Swedish Environmental Quality Objectives

- ✔ Clean air
- ✔ High-quality groundwater
- ✔ Sustainable lakes and watercourses
- ✔ Flourishing wetlands
- ✔ A balanced marine environment, sustainable costal areas and archipelagos
- ✔ No eutrophication
- ✔ Natural acidification only
- ✔ Sustainable forests
- ✔ A varied agricultural landscape
- ✔ A magnificent mountain landscape
- ✔ A good urban environment
- ✔ A non-toxic environment
- ✔ A safe radiation environment
- ✔ A protective ozone layer
- ✔ Limited influence on climate change

Contents

1. Main content of the Bill

The Government's overall environmental policy objective is to hand over to the next generation a society in which the main environmental problems have been solved. Internationally, Sweden should be a driving force and a model of ecologically sustainable development. The Bill throughout states how environmental policy should be conducted in various areas in order to achieve this overall objective.

The Bill represents a further development and more detailed presentation of the work that has already been done on ecologically sustainable development. In the autumn of 1997 and the spring of 1998 the Government presented bills in various areas which, together with the present environmental bill, constitute important components of the integrated efforts to achieve sustainable development. They relate, for example, to energy, transport, regional transport, regional policy, employment, consumer policy, housing policy, agriculture, and architecture and design. Furthermore, the Government has presented a new Environmental Code to parliament. The Environmental Code composes a co-ordinated, stringent and broader environmental legislation with a view to promote a sustainable development. In addition, the Government states in its 1998 Spring Economic Bill that the work to adjust Sweden to ecologically sustainability should continue and it proposes increased appropriations to the environment.

In the Government's view, the new Environmental Code, together with the new national environmental quality goals, will increase the scope for and stimulate interest in voluntary measures, not least in industry, that will improve the environment.

In a global perspective resource utilization needs to be more effective. Calculations indicate that the *use of resources* in our part of the world needs to be reduced radically if the earth's ecosystems are to be able to support a growing world population while allowing developing countries to improve their living standards. A measure of the reductions that need to be made is *factor 10*, a concept that has been launched within the UN and signifies that resource utilization in the industrialised countries must be reduced within a generation by a factor of 10.

The Government proposes, within the framework of a fully developed *ecocycle strategy* aiming at better resource management, that all those concerned adjust their behaviour with respect to a specified range of products so that the declared objectives can be achieved within one or two generations. A *vital and environmentally sound industry* and *ecologically sound community planning* are essential conditions for sustainable development.

As regards chemicals policy, all chemical safety work will continue to be based on risk assessments. In addition to the methods currently in use, more general procedures that target substances with certain specific properties must be introduced.

In the EU Sweden urges an intensification of the efforts to integrate environmental issues into various sectors. *International co-operation on the environment* must continue to be action-oriented and proactive. Environmental issues must be integrated into matters relating to trade, developing co-operation and technology transfer.

The Government proposes that Parliament approve the amendments made in 1997 to the Montreal Protocol which introduce stricter rules for substances that deplete the

ozone layer. The Government also proposes that Parliament approve a *Common Convention on Safety in the Handling of Spent Nuclear Fuel and Radioactive Waste.*

2. National environmental quality goals for ecologically sustainable development

2.1. A new structure for the elaboration and implementation of environmental goals

The Government proposes *a new structure* for the elaboration and implementation of environmental goals. A number of national environmental quality goals have been established by Parliament. These environmental quality goals indicate the environmental states that the Government and Parliament have decided must be achieved within one generation. It will be the task of the Government to fix targets that will facilitate achievement of the adopted goals. These targets represent benchmarks for the definition of goals and strategies in various sectors and at various levels.

Within the new structure, Environmental quality goals will constitute the basis of a system of management by objectives and results, which in the Government's view is the most effective way of implementing a broad environmental strategy involving participants in all sectors. This kind of management is based on the establishment of an overall strategy defined by means of objectives, while the ways and means of achieving the objectives are not defined in detail. The environmental quality goals will thus constitute a framework for continued definition and sectoral and geographical adjustment.

2.2. Overall environmental objectives

One starting-point for the formulation of environmental quality goals is provided by the Government's overall environmental policy objectives. In the Statement of Government Policy of September 17, 1996 it is stated that "Sweden should be a driving force and a model for ecological sustainability". *Sustainable development* in the broad sense is defined as community development that "meets the needs of the present without compromising the ability of future generations to meet their own needs".

