trends in Estonia

- High-quality groundwater and groundwater areas suitable for producing drinking water are decreasing due to mining, urbanisation, concentration of industrial enterprises, intensive agricultural production in unprotected areas, processing of oil shale and landfills that do not conform to requirements.
- The extraction of domestic water has stabilised after the downward trend of the previous decade.
- The utilisation of upper groundwater layers is increasing (as in deep water layers radionuclides and fluorides pose problems in some places), which entails the need for more efficient protection of water intake feeding areas.
- Water extraction from groundwater is increasing in seaside residential districts and this may cause an increase of the content of salts in the groundwater used.
- The high level of dewatering caused by oil shale mining continues to persist.
- Intensification of agricultural production brings about an increase in the content of nitrate ions and may entail an increase in the content of plant protection products in groundwater layers.

2.1.3 Surface water

Trends in Estonia

- The extraction of surface water decreased in 1991-2002. The reduction of extraction was occasioned by economic changes and rearrangements towards sustainable consumption of water both in production and domestic use. Since 2003 the extraction of surface water has been increasing due to growing water consumption by power stations and mines.
- The consumption of surface water decreased steadily in 1992-2003. The need for water decreased in the production of electricity, in industry, agriculture as well as everyday life of people. To save water and reduce costs relating to water supply, companies have altered their production technologies. Also, the stable increase in the price of water contributed to the reduction of water consumption by households. In 2004, the consumption of water increased by almost 2% when compared to 2003, due to greater consumption of water in production and agriculture.
- The obstruction of bodies of surface water for the purpose of producing alternative electric power (i.e. hydroelectric energy) has increased and this has brought about changes in the ecological status of the bodies of water (e.g. preventing or hindering migratory fish from migrating, etc.).
- The load of pollution from point source discharges was characterised by a downward trend in Estonia in 1992-2004. The decline was particularly steep in 1992-994. At the beginning of the 1990s the decrease in the pollution load was mainly caused by a decline of overall production activity. The further decrease related to the modernisation of production, construction and renovation of wastewater treatment plants, as well as structured legislation and increased pollution charges.
- In 1992-2004 BOD[1] and nitrogen and phosphorus compounds were characterised by a slight downward trend in Estonian rivers. Further reduction of the content of nitrogen and phosphorus compounds must be treated as a priority.
- The content of nutrients in the Baltic Sea, incl. in the coastal waters of Estonia, is increasing and this contributes to the eutrophication of the coastal waters.
- The risk of oil pollution has increased in the coastal waters of Estonia due to increasing transit of oil products in the Baltic Sea.

Trends in Europe

- Harmonisation of different policies and objectives, keeping mind the need to protect water, incl. both groundwater and surface water.

2.1.4 Mineral resources

Trends in Estonia

- As a result of Estonia's accession to the European Union, environmental requirements have become more stringent. The mentality of society has changed as well: opposition to any economic activities that involve the utilisation of mineral resources is growing.
- The utilisation of mineral resources declined 15 years ago and was relatively stable in 1998-2001. However, the volume of mining has started to increase in the recent years again.
- The rise of oil prices in 2004 increased interest in oil shale as a raw material of oil. Interest in the possibilities of producing oil shale most probably will not subside in Estonia.
- Owing to building activities, in particular construction of ports and reconstruction of roads, the demand for mineral resources used in the construction industry, especially limestone, gravel and sand, has grown and it sometimes even exceeds the mining capacity. The building-up of mineral deposit areas located near cities and the opposition of the population to mining prevents the utilisation of the supplies of mineral resources used in the construction industry. Therefore, mineral deposit areas located farther away from human settlements are sought. Then again, mining in such areas may be precluded due to socio-political restrictions (the opposition of local governments to mining, resulting in prohibitions) or could have an impact on nature conservation areas, special conservation areas or individual protected natural objects.

1. Load of pollution by organic pollutants in effluent.

2.1.5 Forest

Trends in Estonia

- Financial gains derived from forestry are decreasing.
- The competitiveness of forestry-related use of land, when compared to other land management practices, is diminishing (due to agricultural refunds, support for preservation of semi-natural biotic communities, extension of housing construction and industry). Thus, the growth of the area of forest land is expected to slow down. What is worse, the area of forest land could even decrease in the future.
- The financial interests of forest owners entail more intense utilisation of commercial forests and preservation of the high levels of annual yield.
- The significance of forests in the protection of the environment is increasing; the need to preserve biological diversity is accorded more and more consideration; the relative share of protected forests is growing; better protection of endangered habitats is ensured; the preservation of habitats, as many as possible and as diverse as possible, is pursued; also, the preservation of forests of different ages and types is pursued.
- At the same time the use of forests for recreational purposes is growing and pressure on protected forests is increasing.
- The use of forests for national defence purposes is growing, as is the extent of damage to forests caused by such use.

Trends in Europe and elsewhere in the world

- Perception of the importance of protecting biological diversity.
- Implementation of sustainable forestry certification schemes (FSC[2], PEFC[3]).
- Perception of the need for formulating a common EU forestry strategy and a forest action plan.
- Globalisation of forest industry and trade.
- Impact assessment of activities and simplification of regulations.

2. Forest Stewardship Council
3. Programme for the Endorsement of Forest Certification Schemes

2.1.6 Fish

Trends in Estonia

- The spawning stock biomass of Baltic herring decreased in the central part of the Baltic Sea and in the Gulf of Finland until 2000. From 2004 the spawning stock has been increasing and is used in a sustainable manner. In the Gulf of Riga the population of Baltic herring is in a biologically safe zone and in good condition.
- According to the data of the International Council for the Exploration of the Sea (hereinafter referred to as ICES), the Baltic Sea sprat is in a biologically safe zone and is used in a sustainable manner.
- In recent years the spawning stock biomass of cod in waters adjacent to Estonia has been small, fishing mortality rates continue to be very high and the increment of the population dropped by almost three times in the last decade of the previous century when compared to earlier periods. The ICES estimates that the natural reproductive capacity of the stock has decreased and it has been over-exploited.
- Currently, artificially reproduced salmon accounts for 90% of the increment of salmon population. Natural salmon stocks are endangered in the Baltic Sea. The Salmon Action Plan approved by the International Baltic Sea Fisheries Commission (IBSFC) in 1997 aims at restoring, by 2010, the reproductive capacity of salmon in wild salmon rivers flowing into the Baltic Sea at least to the level of 50% of the natural potential of each river. At the same time the aim of the Salmon Action Plan is to preserve the genetic diversity of salmon populations. According to the assessment of the ICES, this objective cannot be achieved in the case of the salmon rivers of Estonia (Pärnu, Kunda, Keila and Vasalemma Rivers) where only wild salmon live. The main obstacles that hinder the achievement of the objective are the limited number of spawning areas and habitats due to the dams constructed on the Estonian salmon rivers, and poaching.
- The number of several benthic species insignificant for industrial fishing, but having a definite role in the marine ecosystem, has decreased considerably. Natural reproduction and number of fish stock depends on the quality of the living environment of fish. The quality of coastal waters is especially important, as most of the spawning grounds of valuable fish species are located there.

- Industrial fishing in inland waters is carried out to a considerable extent in Lake Peipsi and Lake Võrtsjärv with the primary fish species caught being perch, pike perch, pike, bream, sparling, lavaret and eel. To some extent professional fishing is also carried out in the lakes of Vooremaa (Lake Kuremaa, Lake Saadjärv, Lake Kaiavere), in the Suur-Emajõgi River, the Narva River and to an even smaller extent in certain small lakes. However, these bodies of water are more appropriate for recreational fishing. Generally, the status of fish stock in inland waters is rather good. The problems of recent years included the decrease of the number of cold-water fish (such as lavaret, vendace, burbot) and the small catches of eel in Lake Võrtsjärv. Adverse fluctuations in water level have hindered the migration of eel, and the number of pike perch in Lake Peipsi has kept the number of sparling low.
- To enrich fish resources, inland bodies of water and seas are being restocked with pre-bred fry and juvenile fish: eel, pike, river trout, carp, pike perch, tench, salmon, sea trout and semi-migratory powan. Sea trout and salmon are the species with which bodies of water are restocked the most. The aim of reproduction through fish breeding is to both restore the self-regeneration capacity of damaged populations and increase the fishing opportunities. The natural stocks of eel in the inland bodies of water are extremely small in Estonia and fishing is almost entirely dependent on restocking of juvenile eel. In fish farms, fish are mostly bred in pools and ponds. Therefore, when compared to the dams of hydroelectric power plants, fish farming cannot be regarded a major factor that deprives natural fish species of their habitats.

Trends in Europe

- Even though the relative share of the fisheries sector is less than one percent in the gross national product of the EU Member States, that sector is important for the economies of several Member States, in particular in coastal areas. The European Common Fisheries Policy that was agreed upon at the beginning of the 1980s led to a situation where the stocks of most fish species were depleted rapidly, as some species were left beyond a biologically safe domain.
- The profitability of the fisheries sector has declined and 66,000 employees were laid off in the European fisheries sector in 1990-1998.
- To prevent the over-production of fishing vessels, the payment of grants for construction of new fishing vessels was terminated in the EU and the released resources are being used for supporting the utilisation of existing vessels so as to reduce fishing efforts. Current actions include the preparation of long-term plans for restoration of endangered fish species and heading towards sustainable balance between fishing capacity and fishing opportunities.
- As a result of measures designed to protect eel resources, which are currently being discussed in the European Union, restrictions might be established on restocking bodies of inland water with eel where the return of at least 40% of migratory eels to the sea is not ensured.

2.1.7 Game

Trends in Estonia

- The end of the 1980s and the beginning of the 1990s saw an increase in the number of elks, wild boars and roe deer – our most important game. This trend was followed by a rapid decline in the middle of the 1990s, which slowed down at the end of the decade. Currently a moderate growth in the number can be observed again. Forest damage caused by wild boars and roe deer has increased correspondingly.
- At the beginning of the 1990s the number of lynxes and especially wolves grew rapidly due to the solid food base and a considerable decline in hunting activities. The peak was achieved in the middle of the decade. As a result of hunting becoming more intense and a decrease in the number of hoofed animals, the number of wolves and, to a lesser extent, of lynxes declined in the second half of the decade.
- As regards large predators, the number of brown bears was stable over the period under review, but it has been possible to observe a slightly rising trend during recent years. Along with increase in the number also damage caused by bears and wolves to rural economy has grown in recent years.
- Notwithstanding the more intensive hunting, the population of beavers that have been treated as game since the 1980s is growing. While at the beginning of the 1980s 250 beavers were counted in Estonia, the population now amounts to 20,000 individuals. Beavers change the water regime of smaller rivers and drainage ditches, causing damage to forestry and agriculture.
- Conflicts between hunters and landowners arising from increasing damage may cause the subordination of the values

of nature conservation to economic interests, as a result of which the status of the populations of some species may deteriorate significantly.

- Local selective hunting activities based on commercial objectives (hunting for trophies or elimination of predators as competitors) may materially deteriorate the status of the populations of certain species.
- The number of brown hares and mountain hares, popular game in the recent past, has dropped dramatically by now. In some regions these species have even lost their hunting potential. One of the essential reasons for the low number of hares is the abundance of small predators (incl. raccoon dog, an alien species). Also wild boars have a major impact on the number of small mammals and birds.

Trends in Europe

- EU directives establish unreasonable restrictions on the control of the number of some game species, which may increase the extent of damage caused by such species. This, in turn, increases the negative attitude of local inhabitants towards the game species and will, in a longer perspective, have a harmful effect on the protection of populations (e.g. due to increasing poaching).

2.1.8 Soil and use of land

Trends in Estonia

- Polarisation of the use of land: some of the land is disused, while some is used too intensely (in terms of technology used per hectare, incl. the concentration of human settlements in coastal areas).
- Agricultural use of land has decreased by one-third over the last decade. Fallowing of low-yield areas and intensification of production in high-yield areas with unprotected groundwater are continuing trends. In the areas that are not suitable for intense agricultural production primarily due to low soil fertility (islands, coastal areas, rolling landscape), a large part of agricultural land has been excluded from use and has overgrown with weeds and brush. As a result of this, weeds also advance to cereal fields, as well.
- Growing application of environmentally sustainable cultivation methods in agriculture.
- Dry perennial weeds (grass plants) increase the hazard of fires in disused lands. Grass fires have become more frequent in Estonia and areas captured by fires have become larger.
- Construction of new roads and communications networks contributes to the fragmentation of natural landscapes, causing the obstruction of the migration routes of animals by highways and hydrotechnical constructions. In rural regions the density of population is expected to increase in low-density areas, primarily near highways. Urban sprawl is accelerating near larger cities and along major roads. Notwithstanding the Nature Conservation Act, intensive building activities can be observed in several coastal regions (on Western Estonian islands, in the immediate surroundings of Tallinn).
- Natural habitats are being destroyed due to the intensification of the use of land. Semi-natural habitats are disappearing as a result of the termination of active use of land.
- Land is subsiding above underground oil shale mines, causing changes in the water regime and difficulties in management.
- (Re-) acidification of soils is continuing.
- In many places the humus layer is being stripped away and removed.
- Soil fertility is declining: the content of humus is decreasing in soils used intensively for agricultural purposes and the content of nutrients is decreasing in extensively utilised soils (P and K in case of organic cultivation). The balance of main nutrients continues to be negative, in particular in grasslands and cereal fields.

Trends in Europe

- Reduction of the relative importance of land used for agricultural purposes; reduction of the intensity of agricultural activities. The course of action aiming at reducing direct agricultural payments and increasing the farmers' capability to cope independently increases agricultural intensity, yet makes it possible to reduce the extent of compensation for environmental measures or restrictions.
- Promotion of environmentally sustainable cultivation practices, preservation of traditional agricultural landscapes, implementation of the best environmentally sustainable technologies.
- Diversification of rural life.

2.2. LANDSCAPES AND BIOLOGICAL DIVERSITY

Trends in Estonia

- Until now, nature conservation has mostly been focused on the protection of individual objects or territories. The modern approach deals more with the countrywide network of habitats and valuable landscapes as a whole.
- As a result of changes in social and economic conditions, non-productive agricultural land has been excluded from production, and intensive agricultural production activities have been concentrated in certain regions.
- The management of commercial forests which is becoming more intense on a growing basis renders it more difficult to accord consideration to the need of ensuring biological diversity in forests.
- Most members of society tend to appreciate imported consumption culture, which advances alienation from the traditional natural environment and conventional utilisation of nature.
- The recent trend of urbanisation has led to a situation where cities occupy increasing areas, seizing natural and agricultural landscapes.
- Increasing the relative share of energy based on renewable natural resources is worth supporting, yet this adds to the burden on the natural environment and biological diversity (extensive cultivation of monocultures such as energy forest or rape significantly affects biotic communities and the composition of landscapes).
- Areas of high recreational value (especially coastal areas) are being excluded from public use (private owners ignore the "everybody's right" and make such areas inaccessible).
- The need to preserve the richness of life is not being acknowledged sufficiently; society cannot appreciate biological diversity as a resource that creates preconditions for better quality of life.

Trends in Europe and elsewhere in the world

- The need to arrange for the protection of areas included in the Natura 2000 network established on the basis of EU directives on nature conservation has contributed to the efficiency of protection of the diversity of both landscapes and biota in Estonia. Establishment of the Natura 2000 network has entailed a considerable increase of the area of protected areas (in comparison with the year 1970).
- Increasingly intense agriculture and its pressure on landscapes continue to cause the destruction of habitats and fragmentation of landscapes, resulting in decreasing diversity of species.
- The introduction and spread of alien species is continuing; people's awareness of the possible consequences thereof is low.
- Biotechnology is developing rapidly and potential risks arising from genetically modified organisms (GMO) are not well-known (opinions of possible risks are contradictory, many pseudo-problems are created).

2.3. CLIMATE CHANGE MITIGATION AND QUALITY OF AMBIENT AIR

Trends in Estonia

- Economic development and increasing welfare result in increasing energy consumption. In recent years the consumption of energy has grown by up to 18 percent per year (electric energy) and a stable annual increase of 5-7 percent in energy consumption is predicted for the future. At the same time, energy conservation has not developed at all. It is only in the recent years that a steep rise in the prices of energy sources (liquid fuels) and heat has created increasing interest in energy saving.
- Due to growing consumption of electric energy in the Baltic States and Nordic countries, exports of electric energy are increasing. As a result, the current share of oil shale in the primary energy balance persists. If the volume of consumption of oil shale (currently approximately 15 million tons per year) does not decrease, new mines will have to be opened in 15 years; should the consumption volume increase, that need would be realised even earlier.
- The poor technical condition of (some) district heating networks (and production facilities) reduces the advantages of district heating and necessitates the transfer to local heating which is an inefficient solution for the regional heating system and restricts the potential of combined heat and power

production. When compared to the year 1991, the production of heat has declined by nearly 2.4 times and stabilised at the level of 8-9 TWh per year.

- Recent trends suggest that the price of gas will rise in Estonia soon, thus hindering the introduction of gas as fuel in the near future.
- The competitive ability of biofuels is being inhibited by the rise in prices resulting from the decrease of resources and increase of processing costs, with the prices of local biofuels being comparable to these prevailing in the world market due to the large volume of exports.
- The volume of firewood stock will decrease by up to two times by the year 2015, mainly due to changes in the species composition and age structure of standing crop. On the other hand, owing to processing and logistic costs the energy potential of logging waste has not been realised yet.
- From the beginning of the 1990s until 2002 the emissions of CO_2 per inhabitant decreased significantly, but remained relatively high still when compared to the average level of Europe. In terms of emissions per unit area, which is a more relevant indicator from the aspect of removal, the emissions of CO_2 are rather low in Estonia. In line with the economic growth and increasing consumption of energy also the emissions of CO_2 will grow.
- The resources of peat are decreasing, due to disintegration, in areas drained for agricultural and forestry-related purposes by 2.5-3 million tons per year (increasing proportionally the amount of CO_2 in the atmosphere).
- The number of passenger cars has grown considerably and the development of public transport has slowed down in Estonia in recent 10-15 years. The growth of the number of passenger cars and intensive transit traffic on both railways and highways through cities cause air pollution, noise and vibration and add to the hazard of accidents.
- Fossil fuels are still being used as fuels for vehicles. The quality of fuels used has improved and unleaded fuel types are being used. Also fuels with very low sulphur content have entered the fuel market. However, the relative share of biofuels (biodiesel, petrol blended with ethanol) is still negligible among all fuel types used. An increase in the use of biofuels is expected within the next few years.

Trends in Europe and elsewhere in the world

- To reduce air pollution and prevent climate change, comprehensive global cooperation is pursued and economic mechanisms are introduced in addition to legal ones.
- On the other hand, many large and rapidly developing countries (which also generate remarkable amounts of pollution) still prioritise industry and investments related to industry rather than protection of the environment. Such countries include, for example, India and China, but also Russia and Brazil.
- In Europe more attention is now being paid to particulate matter PM2.5 which pollutes the ambient air and which is considered to be even more dangerous than particulate matter PM10. Relevant amendments to directives regulating that sphere are being drawn up.
- While progress has been made in restricting the effect of other sources of pollution in developed countries in the past two decades, the pollution generated by vehicles is increasing as regards certain essential components, in particular soot and nitrogen oxides.
- Air transport volumes are growing quicker year-by-year, thus causing an increase in exhaust and greenhouse gas emissions. It is estimated that air transport volume would increase by 182% in 1990-2010.
- To protect the ozone layer, an absolute ban on marketing and use of hydrochlorofluorocarbons was established on 1 May 2004. The ban is implemented by fields of application. The use of virgin chlorofluorocarbons will be prohibited from 2010 and the use of reclaimed and deep-cleansed chlorofluorocarbons will be prohibited from 2015. Carbon tetrachloride and 1.1.1-trichloroethane may only be used in laboratories and for limited purposes.
- Following the example of Scandinavia and Central Europe, solar energy is being used on a growing basis. In particular, the use of heat pumps and solar collectors for the production of hot domestic water is becoming more widespread. No practical solutions of hydrogen energy or other microenergy have been introduced yet.

2.4. HEALTH AND QUALITY OF LIFE

2.4.1 Outdoor environment

Trends in Estonia

- The levels of air pollution (particulate matter, gaseous pollutants emitted into the air) and noise pollution are becoming higher as a result of the increasing number of passenger cars and growing volume of goods transit, as well as the expansion of the industrial sector.
- The steep increase, in heating seasons, of air pollution in densely populated areas with local heating is posing a growingly significant problem.
- The construction of new residential districts that lack classical infrastructure and the transformation of gardening associations into permanent settlements cause growing noise and air pollution near residential houses. That trend shows no signs of subsidence.
- The role of major stationary pollution sources involved in energy and other production activities in the pollution of ambient air has decreased significantly thanks to measures taken to control emissions.
- People are lodging more complaints as production activities are planned near densely populated areas which do not take into account the accumulating load of pollution (e.g. in Muuga).
- As a result of its inspections the Health Protection Inspectorate detected that approximately 70% of complaints concerning noise were justified. This means that, when compared to the beginning of the 1990s, noise spreading in the ambient air is becoming a major problem in Estonia due to growing economic activities and the tripled number of vehicles.
- Natural radiation (primarily radon) is disregarded in real estate plans.
- Activities aimed at the identification of the reservoirs of communicable diseases spreading in the nature and at the control of the infection hazard (vaccination of wild animals against rabies, notification of the population) have been started.

Trends in Europe and elsewhere in the world

- Establishment of more stringent pollution limits, in particular as regards emissions of particulate matter PM2.5.
- More attention is being paid to the drawing up of strategic noise maps and to more extensive research of the impact of noise on health based on these maps.
- The impact of various types of radiation and electromagnetic fields on human health is a more frequent topic of research.

2.4.2 Interior space

Trends in Estonia

- Harmful effects of the pollution of outdoor environment on the interior space are increasing due to the low quality of design and/or construction work (first of all, due to inadequate ventilation systems, radon infiltrating into interior space, insufficient heat retention and protection against noise, as well as other factors). Problems are occurring in both older and new buildings.
- Building and design errors and the extensive use of artificial materials in building and furnishing contribute to unfavourable indoor climate as a result of which various health problems become more frequent, i.e. the so-called "sick-building-syndrome" is spreading.
- Ecological buildings and technologies are being used on an increasing basis.
- The replacement of construction materials that contain asbestos with healthier materials is becoming more widespread.

Trends in Europe and elsewhere in the world

- Continuous application of the standards of building and finishing materials with a view to reducing the impact of emissions containing volatile organic compounds.
- More attention is being paid to researching the links between indoor climate and various diseases (such as asthma, allergies, etc.).
- More attention is being paid to links between the quality of air in working and residential space and bringing the essence of the problem to the notice of people (incl. house owners).

2.4.3 Food

Trends in Estonia

- Increased preference of local food with a more environmentally sustainable life cycle.
- Focus on the research of individual pollutants in certain groups of food.
- The principles of food safety used in Europe are being applied.
- Discharges of pollutants into the environment (incl. food) are being reduced in Estonia by means of modification of existing technologies/facilities, reconstruction of equipment and introduction of new technologies.
- Insufficient attention is being paid to the dissemination and availability of food quality and safety monitoring data.

Trends in Europe and elsewhere in the world

- Measures taken with a view to ensuring food safety are based on three components of risk analysis: assessment and management of, and notification about, risks aiming at providing a systematic methodology for determining proportionate and purposeful measures to protect public health.
- The precautionary and traceability principles and the producer's liability approach are applied, all of which imply that only food which, is not harmful to health may be brought to market.
- More research is being carried out with the aim of finding interconnections in the chain: source → factor → consequence.
- More research is being carried out with the aim of finding the best ways of preventing/reducing the harmful consequences of risk factors.
- Measures are being taken to render the collection of data in different spheres (health, the environment, food) more consistent, as the former system of data collection did not enable the data of different areas to be associated with each other.
- The awareness of consumers and various stakeholders is being raised (e.g. by way of recommendations, guidelines, publication of research results).
- The population groups that are the most sensitive to environmental impacts (children, pregnant women) have been placed in the focus.
- Pressure aiming at a wider marketing of genetically modified food can be observed. On the other hand, the European consumers (70% of the consumers) continue to oppose to the utilisation of genetically modified organisms as food and feed.

2.4.4 Drinking and bathing water

Trends in Estonia

- The quality of drinking water and the supply of the population with water from the public water supply system have improved, but insufficient progress has been made in regard to certain indicators of drinking water quality (indicators specified in the Drinking Water Directive [80/778/EEC, amended by Directive 98/83/EC] and fluorine content).
- The number of public water supply systems with small productivity is growing. It is difficult (if not impossible) for small entities engaged in the treatment of water to carry out regular and in-depth control of water at the required frequency and to plan measures to improve the quality of water.
- The cases of proliferation of blue-green algae in surface waters causing health problems have become more frequent in recent years, and species creating toxins have been observed among blue-green algae.
- The quality of bathing water has generally improved, especially in inland bodies of water.

Trends in Europe and elsewhere in the world

- To determine and eliminate hazards that may result from processing and treatment of drinking water, the HACCP (Hazard Analysis and Critical Control Point) system is being implemented which helps to prevent the provision of consumers with critically contaminated drinking water.
- More attention is being paid to the control of materials that come into contact with drinking water.
- More attention is being paid to the notification of the population.
- In connection with the completion of Russian ports, the traffic of tankers in the Gulf of Finland is becoming more intense, entailing an increasing hazard of contamination of (coastal) waters.

3. VISION AND SCENARIOS

3.1. VISION 2030

Predominantly an environmentally sustainable consumption model will prevail in Estonia. In a society that appreciates learning and involvement in the decision-making process, resources allocated to environmental management will be employed for the purpose of making people understand that it is USEFUL to behave well towards nature. In the sphere of environmental management, decisions will be adopted on the basis of knowledge and not enforced in the form of commands and prohibitions. Environmental management functions will have been integrated into all spheres of life and will be carried out by the private, public and third sectors. There will be efficient exchange of information and consistency between different spheres both on the local and global level. Before decisions are made, modelling with the help of information technology will be used to the maximum extent possible. The state will support effectively the development of technologies and research activities, and environmental education will be a natural component of all specialities in institutions of higher education. Engineers and technologists as well as people engaged in other spheres will be according consideration to the environmental impact of products, projects and processes early in the phase of planning thereof.

The relative importance of the service sector, health industry, creative industry and research-intensive production will have increased in the structure of Estonian economy. The pressure of economy on nature will be distributed and will have decreased. Industry and provision of services will be evenly distributed over the territory of Estonia and will not be environmentally intensive; environmentally sustainable transport will prevail. Resources will be used more efficiently thanks to the use of green technologies. The energy and material-intensity of production will be relatively low and minimum waste will be generated. Production will develop thanks to the recovery of materials, and not at the expense of increasing utilisation of natural resources. Local products and the utilisation of local renewable resources will be preferred. The transit of raw materials via Estonia will be compatible with geopolitical developments – both Estonian and imported raw materials will obtain added value here.

Organic farming and agri-tourism will prevail in agriculture; hobby farming will be "in," as well. A well-planned habitation system will exist throughout Estonia, which will take into account the needs of both nature and people. The habitation system will have been integrated into a well-functioning network with the help of public transport based on the most up-to-date technologies.

The living environment will be spacious and beautiful and not excessively arranged. People will perceive that a clean environment is needed for living and that nature has a positive impact on the quality of life. Even though human settlements will be distributed over the country, the trends of urban sprawl and commuting between homes and faraway workplaces will have disappeared. The diversity of jobs, existence of appropriate technological solutions and a well-functioning public transport system will enable many people to choose whether to work from home or on the employer's premises. Work will predominantly be performed from home, while workplaces (and outdoor events) will be used for communication with colleagues, discussing work-related problems and exchanging information. The possibility of working from home will make it possible to live in rural regions. Then again, there will be plenty of people who prefer the artificial environment of cities.

Natural landscapes and traditional cultivated landscapes will still exist; the artificial environment will not be dominant over the green living environment; protected areas with (wild) undisturbed nature will have preserved. Care will be taken of natural landscapes and habitats of the various species of biota. Nature conservation will be a priority in the territory of the entire country, but protected areas will exist, as well. People will be in agree-

ment on the principle that suitable habitats must be ensured for all species and that this principle necessitates certain rules of operating in the habitats of the species that need protection.

People will be aware of the need to preserve a clean and safe environment. A healthy lifestyle will be pursued. Distributed habitation will contribute to the improvement of the quality of life; the aspect of health will be taken into account in planning the living environment. Water and food will be of high quality; controlled GMOs will be used, if necessary. Climate change will still be an issue. Preparedness for natural disasters will be ensured: both plans and technological means will exist for responding to extraordinary situations.

In 2030 new environmentally sustainable technologies and various raw materials, which can be supplied from nearby locations, will be used, in parallel, for production of energy. Stable energy supply will be ensured; alternatives for raw materials currently used for energy production will exist; new technologies will be applied; oil shale will be used in a more efficient manner and with less waste (considering current technologies, wind, sun and water cannot cover the energy need of Estonia). It will be possible to easily switch from one energy producer (source) to another. Micro-energy concepts and autonomous ecological houses will be widespread, with the little necessary energy being produced on the basis of renewable sources. Among developed countries, Estonia will stand out by the smallest energy consumption per unit produced. The load of the oil shale industry (both power and oil industry) on the environment will be minimal and its side effects will have been eliminated.

3.2. SCENARIOS

Scenarios are visions of the possible different future development options, which help, in the contemporary rapidly changing operating environment, to perceive the problems and opportunities that may occur in the future as a result of coincidence of certain circumstances (driving forces) and thereby improve preparedness for responding to these problems and opportunities in an adequate fashion – plan measures for precluding the worst or for achieving the desired situation quicker and more efficiently. Certain scenarios entail the need to implement a considerably more vigorous (and accordingly more expensive) environmental policy than others in the case of which the overall operating environment promotes spontaneous development in the desired direction and thus helps to set priorities in the preparation of shorter-term plans. Then again, it should be remembered that scenarios are not precise predictions, but visions of future which, are based on the combination of driving forces **characterised by the greatest uncertainty** and **impact** and which emphasise the features that are characteristic of the combinations of certain forces. An important aim of scenarios is to prepare us for situations that **we do not actually deem probable**. In real life no scenario is realised to its fullest extent – while the main features of one scenario prevail, components from other scenarios are also present.