The Government declared in the 1997 Spring Economic Bill and the 1998 Budget Bill that *ecologically sustainable development* basically involves three horizontal objectives. These objectives, which also cover policy areas other than environment, are: protection of the environment, sustainable supplies and efficient use of energy and other national resources.

The objective relating to *protection of the environment* means that emissions of pollutants must not damage health or exceed nature's capacity for absorbing or breaking them down. Natural substances must be used in such a way as to safeguard natural cycles. Man-made substances that are harmful to health and the environment should not, in the long run, be allowed to occur in the environment. Biological diversity must be preserved and valuable cultural heritage assets protected.

The objective relating to *sustainable supplies* involves guaranteeing the long-term productive capacity of ecosystems. As far as possible, supplies must be based on sustainable utilization of renewable resources. This means that utilization over time

must not exceed the rate at which nature creates new resources and that materials should be recycled. Moreover, there must be wise management of non-renewable resources and we must consistently seek renewable substitutes.

The *efficient resource utilization* objective means that the use of energy and other natural resources can be much more efficient than today. Flows of energy and materials can be limited so as to be compatible with sustainable development. Community planning, the development of technology and investment must therefore also be oriented towards resource-efficient products and processes.

To make it possible to achieve ecologically sustainable development, natural cycles and biological diversity must be preserved, and it must be possible to meet our needs of resources both now and in the future. Development must be ecologically sustainable in the long term.

In relation to the overall objectives defined by the Government for ecologically sustainable development, as described above, the proposed national environmental goals basically represent a description of appropriate environmental quality.

3. Clean air, good water and sustainable forests

3.1. Summary of environmental goals

A report issued by the Swedish Environmental Protection Agency describes about 170 environmental goals of various kinds and aimed at various levels that were formulated during the period since the passing of the Environmental Bills of 1988 and 1991. The report describes the flaws in these goals. For one thing, it points out the goals were not formulated within the framework of a logical structure, undefined terms we used, which make the monitoring and evaluation of the goals difficult, and in many cases it is not possible to monitor achievement of the goals. It was, therefore, necessary to review the existing national environmental goals with a view to systematization, co-ordination and revision. Consequently, the Government instructed the Swedish Environmental Protection Agency to carry out a review and propose new national and cross-sectoral environmental goals.

On the basis of the Swedish Environmental Protection Agency's proposals for new environmental goals and the comments submitted in the consultation process the Government now proposes *15 new national environmental quality goals.* The intention is to achieve these within a generation, i.e. by 2020-2025.

1. **Clean air:** The air must be clean enough not to represent a risk to health or to animals, plants or cultural assets.

2. **High-quality groundwater**: Groundwater must assure a safe and sustainable supply of drinking water, as well as promoting viable habitats for flora and fauna in surface waters.

3. **Sustainable lakes and watercourses**: Lakes and watercourses must be ecologically sustainable and provide varied living environments. Natural productive capacity,

biological diversity, cultural heritage assets and the ecological and water-conserving function of the landscape must be maintained.

4. **Flourishing wetlands:** The ecological and water-conserving function of wetlands in the landscape must be maintained, and valuable wetlands must be preserved for the future.

5. **A balanced marine environment, sustainable coastal areas and archipelagos:** The North Sea and the Baltic Sea must have a sustainable productive capacity, and biological diversity must be preserved. Coasts and archipelagos should be characterized by a high degree of biological diversity and recreational, natural and cultural heritage assets. Industry, recreation and other utilization of the seas, coasts and archipelagos must be compatible with promotion of sustainable development. Especially valuable areas must be protected against exploitation and damaging activities.

6. **No eutrophication:** Nutrient levels in soil and water must not have adverse effects on health, biological diversity or the possibility of using land and water resources.

7. **Natural acidification only:** Soil and water must not be acidified by depositions of pollutants or land use. Acidification must not increase the corrosion rate in technical materials.

8. **Sustainable forests:** The natural productive capacity of forests and forest land must be protected and biological diversity and cultural heritage and recreational assets preserved.

9. **A varied agricultural landscape**: The value of agricultural land for biological production and food production must be protected, and biological diversity and cultural heritage assets must be preserved.

10. **A magnificent mountain landscape:** The traditional biological diversity and the recreational and natural and cultural assets of the mountain region must be preserved as far as possible. All human activity in the mountains must take these assets into account in order to promote sustainable development. Especially valuable areas must be protected against exploitation and damaging activities.

11. **A good urban environment:** Urban areas must provide a good, healthy living environment and contribute to improvement of the regional and global environment. Natural and cultural assets must be protected and developed. Buildings and amenities must be located and designed in accordance with sound environmental principles and in such a way as to promote prudent long-term management of land, water, energy and other natural resources.