The scenarios described below were compiled on the basis of two driving forces – values for society (non-materialistic values such as, first of all, valuation of nature as opposed to materialistic values) and technological development (capacity and willingness to introduce new technologies as opposed to reluctance or incapacity to introduce new technologies). Combinations of these driving forces yielded the following scenarios:

WILLINGNESS AND CAPACITY TO INTRODUCE TECHNOLOGIES	VALUES IN SOCIETY		
	MATERIALISTIC VALUES		APPRECIATION OF NATURE
HIGH	More is better?		Eco-pearl
LOW	Vicious circle		Back to roots!

On the basis of the variables, i.e. driving forces, provisional scenarios were compiled that were then supplemented, taking into account the effects of other driving forces and trends – development processes in the EU, climate change, prevailing political ideology, the approach of planning products' life cycles, specialisation in the diversity of local resources in production, decrease of "available" resources, the ideology of choosing dwelling places and life cycle migration, and the diversification of working options.

Taking into account the interaction between driving forces, in addition to technologies and societal values also changes in the following components (also those contained in the vision) were described in each scenario: human health and consumption, landscape, biological diversity, economy, energy, transport and education.

The scenarios are set out in Annex 1 to the Environmental Strategy.

4. MAJOR PROBLEMS AND STRATEGIC CHOICES

The following sections are dedicated to major problems, their primary causes (the problems are discussed in more detail on the website of the Ministry of the Environment at www.envir.ee), various options of solving the problems (strategic choices) and preferred lines of actions. As the general needs of economy and human activities cannot be disregarded when seeking the best solution for the environment, the alternatives of strategic choices described below are not mutually exclusive in most cases. However, in order to preserve good environmental status the choices favoured in this document should be given priority when planning the utilisation of resources.

4.1. NATURAL RESOURCES AND WASTE

Main problem

The overexploitation of economically valuable and easily available natural resources, incl. the exhaustion of non-renewable natural resources and the utilisation of renewable natural resources to the extent that exceeds their regeneration capacity, and the pollution and damaging of the environment, incl. the limitation of conditions necessary for regeneration, has either entailed or will entail the following:

- decrease of economically valuable fish stocks and game and the domination of economically worthless species;
- decrease of the quantity of groundwater suitable for using as drinking water;
- decrease of the diversity of forests;
- changes in the composition of landscapes and utilisation of land, incl. changes in many natural habitats, which result from the extraction of mineral resources and disposal of waste;
- plots of land with high-class soil dropping out from agricultural use.

Strategic choices

Waste

A strategic choice must be made with regard to waste (incl. hazardous waste): whether to use cheaper technologies to ensure lower prices of products, which generate more waste, or invest into production technologies that contribute to the reduction of waste generation. Secondly we must make a choice between recovery and disposal of waste, i.e. between the development of reduction and recovery of waste and the disposal of waste. First of all, the reduction of waste generation in production activities must be preferred. When the smallest possible waste generation has been achieved, the recovery of the waste that is inevitably generated must be preferred, as disposal of waste strains the environment.

Water

Since human activities influence the quality of water the most, it is strategically important to make a choice between restricting the economic activities that affect the status of water and pursuing the approach of maximum liberty so as to promote economic development. We should preferably manage economic activities so that the human impact on groundwater and surface water would decrease and that the status of bodies of water would be good or improve.

Mineral resources

A strategic choice must be made between intensive and extensive extraction of mineral resources. At least in the case of min-

eral resources intensive mining technologies must be preferred, in the case of which the environment is strained for a short term and the mined area is arranged quickly. However, extensive extraction cannot be ruled out; the use of that method depends on the resource type in question (e.g. peat), regional conditions and self-regeneration capacity of nature.

Forest

The strategic question is: whether to prefer multifunctional forest (the one that satisfies simultaneously economic, social, ecological and cultural needs) or monofunctional forest. Monofunctional silviculture focuses on the satisfaction of a single need and thus prefers unvaried forest (a pure birch or pine stands for recreational purposes; fast-growing aspens or brushwood for economic purposes, etc.). Monofunctionality excludes other applications and renders the forest too vulnerable both in economic and ecological terms. Multifunctional forest is more stable and resistant to diseases and changes in circumstances, and it can be quicker adjusted to new demands as the economic demand changes. Hence, multifunctional forest is to be favoured.

Fish

The status of fish is to a considerable extent affected by fishing techniques. Therefore, a strategic choice must be made between extensive and intensive fishing techniques. Extensive fishing is preferred, as this ensures the existence of fish resources for a longer time, fish is capable of reproducing itself and no artificial assistance is needed for the reproduction. Intensive techniques require active artificial reproduction of fish as well as fish breeding in fish farms. This, in turn, increases the pollution burden imposed on bodies of water, while fish diseases further endanger the natural reproductive capacity of fish.

Game

It is strategically important to decide whether the number of game should be regulated on the basis of random choice or on the basis of the principle of balanced diversity of species. The regulation based on balanced diversity is preferable, as this fosters the diversity of species of both game and other animals and ensures the viability of populations.

Soil and use of land

As regards the use of soil and land, a choice must be made between two strategically important manners of use. First, it must be decided whether land should be used for agricultural and forestry purposes or whether infrastructure and buildings should be constructed. Second, a choice between multifunctional and monofunctional applications must be made.

1) With a view to preserving soil and landscapes, the use of land for agricultural and forestry purposes should be preferred. The primary function of soil is to produce organic matter that yields food for people (agriculture) and timber as a construction material, raw material used in industry, for manufacturing commodities and for heating. Due to the continuing increase of the number of people in the world and the disappearance of soil (as a result of erosion, desertification, contamination and salinisation), the need for food and natural raw materials (timber, etc.) is growing. Importing is becoming more expensive than local production. In Estonia, climate is sufficiently advantageous for cultivating agricultural products. The food that is the most useful for a person grows within the radius of a couple of hundreds kilometres from the person's home.

2) Monofunctional use of land, e.g. for just forestry or just agriculture, renders the landscape one-type and reduces the diversity of nature. Therefore, multifunctional use of land is to be favoured.

4.2. LANDSCAPES AND BIOLOGICAL DIVERSITY

Main problems

Changes in the use of land (polarisation) occasioned by various reasons entails the following:

- destruction and fragmentation of valuable landscapes and biotic communities, incl. habitats;
- formation of wastelands (swamped areas, areas overgrown with brush);
- prevalence of high density population in coastal areas;
- littering of landscapes (abundance of abandoned technological sites);
- decrease of the number of species of biota.

Strategic choices

The following choices need to be made in the sphere of preservation of landscapes and the diversity of biota:

- Should landscapes and the diversity of biota be protected in limited areas or in the territory of the entire country?
- Should the utilisation of land be directed towards the preservation of landscapes and the diversity of species outside protected areas?
- Should the decline of diversity, destruction of habitats and immigration of alien species be precluded or should just the consequences of these phenomena be addressed?

Owing to the need to preserve the diversity of nature and landscapes and ensure the maximum effectiveness of planned protective measures, it would obviously be reasonable to protect landscapes in the territory of the entire country, managing the use of land also outside protected areas, as this will ensure the preconditions necessary for preservation of both landscapes and the diversity of species. By analogy to the need to treat landscapes and communities as an integrated whole, it would be reasonable to preclude the obliteration and decrease of biodiversity and habitats of different species, instead of just addressing the consequences thereof.

4.3. CLIMATE CHANGE MITIGATION AND QUALITY OF AMBIENT AIR

Energy production

Main problems

Prioritising, on the national level, of power engineering which is based on oil shale and is concentrated in one geographical area has entailed the following:

- concentration of pollution;
- large losses in the transmission of electric energy;
- considerable vulnerability of the system in emergency situations;
- inhibition of the development of renewable energy sources.

Strategic choices

The volume of energy production in Estonia in the future:

- for satisfaction of the consumption needs of Estonia;
- for partial satisfaction of the needs of Estonia, with the rest being covered by imports;
- for satisfaction of the consumption needs of Estonia and for exports;
- all the necessary energy will be imported.

What should energy be produced of:

- mainly out of the local non-renewable energy source – oil shale;
- out of a combination of local energy sources: oil shale (whose resources are non-renewable), peat (whose resources are only provisionally renewable), biomass, landfill gas, using wind, hydro and solar energy (renewable sources);
- out of energy sources imported from other countries.

How energy should be produced:

- to continue the use of the current technology (concentrated production based on fossil fuels);
- to develop an advanced technology which is based on the resources used today but which is compatible with all environmental requirements;
- to develop a new technology for distributed production which is based on the utilisation of the opportunities of larger CHP plants, renewable sources and micro-energy concepts.

When determining the development trends of energy production, regard must be had to both Estonia's own strategic needs and the guidelines and development trends relating to the energy system of the European Union. Consideration must certainly be accorded to the opening of the energy market in 2013. In the production of energy a broader view of the situation must be kept in mind, i.e. the needs of Estonia should not be the only focus. The neighbouring EU member states will soon become importers of (electric) energy instead of exporters. Therefore, it would be reasonable for Estonia to continue the production of (electric) energy both for its own needs and for exports. In the future, Estonia should definitely diversify its sources used for production of energy. However, the diversified selection should be a reasonable combination of local energy sources, both non-renewable (oil shale, peat) and renewable (biomass, wind, water, sun, landfill gas, waste). Energy generation should be developed towards distributed production in

the future. Then again, a sufficient number of facilities covering the base load of energy production should be preserved. More attention will have to be paid to combined production of heat and energy which enables fuel to be utilised more efficiently, while minimising emissions into the environment. The introduction of renewable energy sources and micro-energy solutions should be increased considerably when compared to the current situation. For each new technology a complex evaluation of its life cycle should be carried out and limited assessments that only take into account the current situation should be avoided.

Energy consumption

Main problems

The continuous use of inefficient (out of date) machinery and technologies has entailed the following:

- large energy consumption of buildings;
- losses in transmission and distribution of energy;
- considerable energy-intensity of economy;
- increased demand for energy.

Strategic choices

The main question is whether the consumption of energy should be restricted (by means of adopting certain limits or introducing economic mechanisms) or should the development of energy conservation (in consumption, transmission and production) be encouraged?

What area should be in the focus of energy conservation:

- consumption of energy;
- supply of energy;
- a complex approach?

Energy conservation would be one of the essential answers to all of the energy-related problems of Estonia, as well as the entire European Union. Development of energy conservation should be based on a complex approach, without consumption and supply being separated from each other. On one hand, economic mechanisms should be used to direct the consumption habits of people towards energy conservation. On the other hand, the quality of life must not be impaired thereby. Equipment and technologies which are more environmentally sustainable and ensure smaller losses of energy must be introduced along with possible economic motivators and funding instruments. People's attitude towards energy and its value must change, but without radical side effects on the quality of life and income.

Transport

Main problems

Urban sprawl (unmanaged use of land and construction activities), insufficient development of public transport (which does not take into account the changed movement habits and needs of people) and alternative energy sources (incl. the production and implementation of biofuels) and the functioning of Estonia as a cheap transit corridor has entailed the following:

- increasing number of cars and, accordingly, increasing use of land;
- increasing pollution of ambient air;
- increasing amount and chances of realisation of environmental risks,;
- unsatisfactory use of environmentally sustainable energy sources and fuels.

Strategic choices

How transport should be further developed:

- to continue using the current model under which the number of cars is increasing and this is imposing a growing strain on the environment, i.e. to use vehicles, especially private vehicles, a lot, notwithstanding the energy consumption and the impact on the environment;
- to develop an efficient, comfortable and environmentally sustainable public transport system, i.e. to move a lot, but using public transport;
- to develop an efficient, comfortable and environmentally sustainable public transport system, safe soft traffic and a settlement structure that reduces inevitable commuting traffic, i.e. to reduce the need for transportation and render alternatives of using personal cars more comfortable;
- to promote the use of environmentally sustainable biofuels and thus develop an environmentally-friendly system of personal cars and to support the lacking part of the system with public transport, i.e. to move and carry a lot by means of private transport, but in an environmentally sustainable manner.

The following must be decided:

- What is the role of transport in economy and societal organisation? Should it be an industry (with quantity being the priority) or an input to economy (with quality and optimality being the priorities)?
- Is transport a sector that cannot be planned or is it a sector which takes into account future predictions and which can be managed and designed and in the planning of which the desired system must be used as the basis in the future?

How should Estonia develop in the sphere of transit?

- Should Estonia continue to function as a polluting transit corridor that poses high environmental hazards, thereby maintaining its attractive and temporary competitive ability, or should it discontinue the polluting function and use the transport modes that influence the environment less and let non-hazardous goods be carried?

The entire complex of problems must be kept in mind when developing the transport sector. Different questions that have a direct or indirect impact on the transport sector must be dealt with simultaneously. Any transition to new principal solutions must be smooth and regulated by economic mechanisms. To reduce the impact of the quickly growing number of cars, we should certainly develop a comfortable and environmentally sustainable public transport system, which is also financially advantageous for its users. On the other hand, alternative soft traffic must be developed, as well. The extremely large number of personal cars will probably prevail also in the future. To reduce the impact of the cars on the environment, the use of high-quality and environmentally-friendly biofuels must be promoted much more than it is done today. When planning settlements, transport needs must be taken into account, as well. High quality and optimality must be the underlying concepts for planning transport. The transport system must be manageable, designable and quantifiable in the phase of planning. When developing transit as a currently vital economic sphere of Estonia, regard must be had to the concepts of long-term competitive ability and environmental sustainability. The transport modes that influence the environment less (railway) must be preferred and the relative share and amount of environmentally hazardous types of goods must be reduced in the assortment of goods carried.

Substances affecting the ozone layer

Main problem

The system of collection of, and control over, the utilisation of substances used in the refrigeration equipment of enterprises and households which deplete the ozone layer is insufficient. Liability for processing substances that deplete the ozone layer has not been precisely defined and fines imposed for large emissions of such substances into ambient air are smaller than the costs of elimination of the substances.

Strategic choices

Scientists have not come up with alternatives for reducing the use of substances that deplete the ozone layer yet. Therefore, a gradual transition to the application of other technologies must be effected, which yield an analogous effect, but do not damage the ozone layer. Strict control over existing equipment containing substances that deplete the ozone layer must be instituted and only highly qualified specialists must be used for maintaining such equipment. The substances that deplete the ozone layer which have been removed from the equipment must be eliminated and processed in an environmentally sustainable manner.

4.4. HEALTH AND QUALITY OF LIFE

Main problem

The combination of the legacy of the recent past – active economic activities aiming primarily at quick profits – and the desire of people to achieve as high quality of life as possible has entailed or is entailing the following:

- disappearance of the environment that is safe and that spares and supports health;
- consumption habits that insufficiently take into account the health impact of products consumed, the consequences of which are further boosted by unawareness of potential hazards related to products and services;
- poorly thought-out utilisation of land that fails to take into account the natural peculiarities of locations which, in turn, brings about insufficient protection of people and their property against environmental impacts of both nature and human activities.

Strategic choices

Should we invest in the design and preservation of the environment that does not harm human health and advances health, or in the elimination of health-related harm caused by the poor status of the environment and inevitable hazard factors?

From the point of view of health protection, focus should remain on the reduction of health risks and prevention of problems occurring in the environment. However, in the case of some health risks the quick and effective handling of consequences is an essential or even the only way of addressing the problems. As the direct and robust connection of several pollutants of the environment (e.g. electromagnetic fields, infrasound and non-ionising radiation) with human health is unknown at present, the precautionary principle must be implemented. If measures aiming at the prevention of damage caused to human health are left without attention, the damage will increase significantly, affecting the success of the entire country (social, economic, political, etc.).

5. OBJECTIVES AND MEASURES (LINES OF ACTION)

Objectives were set and measures were planned on the basis of the strategic choices described above and the general development trends of society. In addition, the measures (lines of action) were structured on the basis of management measures and economic mechanisms used by the state, such as legislation and regulation, economic mechanisms, benefits and incentives, development plans, monitoring, supervision, notification, etc. Owing to the long term of the Strategy, the desired trends of changes were set as indicators rather than particular target levels[4]. Data for 2005 are set out as the base level.

5.1. SUSTAINABLE USE OF NATURAL RESOURCES AND REDUCTION OF WASTE GENERATION

5.1.1 Waste

Objective:

By 2030 waste disposed to landfills will have decreased by 30% and the harmfulness of waste generated will have been reduced significantly.

4. Explanations of the signs indicating the direction of indicators: ↑ – a greater amount, relative share, etc., compared to now; ↓ – a smaller amount, relative share, etc., compared to now; ↔ – preservation of the current level; ↑↔ or ↓↔ – at first a greater or smaller amount, relative share, etc., compared to now, and preservation of the achieved level later. The names, definitions and units of measurement are available on the website of the Ministry of the Environment at www.envir.ee. Data for 2005 are used as the base level.

To reduce the amounts of waste disposed to landfills, it is vital to considerably reduce the generation of waste, while improving the efficiency of using natural and other resources. To that end, it is important to cut off links between the generation of waste and utilisation of natural resources, on one hand, and the economic growth, on the other hand, i.e. economic growth must not result in increasing utilisation of natural resources, growth of waste generation and negative environmental impact. Second, it is important to increase the sorting and recovery, incl. recycling, of waste to minimise the waste amounts to be disposed. Also, the harmfulness of waste and the content of hazardous substances in waste must be reduced, as this would preclude the increase of discharges into air, water and soil in the course of waste handling.

Indicators:

Indicators produced for the time being:

- The relative share of separately collected municipal waste in collected municipal waste ↑. Base level: 11%;
- Generation of hazardous waste ↓. Base level: 7,029,000 tons per year;
- The relative share of recovered waste among all the generated waste, for the following materials: glass, plastics, paper ↑. Base level: 53%, 36%, 45%;
- The ratio of produced energy to waste generated in the energy industry ↑. Base level: 599.1 Toe/kg (ratio of produced energy to waste generated in the energy industry);
- Municipal landfill waste per inhabitant ↓. Base level: 283 kg per inhabitant per year.

Indicators to be developed:

- The relative share of the people (considering the entire population) who can deliver sorted waste to a collection point located in less than 1000 metres of the person's home ↑;
- The relative share of local governments with a composting ground ↑;
- The relative share of waste containing biodegradable components in all the waste disposed to landfills ↓;
- The ratio of packages brought to market to the collected and recovered packaging waste ↓;
- The ratio of products of concern brought to market to the collected and recovered waste arising from products of concern ↓;
- The relative share of local governments with a waste management system that conforms to requirements ↑↔.

Measures (lines of action):

- Long-term planning of waste management;
- Development of a monitoring and supervision system to improve control over waste flow and waste management;
- Development and implementation of a system of incentives, benefits and regulations for reduction of waste generation and for development of waste management (incl. for mitigation of environmental impact and risks caused by disposal of waste);
- Organising campaigns and provision of information concerning waste management on the national level and the level of local governments to increase society's environmental awareness.

5.1.2 Water

Objective:

To achieve good condition of surface water (incl. coastal water) and groundwater, and to maintain the bodies of water whose condition is good or very good.

As the general assessment of the status of large bodies of groundwater will probably not change in the near future, the excess of standardised limit values established with regard to nitrates, pesticides and other hazardous substances serves as a key indicator of the status of groundwater.

When assessing the status of a body of surface water, both the ecological condition and chemical indicators are taken into account, and the trends of the contents of nutrients and concentrations of hazardous substances in surface water are observed.

Indicators:

Indicators produced for the time being:

- The number of wells and springs in which the levels of detected pesticides, nitrates and other hazardous substances exceed the effective norms (per individual substance) ↓. Base level data are available starting from 2007;
- The content of organic pollutants in effluent ↓. Base level: 1399 BOD tons per year.

Indicators to be developed:

- Status of bodies of groundwater;
- Status of watercourses;
- Status of lakes;

- Status of coastal waters.

Measures (lines of action):

- Formulation and implementation of operational programmes for improvement and preservation of the status of surface water (incl. coastal water) and groundwater.
- Drafting and improvement of legislation concerning the protection of water due to the need to accord more consideration to the status of bodies of water (subject to prior approval of the Ministry of Justice for drafting legislation).
- Development and implementation of a system of incentives and benefits for reduction of human impact on bodies of water and for improvement of the status of surface water and groundwater.
- Improvement and development of supervision and monitoring with a view to prevention of pollution and assessment of the status of the aquatic environment.

5.1.3 Mineral resources

Objective:

Environmentally sustainable extraction of mineral resources which is sustainable in terms of water, landscapes and air, and efficient exploitation of mineral resources with minimum losses and waste.

The concept of environmentally sustainable mining implies that the mineral deposit is deployed quickly, the mineral resources are extracted for a short duration, groundwater is affected to the minimum extent, noise, dust and seismic effects are prevented, and the mined area is arranged quickly and in accordance with the design plans and specifications prepared for the mining area. Efficient exploitation of resources means the extraction of the designated mineral resources to the fullest extent possible and the utilisation of any concurrent mineral resources.

Indicators:

Indicators produced for the time being:

- Mineral resources extraction volume ↓:

  Oil shale, base level: 11,310,000 tons

  Limestone and dolomite, base level: 5,760,000 m^3

  Gravel and sand, base level: 3,281,000 m^3

  Clay, base level: 189,000 m^3

  Peat, base level: 1,074,000 tons

Indicators to be developed:

- Annual yield of mining claims[5] (the efficiency of using mineral deposits, cubic metres per hectare). Formula: (mineral resources extraction volume) : (total area of mining claims) ↑
- The area of bodies of groundwater and surface water artificially created in mined areas[6], expressed in hectares; this indicator characterises the impact of mining on the water resources; the relative share of arranged mining areas in all mined areas, expressed in hectares ↓.

Measures (lines of action):

- Drafting and implementation of long-term national development plans for extraction and utilisation of mineral resources (based on schemes for optimal utilisation of the resources which advance the utilisation of resources on the basis of the needs of the country and on scientific bases).
- Encouraging companies that extract and utilise mineral resources to focus on environmental sustainability by means of regulations and a system of benefits.

5.1.4 Forest

Objective:

Balanced satisfaction of ecological, social, cultural and economic needs in the course of utilisation of forests in a very long perspective (longer than the period of 25 years discussed in the Strategy).

5. A 'mining claim' means the part of the earth's crust which is designated for the extraction of mineral resources by an extraction permit. 'Area of mining claim' is the area of the plot of land specified in the extraction permit or – in the case of underground mining – of the plot of land above the mineral deposit. The more extensive the exploitation of mineral resources, the larger the area covered by valid mining claims. A mining claim area turns to zero at the moment that the mining land is re-registered in the Land Cadastre with another designated purpose.

6. The areas in which groundwater with new parameters (closed quarries and underground mines) and/or new bodies of water (quarry lakes) have occurred. For example, the area of the upper and deeper layers of groundwater and surface water, impaired by extraction of oil shale, phosphate rock and limestone, is composed of the mined area and its buffer zone. The width of the buffer zone is 0.5-2 km, i.e. approximately 40 times the extraction depth.

Forests must offer economic benefits (timber, mushrooms, berries and other forest products) and socio-cultural benefits like recreation and hiking possibilities and cultural-historical sites (such as sites of ancient sacred groves, etc.). At the same time, the diversity, balance and regeneration capacity of forest ecosystems must be preserved.

Indicators[7]:

To measure the attainment of the objective, a system of balanced indicators could be used which is based on the Improved Pan-European Indicators for Sustainable Forest Management, 2002, and covers both quantitative and qualitative indicators (the main indicators comprise the amount of forest resources, the viability of forest ecosystems, forest products, forest biodiversity, management of forests, socio-economic functions of forests, forest policy, and forest institutions and measures).

Main indicators:

- Forest area, expressed in hectares ↔. Base level: 2,264,000 hectares
- Growing stock, expressed in cubic metres ↑↔. Base level: 454,461,000 cubic metres
- Felling volume, expressed in cubic metres ↑↔. Base level: 7,012,000 cubic metres
- The relative share of felling in annual increment of timber (%) ↑↔. Base level: 60%
- Growing stock, expressed in cubic metres per hectare ↔. Base level: 213 cubic metres per hectare
- Area of forests protected as key biotopes, expressed in hectares ↑. Base level: 10,000 hectares
- Area of protected forests and protection forests, expressed in hectares ↑↔. Base level: 694,000 hectares
- Area of primeval forests, expressed in hectares (ha) ↔, by the following forest types: special management zone + nature reserve; base level 131,200 ha

  protected forest in protected areas; base level 10,200 ha

  pairing areas of wood grouses; base level 22,900 ha

  habitats of protected species; base level 4000 ha
- Investments aimed at recreation purposes in state forests, EEK ↑. Base level: EEK 25,800,000

Measures (lines of action):

- Long-term planning of the development of forestry with a view to balanced satisfaction of economic, social, ecological and cultural needs relating to the utilisation of forests.
- Development of a system of incentives, benefits and regulations with a view to encouraging the management and sustainable utilisation of multifunctional forests.
- Development of forestry-related information and monitoring systems to enable informed decisions to be made.
- Improvement of the supervision system for reduction of illegal utilisation of forests.

5.1.5 Fish

Objective:

To ensure good condition of fish populations, diversity of fish species and avoid the indirect negative impact of fishing on the ecosystem.

The management of fish resources must be based on the ecosystem as a whole. Fish populations are in good condition when fish stocks are capable of naturally reproducing themselves notwithstanding the strain imposed by industrial fishing. The negative impact of fishing on the ecosystem includes the following: death of undersized individuals and sea mammals and birds in fishing gear; damage to marine habitats; interference with spawning and breeding.

Indicators:

Indicators developed for the time being:

- Fishing (the quantity of fish caught, in tons) ↓. Base level: 98,700 tons of fresh fish

Indicators to be developed:

- Spawning stock biomass, i.e. the biomass of mature fish stocks indicating the size of stocks ↑.
- Fishing effort – the capacity of fishing vessels multiplied by the number of fishing days ↓.
- Catch per effort unit – mostly the catch per standard series of entangling nets per night, indicating the condition of the fish stock ↑.

7. The Ministry of the Environment will develop the system of indicators for Estonia in 2006-2007 on the basis of the pan-European indicators, specifying the criteria appropriate to Estonia. All indicators will have to be complied with.

- Fishing mortality rate – the rate of mortality of fish due to fishing, including both physical extraction of individuals and fatal injuring of individuals in the course of fishing, indicating the intensity of utilisation of fish stocks.
- Population increment – the number of the young in the population, indicating the reproductive capacity of the population ↓.

Measures (lines of action):

- Long-term planning of the development of fisheries, elaboration and implementation of regulations for sustainable management of fish resources.
- Improvement of monitoring and supervision to ensure ecosystem-based management of fish stocks and minimising the impact of fishing.
- Development of a system of incentives and benefits that promotes sustainable use of fish resources.

5.1.6 Game

Objective:

To ensure the diversity of the species of game and other game and the viability of populations.

The diversity of game species game and the viability of populations ensure the resistance of game to changes, render the game less susceptible to diseases and other hazards and make it possible to increase the social and economic role of hunting in rural areas. To that end, the ownership of land needs to be valued and more landowners engaged in hunting activities. It is also important to preclude extensive damage caused by game to forests and fields, so as to not contradict the objectives of forestry and agriculture.

Indicators:

Indicators produced for the time being:

- The ratio of counted and hunted game by species ↑:

  wolf – base level: 4.7

  lynx – base level: 8.1

  beaver – base level: 3.0

  roe deer – base level: 5.4

  wild boar – base level: 1.5

  red deer – base level: 13.1

  brown bear – base level: 23.0

  elk – base level: 2.0.

Indicators to be developed:

- The number of contracts signed between landowners and users of hunting grounds.
- The extent of damage caused by game (by species); ecological balance between game species.
- The relative share of landowners whose land is within the boundaries of hunting grounds.

Measures (lines of action):

- Long-term planning of the development of hunting, being based on the agreement of different stakeholders on the ecological, social and economic aspects of hunting.
- Development of research and setting up a monitoring system for research-based exploitation of game populations.
- Training of hunters and designing the reputation of hunting.

5.1.7 Soil and use of land

Objective 1:

Environmentally sustainable utilisation of soil.

Environmentally sustainable utilisation of soil implies the balance of nutrients and organic matter, optimal size of fields, implementation of the rotation principle, prevention of damage caused by excessive driving over land, the use of not too heavy agricultural and forestry machinery (maximum weight of 10 tons), and optimal use of plant protection products.

Indicators:

Indicators to be developed:

- Increase of the area of artificial space resulting from construction activities and real estate development (artificial space is defined in terms of the area of residential space permitted to be used, the area of land under roads, production and retail area) ↓.
- The area of spoilt land (the area of mined areas and land under landfills, the number of abandoned buildings in local government units) ↓.
- Humus content (by organic carbon) ↑.

- Content of principal nutrients (nitrogen, phosphor, potassium, calcium, magnesium) in soil ↔.
- Acidity indicator ↔.
- Bulk density ↔.

Measures (lines of action):

- Elaboration and implementation of an integrated soil policy for sustainable use of soil.
- Development of a monitoring and information system concerning the use of land and soil to ensure the use of land in a manner that takes into account the value of soil as a resource.
- Increasing the awareness of landowners with regard to keeping plots of land with high-class soil in agricultural usage as well as preservation and improvement of soil fertility.
- Setting up and implementation of a system of incentives and benefits ensuring sustainable use of soil.

Objective 2:

Functionality and sustainable utilisation of natural and cultivated landscapes.

The diverse cultural and natural values of landscapes form a part of the cultural heritage and landscape resources of Estonia. Therefore, the state must arrange for the strategic planning of the preservation and utilisation of these values. The preservation and enlargement of the diversity of natural and cultivated landscapes and the functioning of such landscapes in the conditions of traditional habitation and sustainable use of land will ensure the preservation of our cultural and natural heritage, especially in rural regions, and create preconditions for the preservation of the diversity of landscapes and biota and of ecological functions of landscapes. Provided that land is used in a sustainable manner, the quality and potential of landscapes as a resource will not decline, and the value and different functions (purposes) of landscapes will persist. Landscapes disturbed as a result of production activities and other uses will be arranged and assigned diverse functions (incl. those of ensuring biodiversity and aesthetics). The attractiveness and ecological effectiveness of landscapes will increase.

Agricultural landscapes and restored landscapes must offer both economic benefits (agricultural produce) and socio-cultural benefits (recreation and hiking opportunities, sites of cultural historical value, such as the sites of ancient sacred groves) and operate as habitats of many species.

Indicators:

Current indicators:

- The relative share of cultivated heritage landscapes among all cultivated land ↑; data available from 2007.
- The relative share of land used for organic farming among all agricultural land ↑. Base level: 7.1%
- The area and relative share of quarries (sand pits, oil shale quarries, clay quarries, stone pits, etc.) ↓; data available from 2007.

Indicators to be developed:

- The area of restored and recultivated areas and their ratio to disturbed areas ↑.
- Increase of the area of artificial space resulting from construction activities and real estate development (artificial space is defined in terms of the area of residential space permitted to be used, the area of land under roads, production and retail area) ↓.
- The number of building permits issued for construction of new buildings in rural regions ↓.
- The relative share of land covered by agri-environment payments in all agricultural land ↔.

Measures (lines of action):

- Formulation and implementation of a landscape policy, considering the principles of the European Landscape Convention; if necessary, drafting the relevant legislation, instructions and action plans.
- Development of an information and monitoring system concerning landscapes to enable informed decisions to be made.
- Setting up a system of incentives, benefits and regulations with a view to encouraging multifunctional and sustainable use of land.

5.2. PRESERVATION OF THE DIVERSITY OF LANDSCAPES AND BIODIVERSITY

5.2.1 Landscapes

Objective:

Preservation of multifunctional and coherent landscapes.

To preserve the coherence of landscapes of different types and the multifunctional nature of landscapes, the landscape policy must be more integrated into the policies of different areas of activity (nature conservation, heritage conservation, forestry, agriculture, construction, etc.). The coherence of landscapes is primarily ensured by integrated approach to landscape types with different functions (cultivated landscapes, heritage biotic communities, disturbed landscapes, natural landscapes), keeping mind the need to preserve the diversity of landscapes and biodiversity. In a broader meaning, coherent landscapes constitute networks (complexes of landscapes) whose composition includes ecologically functioning units of various structures, which ensure the existence of valuable habitats and the preservation of social and economic values. Thanks to the preservation of coherent and multifunctional landscapes, the naturalness and diversity of habitats will presumably increase, natural and cultivated landscapes will function and will be used in a sustainable manner, and the condition of the valuable marine habitats of the Baltic Sea, coastal areas (incl. small islands) and coastal communities, swamps, inland bodies of water and forests will continue to be good.

Indicators:

Indicators produced for the time being:

- The area and relative share of semi-natural biotic communities in the aggregate territory of Estonia (%) ↑. Base level: 20,000 ha
- The area of protected areas, expressed in hectares ↑. Base level: 1,389,677 hectares
- The area of swamps and its relative share in the aggregate mainland area (%) ↔. Base level: 22.0%
- The relative share of land not used for agricultural purposes in the aggregate mainland area (%) ↓. Base level: 5.5%.

Indicators to be developed:

- Changes in the relative shares of different land-cover types (%) ↔.

Indicators reveal changes in the relative shares of different land-cover types, based on which analyses can be made as to whether and how the preservation of coherent and multifunctional landscapes is ensured. The more different types and the smaller the proportional difference between them, the better the result.

Measures (lines of action):

- Long-term planning of nature conservation, taking into account other fields of activity and being based on the need to preserve coherent and multifunctional landscapes and on the priorities of nature conservation development plan.
- Setting up a balanced system of benefits to ensure the preservation of the diversity of landscapes and various types of habitats.
- Improvement and development of supervision and organisational systems for the purpose of managing the use of land also beyond protected areas and thereby promoting the preservation of the diversity of landscapes and species.
- Development of the system of nature education ensuring the provision of high-quality systematic nature education and continuing training to various target groups, which supports practical nature conservation.

5.2.2 Biodiversity

Objective:

To ensure the existence of habitats and biotic communities necessary for the preservation of viable populations of species.

The existence of habitats and biotic communities is necessary for ensuring the preservation of the populations of all naturally occurring species[8] and for making sure that the number of endangered species and the impact of hazards on them does not increase and that the condition of endangered species improves. Measures designed to protect species and communities/areas coincide only partly. However, in order to maintain the conditions

8. Naturally occurring species are species living outside artificial conditions (in nature) which have not been deliberately released into nature by man or in the case of which deliberate release was necessary for preventing the extinction of the species elsewhere.

necessary for viable populations[9] (high-quality habitats with appropriate conditions) the protection of both habitats and species should be dealt with.

Indicators:

Indicators produced for the time being:

- The relative share of the area of threatened habitat types (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, Annex I) in the territory of Estonia (%) ↑; data available since 2007
- Trends (changes in number) of populations of protected species of the first category ↔; base level – slight increase:

  black stork; base level 2004: 100-115 pairs
  white-tailed eagle; base level 2004: 140 pairs
  short-toed eagle; base level 2004: 5 pairs
  osprey; base level 2004: 45 pairs
  golden eagle; base level 2004: 45 pairs
  greater spotted eagle; base level 2004: 20-30 pairs
  lesser spotted eagle; base level 2004: 500-600 pairs
  grouse; base level 2004: 50-100 pairs
  flying squirrel; base level 2004: 60 habitats
  lesser white-fronted goose; base level 2004: 25-29 individuals
- The relative shares of areas regarding which protective restrictions have been established in the territory of Estonia (%) ↔ Base level: 18%.
- Resources allocated to nature conservation (% of GDP) ↑. Base level: EEK 2.8 billion.

Indicators to be developed:

Changes in the number of protected plant and animal species (number) ↔.

Index of the population diversity of bird species of agricultural land (number) ↑↔.

Measures (lines of action):

- Formulation of measures to oust alien species and avoid the spread of new potentially invasive alien species.
- Development and improvement of monitoring systems to enable informed decisions to be made.
- Preservation, supplementation and development of the existing network of protected areas.

5.3. CLIMATE CHANGE MITIGATION AND QUALITY OF AMBIENT AIR

5.3.1 Energy

Objective:

To produce energy in an amount that meets the consumption needs in Estonia and to develop diverse and sustainable production technologies based on different sources of energy, which do not impose a significant burden on the environment and which enable electricity to be produced for export.

The aim of development is to advance the energy industry that meets the consumption needs of Estonia and is based on different energy sources. The production technologies that encumber the environment the less are preferred. However, fossil energy sources may be used, as well. Provided that production technologies characterised by small environmental burden are developed and applied under an optimal production regime, electricity can also be produced for exports.

Indicators[10]:

Indicators produced for the time being:

- The amount of greenhouse gases emitted in the course of energy production (absolute value) ↔ – the absolute value of greenhouse gas emissions remains on the level of the year 2005.[11]

  CO_2 – base level 18,532,000 tons
  CH_4 – base level 35,000 tons
  N_2O – base level 140 tons
- Emissions of air pollutants (SO_2, NO_x, PM_x, VOC, heavy metals) in the course of energy production – the amounts of

9. While the preservation of a species is generally manifested by the existence of a viable (self-reproductive) population, in many cases the consistent occurrence of individuals of the species in nature must be taken as the basis in practice (e.g. in the case of species that live within a large range or occur on the edges of the range, or species that are extremely rare or difficult to observe).

10. The selection of indicators is based on the internationally acknowledged indicators of sustainable development of energy, which have been formulated and accepted both in the EU and on the international level.

11. Emissions of other pollutants should also be expressed through the same value.

emissions are reduced at least to a level that conforms to EU requirements (tons per year) ↓:

SO_2 – base level 75,696 tons/year
NOx – base level 43,383 tons/year
VOC (volatile organic compounds) – base level 35,484 tons/year

- The relative share of various fuel types in energy (incl. electricity) production (%):

  – by 2015 the relative share of oil shale in the production of electricity amounts to less than 90%.

  Base levels in energy production:
  Oil shale 80.1%
  Peat 2.2%
  Firewood 7.3%
  Wood waste, wood bricks and pellets 10.1%
  Biogas 0.1%
  Hydro and wind power 0.2%
  Base levels in the production of electricity:
  Oil shale 91.1%;
  Peat 0.1%
  Oil shale 0.3%
  Natural gas 5.4%
  Oil shale gas 2.1%
  Renewable sources 0.2%
  Hydropower 0.3%
  Wind power 0.5%

  – by 2015 the relative share of electricity produced on the basis of renewable energy sources and consumed in Estonia will increase to at least 8%;

  – by 2020 the relative share of electricity produced in combined heat and power plants and consumed in Estonia will increase to at least 20%.

Measures (lines of action):

Assessment of the availability of existing energy resources and preparation of long-term plans for their utilisation.

Drafting and supplementation of legislation concerning ambient air protection (subject to the approval of the Ministry of Justice for drafting legislation) and development of an ambient air monitoring system.

Support to research and development activities and pilot projects relating to new energy production methods.

Modernisation of existing production basis to bring it into conformity to environmental requirements.

Introduction of renewable and other alternative energy sources.

5.3.2 Energy consumption

Objective:

To slow down and stabilise the consumption of energy, while ensuring that the needs of people are met, i.e. to ensure the preservation of the volume of primary energy while consumption grows.

Indicators[12]:

Indicators produced for the time being:

- Intensity of energy consumption (thousand toe/EEK million [13]) ↓. Base level: 0.03 thousand toe/EEK million.
- Fuel prices (EEK/ton or EEK/m^3) ↔

  Base levels:
  Coal EEK 939/ton
  Oil shale EEK 127/ton
  Sod peat EEK 365/ton
  Peat bricks EEK 1350/ton
  Oil shale EEK 2761/ton
  Heavy fuel oil EEK 3384/ton
  Light fuel oil EEK 6345/ton
  Diesel fuel EEK 10,017/ton
  Motor spirit EEK 12,337/ton
  Firewood EEK 258/ton
  Wood chips and wood waste EEK 145/ton
- Prices of electricity (EEK/MWh) ↔. Base level: EEK 765/MWh
- Fuel and energy losses (TJ) ↓:

  Base levels:
  Electric energy 3971 TJ
  Heat 4186 TJ
  Fuel 31 TJ

12. The selection of indicators is based on the internationally acknowledged indicators of sustainable development of energy, which have been formulated and accepted both in the EU and on the international level.

13. Intensity of energy consumption: this indicator connects the final consumption of energy, measured in tons of oil equivalent (toe), with an appropriate factor to calculate the intensity of energy consumption for the entire economy.

- Energy consumption per unit of GDP (considering the purchasing power parity) – primary energy consumption volume will remain at the level of the year 2003 until 2010. Base level in 2003: 20.0 TJ per PPP[14].

Indicators to be developed:

- Efficiency of production and distribution of energy:

  - decrease of network losses in the distribution network to the level of 8% by 2009;

  - keeping the network losses in the distribution network at the level of 8% at least until 2015;

  - keeping the network losses in the transmission network at least at the level of 3% until 2015;

  - reducing the Estonian power stations' own consumption at least to the level of 9% by 2015.

- Energy prices applicable to end users, by fuel types and sectors; the end consumer's energy-related expenses should proportionally accord with these in developed EU Member States ↔.

Measures (lines of action):

- Formulation and implementation of regulations and support schemes to enhance energy conservation and manage the consumption of energy, incl. development in line with the legislation of the European Union (directives on the energy labelling of domestic appliances, framework directive on eco-design requirements for energy-using products [2005/32/EC], energy services directive [2006/32/EC], directive on the energy performance of buildings [2002/91/EC], etc.).
- Support to research and development activities and pilot projects relating to the optimisation of energy systems.
- Upgrading of energy systems to reduce power and heat losses.
- Increasing the awareness of energy conservation.
- Integration of energy conservation in other sectors, i.e. analysis of the impact of current legislation underlying the grant of state benefits.

14. PPP – purchasing power parity.

5.3.3 Protection of the ozone layer

Objective:

Phase-out of artificial substances used in industry and households, which deplete the ozone layer.

Indicators:

- Estonia complies with all obligations assumed with regard to the use, import and export of substances, which deplete the ozone layer by the designated deadline.

Measures (lines of action):

- Collection, storage and reclamation, in an ecologically compatible manner, of ozone-depleting substances.
- Improvement of the qualification of personnel dealing with ozone-depleting substances.
- Supervision over systems and equipment that contain ozone-depleting substances.
- Revision of the plan for gradual removal from circulation of ozone-depleting substances.

5.3.4 Transport

Objective:

To develop an efficient, environmentally sustainable and comfortable public transport system, ensure safe soft traffic (render alternatives of using motor vehicles more comfortable) and develop a settlement and production structure that reduces inevitable commuting traffic and road transport (i.e. to reduce the need for transportation).

Indicators[15]:

Indicators produced for the time being:

- Emissions of CO, NOx, PM10, SOx from transport vehicles ↓ (in tons):

  CO – base level 48,600 tons
  NOx – base level 18,130 tons

15. The selection of indicators is based, first of all, on the relevant EEA TERM indicators towards which Estonia needs to develop its transport-related and environmental reporting.

PM_{10} – base level 1460 tons
SOx – base level 1410 tons

- Emissions of greenhouse gases from transport vehicles (CO_2 equivalent tons) ↓. Base level: 2,157,000 CO_2 equivalent tons.
- Relative share of empty journeys of vehicles in overall transportation (%) ↓. Base level: 21%.
- Passenger turnover of public transport (passenger kilometres per year) ↑

  Base levels:
  buses (incl. urban transport): 2,716,000,000 passenger kilometres per year
  airplanes: 1,106,000,000 passenger kilometres per year
  trains: 248,000,000 passenger kilometres per year
  sea-going vessels: 541,000,000 passenger kilometres per year

  Freight traffic turnover ↓ Base levels:
  road transport: 7,641,000,000 ton-kilometres per year
  rail transport: 10,639,000,000 ton-kilometres per year
  sea transport: 1,218,000,000 ton-kilometres per year
  air transport: 4,000,000 ton-kilometres per year
- Use of fossil fuels in transport (kg of oil equivalent per inhabitant) ↓. Base level: 387.7 kg per inhabitant.
- The relative share of cars older than ten years in the aggregate number of registered passenger cars (%) ↓. Base level: 68.7%
- The relative share of population whose nearest public transport stop is farther away than 0.5-1 km (%) ↓. Base level: 10%
- The relative share of the employed who go to work by foot or use a bicycle to go to work (%) ↑. Base level: 27.2%
- The relative share of the employed who use public transport to go to work (%) ↑. Base level: 29.9%
- The relative share of the employed who use a personal car or a business car to go to work (%) ↓. Base level: 39.5%

Measures (lines of action):

- Elaboration and implementation of a system of regulations and benefits for development of public transport and soft traffic.
- Long-term planning of the development of sustainable and integrated transport, incl. formulating a regional policy that contributes to the reduction of commuting and road transport, and increasing the functions of settlements and reducing commuting through habitation plans.
- Increasing society's' awareness and designing its attitude towards sustainable transport and city planning, incl. advancing the attractiveness of sustainable modes of transport.
- Elaboration of regulations for reduction of energy consumption in transport and for reduced use of fossil fuels.

5.4. THE ENVIRONMENT, HEALTH AND QUALITY OF LIFE

5.4.1 Outdoor environment

Objective:

Outdoor environment that spares and supports health.

The condition of the outdoor environment has a direct impact on all aspects of human health. By improving the condition of the outdoor environment better health status of people and decreasing number of illnesses can be achieved. On the level of society it is important to adopt environmental management measures – managing the utilisation of land, spatial planning of the environment used or to be used by humans, monitoring, assessment and management of risks, etc. The level of implementation of these measures and the allowance for the results in the adoption of decisions will determine the impact on each person's health.

Indicators:

Indicators used for the time being:

- Investments placed in the reduction of noise levels (EEK or % of GDP or per inhabitant) ↑. Base level: EEK 2,192,000.
- Air pollution (the average number of days in urban regions on which the concentrations of ozone, particulate matter, sulphur dioxide and nitric oxide exceed the permitted level) ↓.

  Base levels (average of four measuring points):
  PM_{10} 16 days/year
  O_3 1.8 days/year
  NOx 0 days/year
  SO_2 0 days/year
- Rate of deaths caused by respiratory diseases (deaths per 100,000 inhabitants per year) ↓. Base level: 35.1

- Rate of deaths caused by cardiovascular diseases (deaths per 100,000 inhabitants per year) ↓. Base level: 685.7
- Number of motorcars per thousand inhabitants (by counties) 365 ↓.

Indicators to be developed:

- The exposure of the population to noise of various levels ↓
- The extent of annoyance of noise ↓
- The number of breaches of noise limits ↓
- The exposure of the population to pollutants – annual average concentrations of pollutants for PM_{10}, $PM_{2.5}$ (currently not measured) and volatile organic compounds, O_3, NO_2, SO_2, calculated in relation to the size of population in a given region ↓
- Biochemical monitoring

Measures (lines of action):

- Development of a monitoring and information system for outdoor environment factors that affect health, and publication of data.
- Development of a system for assessment and control of health hazards for reduction and mitigation of long-term environment-related health risks.
- Formulation of regulations, instructions and action plans for mitigation of health risks in the urban environment.
- Increasing the knowledge of specialists and people about the health risks posed by the outdoor environment.

5.4.2 Interior space

Objective:

Safe interior space that advances the preservation of health.

As many pollutants originating from the outdoor environment reach, to a greater or lesser extent, the interior space where people spend most of their time, it is important to not just focus on the reduction of outdoor pollution, but emphasise also a complex approach to the problem so as to reduce the breakthrough of pollution into interior space. In addition to pollution, consideration must be accorded to health factors occasioned by the specific features of nature. In Estonia, these features primarily relate to radon-related circumstances.

Indicators

Indicators to be developed:

- Excess of the limit values established in the standard of indoor radon levels in areas exposed to radon (%) ↓.
- Concentrations of radon in interior space do not exceed the recommended values established in various guidelines.
- Indoor climate conforms to indoor climate standards or norms established by legislation: the number of apartments or institutions that fail to conform to standards in relation to the general number of investigated apartments or institutions.

Measures (lines of action):

- Formulation of regulations and development of a monitoring system for observing the status and health effects of interior space (incl. development of a methodology for measuring radon levels, and construction concepts).
- Development of support systems for use of environmentally sustainable and healthy materials and technologies.
- Increasing the knowledge of specialists and people about health risks posed by the indoor environment.

5.4.3 Food

Objective:

The content of pollutants in the food chain which originate from the environment does not harm human health.

The most efficient way of reducing the contamination of food is to reduce pollution load on the food chain in its entirety. The general pollution load must be reduced in all essential sectors of economy related to food. Thus, the principal means aimed at the reduction of the contamination of food must be integrated in strategies related to these sectors.

Indicators[16]:

Indicators used for the time being:

- Non-conformity of food samples to norms (%) ↓, data available from 2007.

16. Systemic base data are missing at the moment.

- Content of certain pollutants in food (%) ↓, data available from 2007.

Indicators to be developed:

- Biochemical investigations (%) ↓.

Measures (lines of action):

- Extension of monitoring and analysis possibilities for improvement of supervision over food.
- Improvement of the information system of food contaminants to enable informed decisions to be made and to increase the awareness of the population.
- Development of a system for assessment of the health risks and effects arising from food contaminants.

5.4.4 Drinking and bathing water

Objective:

Drinking and bathing water does not harm human health.

In addition to reduction of pollution, notification of the population will be carried out to ensure the safety of drinking and bathing water. The availability of information enables to make choices, which are safer for health.

Indicators:

Indicators used for the time being:

- The percentage of the population provided with water from central water supply network ↑. Base level: 72%
- The percentage of factors that negatively influence the quality of bathing water in all samples taken (the percentage of samples in which chemical, microbiological and other indicators exceed the relevant limit values in all samples taken) (%) ↓. Base level: 2.8
- The number of outbreaks of illnesses due to the contamination of water and the number of the sick in the case of the outbreak of an illness ↓. Base level 0
- The relative share of population provided with drinking water that conforms to requirements (% of population) ↑. Base level in 2005:
  non-conformity as to microbiological indicators (%): 0.01
  non-conformity as to chemical indicators (%): 2
  non-conformity as to other indicators (%): 29

Measures (lines of action):

- Development and implementation of a system of regulations and benefits for reduction of contaminants originating from the environment in drinking and bathing water.
- Development of a system for monitoring and publication of contaminants originating from the environment.
- Preparation of action plans for prevention and prompt elimination of emergencies arising in the environment.
- Increasing the knowledge of specialists and people regarding the safety of drinking and bathing water.

5.4.5 Disused hazardous sites

Objective:

All currently known disused hazardous sites will be eliminated by 2030.

Indicators:

- The number of eliminated disused hazardous sites ↑. Base level: 75 sites

Indicators to be developed:

- Change in the area of disused hazardous sites entered in the environmental register (expressed in hectares) ↓.
- The area of arranged (i.e. brought into conformity to pollution limits) disused hazardous sites in relation to the aggregate area of disused hazardous sites (%) ↑.
- Change in the concentrations pollutants in remaining disused hazardous sites ↓.

Measures (lines of action):

- Development of the legal regulation of the sphere of disused hazardous sites (in conjunction with and subject to the approval of the Ministry of Justice for drafting legislation).
- Development of a monitoring and information system for disused hazardous sites and risks accompanying the use of such sites.
- Formulation and implementation of plans for arrangement of known disused hazardous sites.

5.4.6 Safety and protection of the population

Objective:

To ensure the safety and protection of people against risks jeopardising their security.

To achieve the objective, an effective system for preparedness for emergencies must be developed with the aim of preventing possible emergencies and ensuring timely response with adequate resources to possible emergencies in Estonia which may threaten the security of the state or the lives and health of people or which may significantly damage the environment or cause substantial economic damage. It is vital to ensure the safety and protection of people against risks jeopardising their security.

Indicators:

Marine pollution:

- Sufficient frequency of distant sensory monitoring for detection of pollution in areas characterised by intensive shipping traffic (temporary coverage of marine areas, percent of year).
  • Sufficient capacity of pollution sweeping in a marine area of 4.5 m^2 within 24 hours (% of the minimum recommendations of HELCOM[17]).

Disasters on land:

- Sufficient capacity of elimination of floods and storm damage (the capacity of responding simultaneously, percent of counties). Sufficient capacity of localisation and elimination of large fires (percent of immediate readiness to eliminate fire in the area of up to 50 ha). Sufficient capacity of reacting to industrial and transport fires, chemical and radiation accidents on the level of regions (percent of the provision with equipment of Rescue Board units).
- Development of a logistic supply necessary for elimination of disasters on the level of regions (percent of necessary structures).

Current indicators:

- Average wait-time upon reception of emergency notices at 112 (seconds) ↔↓. Base level: 10.

Indicators to be developed:

- The number of pollution incidents that were detected early in relation to the aggregate number of pollution incidents (%) ↑.
- Costs incurred in the elimination of emergencies (EEK or % of GDP) ↑.
- Investments in equipment and infrastructure necessary for elimination of marine pollution ↓.
- Number of seabirds perishing due to marine pollution per year ↓.
- Investments in equipment necessary for elimination of major accidents ↑.
- Average time spent upon commencement of rescue operations ↓.
- Number of exercises carried out for the purpose of increasing preparedness for environmental emergencies ↑.

Measures (lines of action):

- Arrangement of the legal framework of prevention of possible emergencies relating to the natural environment, planning of the preparedness for emergencies and elimination of emergencies.
- Planning of scientific and applied research, and development of a training system in the spheres of preparedness for emergencies, crisis management and protection of the population.
- Improvement of preparedness for environmental emergencies, incl. participation in international undertakings in the fields of crisis management and protection of the population.

17. BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION or HELCOM is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Party States: Estonia, Latvia, Lithuania, Denmark, European Community, Finland, Germany, Poland, Russia and Sweden).

6. CONNECTION WITH THE STRATEGIC DOCUMENTS OF OTHER SPHERES

As many institutions may change in the coming 25 years, but the spheres that need to be developed will most probably remain the same, instead of analysing the roles of sectors and institutions it is more reasonable to analyse the impact of strategic documents related to environmental issues on the Environmental Strategy and describe the actual cooperation or antagonism of different spheres in the implementation of the objectives of the Environmental Strategy. Cooperation is, first of all, needed in the case of the objectives of the Environmental Strategy on whose achievement the goals set in the strategies of other spheres have a positive or negative impact. Ministries responsible for the implementation of such strategic documents, along with the institutions operating within the jurisdiction of the ministries, are the partners.

As sustainable development and, more generally, protection of the environment are among the priorities of the European Union, most of the development documents that have been or that are being prepared in Estonia and which affect the natural environment focus on the protection of the environment. Therefore, achieving the goals of these documents will mostly have a positive impact on the objectives set in the Environmental Strategy. We can only hope that the principles described in the development documents are adhered to in practice, as well.

To describe the impact of goals set in different spheres on the objectives established in the Environmental Strategy, the working groups chose the strategic documents set out below which have been approved or are being prepared. Potential conflicts between the protection of the environment and economic activities or possible momentum in the implementation of different development plans served as the selection criteria. A detailed table ("Impact of the strategic documents of related spheres on the objectives of the Environmental Strategy") available on the website of the Ministry of the Environment at www.envir.ee describes the impact of other spheres on the objectives established in the Environmental Strategy.[18]

The impact of the goals set in the approved development plans of different spheres on the objectives established in the Environmental Strategy was evaluated:

- Estonian Enterprise Policy 2007-2013
- Estonian Forest Policy (1997)
- Estonian Forestry Development Plan until 2010 (2002)
- Long-term Public Fuel and Energy Sector Development Plan until 2015
- Estonian Development Plan for the Electricity Sector 2005-2015
- National Programme for Reduction of Greenhouse Gases 2003-2012
- Estonian Housing Development Plan 2007-2013
- Bases of Ecological Tax Reform
- National Programme "Estonian Natura 2000" 2000-2007
- National Budgetary Strategy 2007-2010

In addition, the impact of goals set in draft development plans that had not been approved by spring 2006 on the objectives established in the Environmental Strategy was assessed.

At the time of revision of the Environmental Strategy, i.e. in 2013, also the following strategic documents that were not available at the time of formulating the Environmental Strategy or whose impact on the objectives established in the Environmental Strategy the working groups assessed as insignificant will have to be discussed: Development Plan for Use of Oil Shale, Tourism

18. The impact of Sustainable Estonia 21 was not assessed, as that document served as the basis of compiling this Strategy. Likewise, the impact of nature Conservation Development Plan was not assessed, as that document essentially supports the objectives of the Environmental Strategy which are related to the diversity of landscapes and biological diversity.

Development Plan, Development Plan for Chemical Safety, National Concept of Education for Sustainable Development, National Rural Development Plan 2007-2013, Estonian Higher Education Strategy 2006-2015, Estonian Fisheries Strategy 2007-2013, and Development Plan for Radiation Safety.

The interaction between activities planned in different spheres is manifested in the Environmental Action Plan, which describes the activities in which institutions operating within the jurisdiction of several ministries participate.

7. MONITORING AND UPDATING OF THE ENVIRONMENTAL STRATEGY

1. MONITORING PERIOD

Monitoring and revision of the Environmental Strategy (hereinafter referred to as **ES**) will be carried out through the monitoring of the Environmental Action Plan (hereinafter referred to as **EAP**). Thus, thorough monitoring will be carried out every three years.

2. PERSONS CARRYING OUT MONITORING

Monitoring will be carried out by ministries specified as entities responsible for the implementation of the activities set out in the EAP. The ministries will submit monitoring reports to the Ministry of the Environment in the first quarter of the year of monitoring for the preceding year. Being based on the reports submitted by the ministries, the Ministry of the Environment will compile a summary report which will be submitted to the Government of the Republic within the first half-year.

3. CONTENT OF MONITORING

Three aspects need to be kept in mind when carrying out monitoring:

- The efficiency of the activities specified in the Environmental Action Plan
- The social, economic and environmental effects of the activities
- Progress made in accomplishing the objectives of the Environmental Strategy

The following questions must be answered in the course of monitoring:

1) Are the circumstances and trends in consideration of which the objectives and measures (lines of action) of the ES and the activities of the EAP were planned still an issue?

- The assessment is based on a comparison of the main problems and trends specified in the ES with the essential problems and trends prevailing at the time of monitoring (also taking into account the most important trends and key elements of the currently prevailing scenario).

2) Has progress been made in achieving the objectives established in the ES? Are there any objectives that could not be pursued? If yes, what have been the hindrances?

- The assessment is based on the objectives established in the ES and the corresponding indicators (targeted development trends).

3) Have the results envisaged for the activities set out in the EAP been achieved or has progress been made in achieving these results? (The assessment will be made annually as a separate report, and once every three years as a component of integrated monitoring.)

- The assessment is based on the *pursued outcome* specified in the tables of the EAP.

4) How have activities specified in the EAP influenced the social, economic and natural environment? Have the activities entailed any sudden and unwelcome consequences (side effects)? What were the activities that have had a significant impact?

- The assessment is based on the *pursued outcome* specified in the tables of the EAP.

5) What are the socio-economic and environmental effects of lines of action (i.e. sets of activities)? Were these effects rightly predicted?

- To make the assessment, the actual overall effect of the activities specified under a line of action in the EAP should be compared with the presumed impact of the line of action as set out in the additional table of the EAP titled "Socio-economic impact."

6) Have the selected activities been appropriate to the accomplishment of the objectives of the ES?

- An overall assessment of the compatibility of the activities is made on the basis of the analysis of answers given under items 1-4 above.

7) Considering the changed situation, the new trends, the compatibility, relevance and impact of activities, should the activities specified in the EAP and/or the objectives established in the ES (or indicators) be altered?

- In consideration of the foregoing analysis, proposals will be made regarding the alteration of activities, removal of activities from the EAP or adding new activities.

4. ADJUSTMENT OF THE ENVIRONMENTAL STRATEGY ON THE BASIS OF MONITORING RESULTS

The Environmental Strategy will be updated in 2013 on the basis of monitoring results. In the case that the monitoring results reveal a need to alter any lines of action or objectives of the ES, working groups will be formed on the initiative of the Ministry of the Environment which consist of specialists of the areas of activity that need to be adjusted. The working groups will elaborate proposals of amendments and introduce the amendments to the ES. The *Riigikogu* will approve the amendments to the ES.

8. ESTIMATE OF THE COST OF THE ENVIRONMENTAL STRATEGY

Considering current conditions and possibilities, it is impossible to plan, with reasonable assurance, the cost of lines of action, activities and measures necessary for achievement of the objectives of the Strategy until 2030 because:

- no Estonian authority or the Bank of Estonia prepares any forecasts for that period with regard to the state budget volume, inflation or other coefficients or any other factors that influence funding sources;
- during that period, values prevailing in society, technologies used and other factors that influence the need for and the particular content and cost of the activities envisaged for a longer perspective will change (i.e. as the practices prevailing in society change, some of the planned activities may prove to be unnecessary, be modified or replaced with an activity of another type but aiming at the same objective);
- the principles of preparation of the budget of the EU, an important source of funding, will presumably change already by the programming period 2014-2020, being dependent on the developments relating to further enlargement of the EU and changes in the foreign policies of the EU and its Member States. For these reasons, the estimates of the volumes of

8. ESTIMATE OF THE COST OF THE ENVIRONMENTAL STRATEGY

EU resources are more or less concrete only for the period ending in 2013.

The cost of carrying out activities is calculated for the period of 7 years which is also the programming period of the EU and is set out in the Environmental Action Plan.

According to the provisional estimates, the expenditures relating to the Environmental Strategy will be divided as follows in 2007-2013:

Financial income to be earned as a result of implementing the Strategy cannot be planned into the budgets of the next four years, as the Strategy covers 25 years and the income to be earned will be of long-term and mostly indirect nature (e.g. better health of people, diversity of nature, etc.).

FINANCING SOURCES

In prices prevailing in 2006, MEEK	2007	2008	2009	2010	2011	2012	2013	TOTAL
State budget, Ministry of the Environment	486	522	551	577	581	584	585	3601
State budget, other ministries (MOIA, MOSA, MOA, MORE, MOEAC)	476	518	751	478	338	257	254	3073
State budget, Environmental Investment Centre	414	509	743	600	498	397	384	3544
EU resources	2519	3167	4480	3866	3152	2120	2088	21,393
Companies	3646	5829	9022	6948	8577	3292	6097	43,696
Local governments	410	492	489	376	304	265	263	2600
Other financers	274	300	584	541	661	112	100	2572
TOTAL	**8225**	**11,338**	**16,619**	**13,386**	**14,111**	**7028**	**9771**	**80,478**

BY WORKING GROUPS

Prices prevailing in 2006; MEEK	2007	2008	2009	2010	2011	2012	2013	TOTAL
The environment, health and quality of life	134	858	1462	886	785	785	785	5696
Preservation of the diversity of landscapes and biodiversity	357	408	483	537	485	417	417	3103
Sustainable use of natural resources and reduction of waste generation	2294	2332	4110	4141	3242	1550	1548	19,216
Climate change mitigation and quality of ambient air	5432	7733	10,558	7815	9594	4272	7016	52,421
Environmental management (management activities supporting all areas of activity)	7	8	6	7	5	5	5	42
TOTAL	**8225**	**11,338**	**16,619**	**13,386**	**14,111**	**7028**	**9771**	**80,478**

Annex 1
Vision and scenarios[19]

Vision 2030

Predominantly an environmentally sustainable consumption model will prevail in Estonia. In a society that appreciates learning and involvement in the decision-making process, resources allocated to environmental management will be employed for the purpose of making people understand that it is USEFUL to behave well towards nature. In the sphere of environmental management, decisions will be adopted on the basis of knowledge and not enforced in the form of commands and prohibitions. Environmental management functions will have been integrated into all spheres of life and will be carried out by the private, public and third sectors. There will be efficient exchange of information and consistency between different spheres both on the local and global level. Before decisions are made, modelling with the help of information technology will be used to the maximum extent possible. The state will support effectively the development of technologies and research activities, and environmental education will be a natural component of all specialties in institutions of higher education. Engineers and technologists as well as people engaged in other spheres will be according consideration to the environmental impact of products, projects and processes early in the phase of planning thereof.

The relative importance of servicing, health industry, creative industry and research-intensive production will have increased in the structure of Estonian economy. The pressure of economy on nature will be distributed and will have decreased. Industry and provision of services will be evenly distributed over the territory of Estonia and will not be environmentally intensive; environmentally sustainable transport will prevail. Resources will be utilised much more efficiently thanks to the use of green technologies. The energy-intensity and material-intensity of production will be relatively low and minimum waste will be generated. Production will develop thanks to the recovery of materials, and not at the expense of increasing utilisation of natural resources. Local products and the utilisation of local renewable resources will be preferred. The transit of raw materials via Estonia will be compatible with geopolitical developments – both Estonian and imported raw materials will obtain added value here.

Organic farming and agri-tourism will prevail in agriculture; hobby farming will be "in," as well. A well-planned habitation system will exist throughout Estonia, which will take into account the needs of both nature and people. The habitation system will have been integrated into a well-functioning network with the help of public transport based on the most up-to-date technologies.

The living environment will be spacious and beautiful and not excessively arranged. People will perceive that a clean environment is needed for living and that nature has a positive impact on the quality of life. Even though human settlements will be distributed over the country, the trends of urban sprawl and commuting between homes and faraway workplaces will have disappeared. The diversity of jobs and the existence of appropriate technological solutions and a well-functioning public transport system will enable many people to choose whether to work from home or on the employer's premises. Work will predominantly be performed from home, while workplaces (and outdoor events) will be used for communication with colleagues, discussing work-related problems and exchanging information. The possibility of working from home will make it possible to live in rural regions. Then again, there will be plenty of people who prefer the artificial environment of cities.

Natural landscapes and traditional cultivated landscapes will still exist; the artificial environment will not be dominant over the green living environment; protected areas with wild nature will have preserved. Care will be taken of natural landscapes and habitats of the various species of biota. Nature conservation will be a priority in the territory of the entire country, but protec-

19. The vision and an explanation of bases for formulating the scenarios are also contained in Chapter 3 (parts 3.1 and 3.2) of the Environmental Strategy.

ted areas will exist, as well. People will be in agreement on the principle that suitable habitats must be ensured for all species and that this principle necessitates certain rules of operating in the habitats of the species that need protection.

People will be aware of the need to preserve unpolluted and safe environment. A healthy lifestyle will be pursued. Distributed habitation will contribute to the improvement of the quality of life; the aspect of health will be taken into account in planning the living environment. Water and food will be of high quality; controlled GMOs will be used, if necessary. Climate change will still be an issue. Preparedness for natural disasters will be ensured: both plans and technological means will exist for responding to extraordinary situations.

In 2030 new environmentally sustainable technologies and various raw materials, which can be supplied from nearby locations, will be used, in parallel, for production of energy. Stable energy supply will be ensured; alternatives for raw materials currently used for energy production will exist; new technologies will be applied; oil shale will be used in a more efficient manner and with less waste (considering current technologies, wind, sun and water cannot cover the energy need of Estonia). It will be possible to easily switch from one energy producer (source) to another. Micro-energy concepts and autonomous ecological houses will be widespread, with the little necessary energy being produced on the basis of renewable sources. Among developed countries, Estonia will stand out by the smallest energy consumption per unit produced. The load of the oil shale industry (both power and oil industry) on the environment will be minimal and its side effects will have been eliminated.

SCENARIOS

Scenarios are visions of the possible different future development options, which help, in the contemporary rapidly changing operating environment, to perceive the problems and opportunities that may occur in the future as a result of coincidence of certain circumstances (driving forces) and thereby improve preparedness for responding to these problems and opportunities in an adequate fashion – plan measures for precluding the worst or for achieving the desired situation quicker and more efficiently. Certain scenarios entail the need to implement a considerably more vigorous (and accordingly more expensive) environmental policy than others in the case of which the overall operating environment promotes spontaneous development in the desired direction and thus helps to set priorities in the preparation of shorter-term plans. Then again, it should be remembered that scenarios are not precise predictions, but visions of future, which are based on the combination of driving forces characterised by the greatest uncertainty and impact and which emphasise the features that are characteristic of the combinations of certain forces. An important aim of scenarios is to prepare us for situations that we do not deem probable. In real life no scenario is realised to its fullest extent – while the main features of one scenario prevail, components from other scenarios are also present.

The scenarios described below were compiled on the basis of two driving forces – values for society (non-materialistic values such as, first of all, valuation of nature as opposed to materialistic values) and technological development (capacity and willingness to introduce new technologies as opposed to reluctance or incapacity to introduce new technologies). Combinations of these driving forces yielded the following scenarios:

WILLINGNESS AND CAPACITY TO INTRODUCE TECHNOLOGIES	VALUES IN SOCIETY	
	MATERIALISTIC VALUES	APPRECIATION OF NATURE
HIGH	More is better?	Eco-pearl
LOW	Vicious circle	Back to roots!

On the basis of the variables, i.e. driving forces, provisional scenarios were compiled that were then supplemented, taking into account the effects of other driving forces and trends – development processes in the EU, climate change, prevailing political ideology, the approach of planning products' life cycles, specialisation in the diversity of local resources in production, decrease of "available" resources, the ideology of choosing dwelling places and life cycle migration, and the diversification of working options.

Taking into account the interaction between driving forces, in addition to technologies and societal values also changes in the following components (also those contained in the vision) were described in each scenario: human health and consumption, landscape, biological diversity, economy, energy, transport and education.

More is better?

Belief in technology; materialistic values

People of Estonia will be living in an artificial environment in 2030. A part of them will be sitting in front of a computer all the time, living in the virtual world. People will be striving to just live happily, with happiness meaning consuming quickly and in large amounts according to the common belief. New technologies will eagerly being introduced, as they promise better opportunities of becoming rich even quicker. More and more of these technologies will be bought, exchanged and – where possible – stolen in the vast expanses of the virtual world, which is difficult to control. The same trends can be perceived also elsewhere in the European Union that will have become a purely economic community again, following the Lisbon Strategy, and will not be dealing with the Member States' environmental and social problems any more. Climate change will still be an issue all over the world, but people living in Estonia will believe that it is possible to solve all problems arising from the climate change with the help of the existing technologies.

In terms of economy, Estonia will be incredibly successful, as everything that can be cashed will be converted into money, using the newest technologies. High-tech businesses will prevail. Trading (incl. transportation of various goods) will be effected globally, borders will have become indistinct and the nation state as such will have no significance any more. Policy-making on the state level will start to fade away before the end of the first decade of the 21st century, and from the middle of the second decade the main task of the Ministry of Finance located in the northern part of Talsinki (Tallinn + Helsinki) will consist in the allocation of international project grants and consumption allowances. As, thanks to persistent lobbying, requirements concerning the protection of the environment, which had initially been imposed by the developed society (and which slowed down the development of economy) will have been waived, no environmental projects will be planned any more. While lots of programmes and strategies will be compiled, these plans and strategies will have no real significance in terms of the environment, as financial considerations will be determining everything. Product cycles will be planned for short terms – new technologies, new and interesting models will continuously be launched on the market and people will desire to obtain all those new and better things. Efficient production technologies will be used; there will be many products and services on the market. However, products and services will also be imported, if this is more advantageous.

The better part of oil shale will be utilised to meet the need for energy. If necessary, energy will be bought from neighbouring countries or, alternatively, a nuclear power station (or another station operating on the basis of a new and powerful technology) will be built in cooperation with neighbouring countries. Choices of the source for energy production will be based on the considerations of capacity and low price, not environment-friendliness. Distributed production of energy will be possible, as the energy sources and technologies that are economically the most advantageous and that can be obtained in the closest vicinity (such as H2, CH4, sun, nuclear power, etc.) will be used. The most up-to-date technologies will be implemented which enable the resources to be exploited to the maximum extent and which generate only a little waste. There will be no problems with resources – as some resources are exhausted, replacements are will be sought quickly. All kinds of products will be made out of local natural resources with the help of new technologies. The pollution load will be smaller, as technologies will be better. However, as a result of intensive utilisation of resources the overall pollution volumes will remain the same when compared to now. Waste will be processed insofar as this is economically worthwhile and the rest of the waste will be taken to landfills.

While landscapes will be nicely taken care of, large quarries and mines and extensively grown monocultures will prevail. Forests will be plantations of trees rather than real forests, and dams will have been constructed on rivers. Agricultural activities will be intense – the crops that bring in profit will be cultivated notwithstanding their impact on nature. Due to the intense agricultural activities a large part of the currently existing agricultural land will have been overexploited and excluded from use. The current cultural and historical value of landscapes will have vanished and replaced with the consideration of economic expediency. Biotic communities will have been impoverished and biological diversity will have been preserved in the form of genetic codes only, owing to their potential (economic) utility. The animals that are becoming extinct but which people love will be replaced with robots (e.g. "technological dog"); the services of nature will be replaced by technologically created services.

Infrastructure will occupy a large share of the space used. In the context of Europe, the settlement system will be characterised by distributed urbanism – "real" life will be in large cities like Talsinki, with various modes of transport (air, water and land) plying between the cities. As all cities will be alike, it will be of no particular importance where one lives. Individual means of transport will be remarkably varied. Fancy jeeps and limousines,

as well as more environmentally sustainable vehicles will exist side by side.

As regards lifestyle, the boundary between the classical city and countryside will have disappeared, and residences and workplaces will be blending, as well. Work issues will be discussed on golf courses or in other similar places. At best, there will be one child in families, as consumption will not leave much time for children. Indoor climate will be regulated, but the threats to health that result from artificial indoor climate will not be known.

Society will be strongly stratified; everyone will struggle for himself and the consumption power will mark success. People will communicate with each other on established levels. Technical and business-related specialities will be appreciated and will assure the highest wages.

Economic success will entail an immigration pressure. Therefore, a stringent immigration policy will be formulated notwithstanding the previously open borders, which means careful selecting of the persons that are allowed to enter the country. The selection will be based on high qualifications (the "dirty work" will be done by machines).

Health will mean, first of all, mass consumption of health services. Health services will be diverse and of very high quality. It will be even possible to replace certain body parts and organs, which will enable some people to live up to incredibly old age. On the other hand, with life being extremely intense and stressful, sudden "unexplained" deaths at young age will be relative frequent. Life will be short and intense. Due to abundant stress, people's mental health will be weak. This will be the consequence of living with the aim of being happy at any cost.

GMOs will be used extensively in agriculture, pharmaceutics and even regular housekeeping. Cooking at home will be exceptional rather than habitual, with the kitchen being just an element of interior design. "GM food with organic label" will be popular, with the nice appearance of food being the most important selection criterion.

Everything will function quite well until 2030. The question is, however, will there be anyone left in 2060 to prepare a scenario 30+?

Eco-pearl

Valuation of nature and belief in technology

In 2030 no one in Estonia will be concerned about the fact that on some continents the quality of life is still being measured by reference to gross domestic product. In Estonia, like in most of the European countries, nature and optimal consumption will be appreciated owing to a new theory that discusses the relations between man and nature. The paradigm of consumption will start changing during the second decade of the 21st century, which will lead business sharks valuing economic benefit and intensive consumption into despair (and eventually into bankruptcy). Flexible and innovative businessmen will adapt themselves to the new circumstances and increase investments into the development of technologies, enjoying the support of the state. In 2030, natural resources will be utilised as little as possible and as much as strictly necessary. The foundation of that approach will be laid by the system of measures designed at the beginning of the second decade of the 21st century for the purpose of optimisation of the use of resources and aiming at the subsistence of important natural resources for as long a time as possible. The norms, which at first aroused stress and opposition and for enforcement of which a costly administration system had to be put into operation, will become a prevailing norm of life. Local products and the utilisation of local renewable resources will be preferred. Green technologies will enable resources to be used efficiently and minimum waste will be generated.

The environmental awareness of both producers and the entire population will be high. While in the second decade of the 21st century the state will substantially support the replacement of old technologies and product development will need to be supervised to ensure the safety of products to human health and the environment, by 2030 environmental impact assessment as a separate field of activity will have become needless. The state will start to effectively support R&D activities relating to new technologies at the end of the first decade of the 21st century, and environmental education will be a natural component of all specialties in institutions of higher education. Therefore, engineers and technologists as well as people engaged in other spheres will accord consideration to the environmental impact of products, projects and processes early in the phase of planning thereof. Known environmental and health hazards will be under control, but some problems will arise from the circumstance that not all hazards are known. There will be plans and technological capacity for responding to climate change, which will still be an issue.

Physical living environment will be of high quality, as the technologies used will be predominantly waste-free and the small amounts of waste generated will be eliminated. Emissions of pollutants into the ambient air will be practically non-existent, as the need for energy will be much smaller than now and the necessary energy will be produced mostly on the basis of renewable sources. As a result of a substantial decrease of pointless commuting and the change of means of transport, the pollution pressure exerted by transport on the environment will have dropped radically. Water and food will be of high quality; controlled GMOs will be used, if necessary. Hygiene will be of high level. As preferences vary, people will also be growing food for themselves.

Debates will mainly concern the issue of whether nature should be maintained in its current state or whether it should be designed. Those favouring designing will seek to artificially increase the biological diversity by means of genetic engineering – extinct species will be restored and new species will be created. Extremist groups will recommend limiting the human population and defend also the right of viruses that are dangerous to humans (as a part of biological diversity) to life. Both those in favour of maintaining nature as it is and those advocating designing nature will share the principle that adequate habitats must be ensured for all species. Therefore, the places of inhabitation of people will be strictly delimited and rules for operating within the habitats of species in need of human support will be established. Ecological systems of increasing complexity, with or without the participation of man, will be composed.

Landscapes will be very diverse, as will be the ways of using landscapes. Taking care of the naturalness of landscapes and the habitats of species will generally be preferred. Some areas will be assigned for extracting raw materials and intensive activities will be carried out there with the help of the best possible technologies. Protected areas will still exist, but primarily as a result of an old habit only, as nature conservation will be a priority all over the country. Rural tourism will be popular among Estonian city-dwellers and growing numbers of foreigners will come to enjoy Estonian nature, as well. Natural resources will be left unused (which for some time will be treated as missed profit) and landscapes will be maintained for the purpose of preserving the habitats of species. At first, the state will compensate this, but by 2030 such approach will have become normal lifestyle.

In 2030, all Nordic countries and some other European countries will have given up global transportation of basic commodities, following the example of Estonia. In Estonia the third sector will start to actively promote the consumption of basic commodities and foodstuffs based on local raw materials at the end of the first decade of the 21st century. At the beginning of the second decade of the 21st century, the state will establish (tax) benefits for merchandising companies that sell goods produced on the basis of local raw materials. The export and transit of raw materials via Estonia will be discontinued – both Estonian and imported raw materials will obtain added value here.

A technological leap will be made in the Estonian production activities in the middle of the second decade, being based on the decision made in the country at the beginning of the second decade to replace old technologies. Searches for new solutions for Estonian energy began in 2006. The technologies used in 2030 will require just small amounts of energy, and energy will be produced from renewable resources on the local level to the maximum extent possible. To ensure stable supply, energy producers will have been switched to the local as well as international networks of green energy. Until the elaboration of the new environmentally sustainable energy production technology, most of the energy will be imported. When the new solution is found, a new power station will be built in conjunction with neighbouring countries. Micro-energy concepts and autonomous ecological houses will be widespread, with the little necessary energy being produced on the basis of renewable sources (e.g. wind-based generators and solar panels as the current options + heating of water with the help of solar radiation). Just a few usable old power stations will be operated for central energy production and no new power stations will be planned to be built upon the old ones becoming unfit for use. Estonia will stand out among developed countries with the energy consumption per unit produced which will be 4-5 times smaller than in other countries. The oil shale industry (both power and oil industry) that encumbers the environment will have been closed and its side effects will be eliminated.

A well-planned habitation system will exist throughout Estonia, which will take into account the needs of both nature and people. The habitation system will have been integrated into a smoothly functioning network with the help of public transport based on the newest technologies. Transport sector's need for infrastructure will be small; comfortable and quick public transport vehicles and soft traffic will be preferred. The diversity of jobs and the existence of appropriate technological solutions and a well-functioning public transport system will enable many people to choose whether to work from home or on the employer's premises. Also life cycle migration will be quite common, with a

city or countryside being chosen as the place of residence in line with work and family needs. Employers will see to it that working is pleasant and comfortable. Thus, stress levels will be low and mental health will be good.

Immigration and emigration will be balanced; Estonia will be an appreciated place of residence among highly qualified labour. Even though social equality will be greater than in 2007, there will be some problems with those who cannot keep up with the development of technologies.

Back to roots!

Fear of new technologies, high appreciation of nature

In 2030, there will be two relatively self-contained social groups in Estonia, which will not be in conflict but just isolated from each other. One of them will live in cities characterised by agreeable environment and the other will live in country settlements that will keep up close communal relationships.

People will start to flee to the countryside following the energy crisis in the middle of the second decade of the 21st century, which will result from the exhaustion of oil resources. Many will move to the countryside, as there will be better opportunities for acquiring uncontaminated resources that are necessary for living. At the commencement of the crisis, the impact on Estonia of the policies implemented in the European Union will disappear quickly, as all countries will be dealing with their own domestic social and economic issues. The absence of regional policy measures and the inadequate public transport will have kept Estonian rural areas relatively empty of permanent inhabitation, and as owing to the interaction of the agricultural and environmental policies of the EU agricultural activities will have been replaced mainly by maintenance and conservation of landscapes and rural tourism by the beginning of the second decade of the 21st century, it will be possible to take into use vacant and well-rested agricultural land and even vacant dwellings. As several generations of families will move under the same roof and as effort-consuming work must be performed jointly, communal relationships will become stronger and non-utilitarian values and nature will be highly appreciated. The approaches that advocate sustainable consumption and a natural way of life will have become widespread. People will be adapting themselves to slowly occurring climate change. However, should something drastic happen, life in Estonia would probably die out.

Large cities will empty at the beginning of the period; residential districts depending on central supply of heat and energy will turn into ghettos where only those who cannot move to the countryside live. Inhabitation will be preserved only in the urban areas of cultural and environmental value. While in the rest of Europe all available resources will be employed in research and development activities aimed at finding solutions to the problem, in Estonia the R&D base will be weak and the state will be incapable of responding to the problem in the absence of forward-looking measures. As the only solution of mitigating the crisis, norms limiting both consumption and ownership will be established. With time and based on new approaches, people will acknowledge that materialistic values are only needed for satisfaction of basic needs. Financial stratification will be minimal, yet perceivable in terms of symbolic capital. After the peak of the crisis is overcome, many people will become frustrated due to the impossibility to own and consume.

By 2030, Estonia will be divided into more innovation-oriented city-dwellers who will also use GM food and make efforts to buy new technologies from abroad and develop them locally, and conservative rural inhabitants engaged in extensive organic agriculture and operating in small communities under the principle of natural economy (eco-villages). Inhabitants of the cities of Ida-Viru County will have partially merged in Estonians' rural communities; some of them have emigrated to the East and to the West, as it will be easier to live there.

Irrespective of whether people live in cities or in countryside and of the level of their education, they will appreciate nature highly. Subjects relating to nature will be taught at all education levels and most of the fields of activity will be related to nature in one or another manner. The research activities of institutions of higher education will mostly be focused on the assessment of the health and environmental impact of foreign products and technologies. Private initiative research activities will be rather scarce, as a large share of people will resist necessary experiments. As fear of introduction of new technologies will have made Estonians very cautious, old and simple solutions or those thoroughly tested elsewhere will be used, provided that they do not pose hazards for the environment and human health. The utilisation of all natural resources will be carefully supervised. The resources will be consumed to the smallest extent possible. As a rule, only a little waste will be generated, as the life cycles of products will be planned for long periods and everything that can be recovered will be recovered. The diversity of jobs, specialisation, and the amount of services will be decreasing. Natural

economy will prevail and focus on the satisfaction of domestic needs only. Therefore, the Estonian economy will be regressing when compared to the rest of the world where new technologies will be actively introduced. To obtain the necessary resources that cannot be acquired locally, some goods will be imported. Money to pay for such goods will be earned by servicing carefully selected (extremely solvent) foreign tourists.

To defend the country against external threats, the borders will be thoroughly controlled. Small-scale emigration will be possible; immigration will be carefully limited. As the resources necessary for subsistence will better be achievable in rural regions, most people will prefer to live in the countryside. Therefore, inhabitation will be more evenly distributed over the territory of Estonia than earlier.

Transport will consist of two levels, with no point of contact between these levels – high-velocity public transport vehicles will be plying between large cities, forming a part of the single transport network of Europe, while in rural regions people will cover only short distances, travelling between neighbouring settlements, with muscle power (bicycles, horse-drawn vehicles) being preferred as the existing and familiar technologies will be considered too environmentally harmful and new technologies tried and tested elsewhere will be too expensive. By 2030 the vehicles that initially were considered too expensive, such as compressed-air vehicles, will have started to spread. To be authorised to pass Estonia, high-speed transport modes will need to be highly environmentally-friendly. Small towns will have become local trading centres and they will be connected by narrow, but well-maintained roads.

Nature and its beauty will be perceived as values on their own. There will be many areas where nature is allowed to develop on its own. Heritage landscapes will be taken care of with the support of the state, with physical power being predominantly used for maintenance operations. Maximum biodiversity will be maintained; man will leave nature a lot of space. The boundaries of former conservation areas will have become blurred, as the principle of nature conservation will underlie all activities in the territory of the entire country.

Physical living environments will be of high quality, people's roles and possibilities will be clear, and the stress arising from information noise and competing with each other will have decreased significantly. Efforts will be made to increase the share of green areas in large cities, as well. Uninhabited residential districts with large apartment buildings will be converted into green zones; the use of individual motor vehicles will be regulated by norms; the majority of roads will be transformed into cycle lanes, and a lot of cycle taxis will be used. All citizens will be aware, however, that both the living environment and food are of much higher quality in rural regions.

To produce energy, first the existing oil shale resources will be utilised (thereby avoiding possible damage to the environment); then the shift to local renewable resources will be made and energy production will be distributed over the territory of Estonia. Then again, as local resources can only satisfy minimum energy needs and as there will be a fear of introducing new technologies and the use of renewable resources damage the living conditions of many species, cities in particular will be haunted by constant shortages of energy. New technologies will be introduced no earlier than in 2030, as by that time they will have been tested for decades in other countries and, as such, will be approved in Estonia, too.

Vicious circle

Insufficient capacity of introducing new technologies; materialistic values and individualism prevail

The situation will be critical in Estonia in 2030, because the stories of transition to knowledge-based economy told at the beginning of the 21st century will not have reached the consciousness of the government or the people for the simple reason of unwillingness to spend money on something that would benefit in the future – the former will need money for keeping its promises and the latter will need money for immediate consumption. Thus, all resources will be sold quickly and for little value. When it eventually dawns on people that such sale of wealth has not been a wise thing to do, there will not be enough resources left to obtain new technologies, and the prices of the production of Estonia will be declining due to the low quality of the production. Inadequate investments in education and R&D activities will cause a situation where the country has insufficient knowledge for development of technologies as well as insufficient resources for purchasing new technologies from other countries. Likewise, the country will not have enough resources or determination to deal with climate change issues.

As the European Union will have lost its role in directing the activities that relate to environmental protection and will be operating more as a purely economic community, almost nothing

will be left of the beautiful nature of Estonia (with the exception of the natural areas of wealthy private individuals, which will be excluded from public use). Most of the available resources will have been depleted and even state forests will have been sold to private owners to fill the public purse. Wealthy land-owners who, due to the low prices of raw materials, will deem it pointless to sell the natural resources owned by them will assign a new value to nature – land will have become the property of "the noble." Private individuals will own large natural areas, which are closed to the public at large and are used for recreational purposes. Maintaining the diversity of nature in these areas will generally not be an objective on its own, although some of the rich will be devoted to that cause. Traditional rural economy will have vanished, as it will not be able to compete with cheap foreign products. The only employment opportunity of rural inhabitants will consist in serving the guests of the wealthy.

Large quarries and mines will be dominant over the landscapes. Forests will be felled to an extent exceeding their increase; reforestation will be of low quality. Brushwood and monocultures promising the best profits will cover most of the territory of Estonia. The number of habitat types and thus also biological diversity will have declined substantially; as a result of changes in habitats also the species composition of biota will be changing. Specimens of the species that are dying out will be frozen to preserve the genetic code (for economic purposes).

Urban sprawl will continue at the expense of agricultural land located near cities, and the pressure of real estate developers on the green zones in and near cities will be growing. After some time, urban sprawl will be replaced by simple urbanisation. Only extremely wealthy people can afford to live in a naturally scenic and clean environment. The organisation of transport will be inefficient and chaotic. Transport infrastructure will be clogged and of low quality; conflicts will be insoluble. Public transport will be practically non-existent and personal vehicles with exceptionally powerful engines ("ego-transport") will be popular. In the absence of public transport, the right to drive will be granted to younger and younger people under the pressure of society. This in turn, will add to traffic-related risks and traffic load.

As people's consumption desire will not diminish, there will be lots of products to satisfy that desire. Foreign trade will be intense and both export and import of products will be growing. The increasing number of people suffering from allergies and other illnesses will be blamed on GM food and all other new technologies. However, producers whose aim is to encourage people to consume as much as possible will use both old and new technologies, whichever will be available at lower prices. People will be really afraid of health hazards, but their awareness will be very low. Consumers will be deceived frequently, their attention will be distracted by means of information noise and they will simultaneously be offered both poison and counter-poison (eat whatever you like and as much as you like – just take a pill later and you will be healthy and slim again). The result will be poor "package-life" and forced consumption – producers will provide, in the form of packages, nourishment for both body and mind. As people's consumption opportunities will be varied, stress and discontent will be widespread.

The education system will focus on business; nature education will only have been included in curricula to the extent necessary for commercial purposes. High-quality education will be expensive and only the economic elite will be able to afford it. Education can mostly be obtained for a charge, and the guiding role of the state will have practically disappeared in the sphere of education. Due to lack of innovation, economic activities will focus on performing outsourced tasks, not creating something new. Highly qualified labour will be flowing out of Estonia and as no restrictions will be established on bringing in labour from abroad, cheap labour will continuously be imported for business purposes. This will result in immigration causing increasing integration problems. The number of Estonians will have been decreased catastrophically when compared to non-Estonians.

There will be an acute need for energy and resources, but as working on the new energy development plan will start only at the end of the first decade of the 21st century, there will be no time to implement new solutions before the old technology fails. The utilisation of out-of-date technologies will be inefficient; therefore, more and more mineral deposits, forests and agricultural lands will be taken into use. To produce energy, oil shale and oil shale will be used to a great extent and the energy sources that have traditionally been regarded as renewable (timber, peat, water) will be used most extensively. Due to short-sighted management practices, valuable resources will already be depleted in the second decade of the 21st century. From then on, the state will have to confine itself to the leftover resources, whose quality is declining. A lot of waste will be generated. As waste processing is not economically beneficial, the areas of landfills will be expanding.