12. **A non-toxic environment**: Eventually, the environment must be free from man-made substances and metals that represent a threat to health or biological diversity.

13. **A safe radiation environment:** Health and biological diversity must be protected against the harmful effects of radiation in the external environment.

14. **A protective ozone layer:** The ozone layer must be replenished so as to provide long-term protection against harmful UV radiation.

15. **Limited (influence on) climate change:** The UN Framework Convention on Climate Change provides for stabilization of the content of greenhouse gases in the atmosphere at levels that ensure that anthropogenic activities do not make a harmful impact on the global climate system. This goal must be achieved in such a way and at such a pace that biological diversity is preserved, food production assured and other goals of sustainable development are not jeopardized. Sweden, together with other countries, must assume responsibility for achieving this overall objective.

3.2 Objectives and targets

Clean air

The most harmful airborne pollutants, apart from ozone, are nitrogen oxides, particulates and carcinogenic substances. Nitrogen oxides and particulates affect the respiratory systems. At low levels sensitivity is increased and symptoms strengthened, in particular for asthma sufferers, for example in conjunction with the inhalation of cold air and pollen and in conjunction with exertion.

Airborne and respirable particles also affect health. Particulate substances such as polycyclic aromatic hydrocarbons and certain gaseous hydrocarbons such as ethylene, butadiene are carcinogenic.

Environmental quality goal

The air must be clean enough not to represent a risk to health or to animals, plants or cultural assets. This means that the concentration of airborne pollutants must not exceed established low-risk levels for cancer, hypersensitivity and allergies, and for respiratory diseases. Furthermore, the levels of ground-level ozone must not exceed the limit values established in order to prevent damage to health, animals, plants, cultural heritage assets and materials.

Targets

• Emissions of carcinogenic substances in urban areas should be halved by 2205 with 1991 as the baseline.

• Emissions of volatile organic compounds (VOCs) from the transport sector should be reduced by 60 per cent by 2005.

New targets

Emissions of VOCs other than those from the transport sector should be reduced to harmless levels.

High-quality groundwater

Half of Sweden's water supplies are based on groundwater and half on surface water. Surface water and groundwater are renewable resources which are normally in plentiful supply in Sweden. In some areas, however, groundwater resources are threatened by overexploitation, e.g. in certain recreational areas with permanent housing in coastal areas and in the archipelagos.

The chemical composition of groundwater has gradually changed. Our agricultural methods, means of transport, production processes and consumption of groundwater, and also our energy supply, are responsible for most of these changes. The factors that have the greatest impact on health, and which also affect groundwater and the ecosystems of lakes and watercourses, are eutrophication and acidification.

All groundwater becomes surface water in time. Therefore, the quality requirement for groundwater should basically be that it must meet the need to protect ecosystems and the biological diversity of lakes and watercourses.

Environmental quality goal

Groundwater must provide safe and sustainable drinking water supplies and contribute to suitable habitats for plants and animals in lakes and watercourses.

This means that the quality of groundwater must not be affected by human activities such as land use, gravel extraction, discharges of pollutants etc. Moreover, the quality of leaking groundwater must be conducive to a good environment for plants and animals in lakes and watercourses. In addition, consumption or other anthropogenic activities must not lower the water table so as to jeopardize supplies and quality.

Targets

- Groundwater quality must not be impaired by land development or other activities.
- Such activities must not be allowed to affect groundwater volume.
- All landfill sites should have achieved a uniform standard and should meet stringent environmental requirements by 2008.

New targets

- The correlation between the environmental quality goal for surface water and health protection should be investigated.

Sustainable lakes and watercourses

Sweden is one of the countries with the largest number of lakes in the world; these range from transparent oligotrophic mountain lakes to shallow high-nutrient lakes in flat country. They thus provide a great variety of habitats and assure biological diversity.

In the 19th century and the beginning of the 20th century the surfaces of many lakes were lowered in order to create more agricultural land. The lowering of lake surfaces usually had adverse affects on lake and shore species. In most large water-

courses the discharge has been regulated for hydroelectric power generation. These measures have destroyed many of the genetically unique salmon and sea trout strains that were associated with individual watercourses. In harnessed watercourses the natural water regime with a large spring flow and a low discharge during the winter has been radically altered and regularized. There is no free-flowing water and none of the plants and animals that are typical of such environments occur. The water levels in reservoirs vary greatly. Naturally, this completely alters the composition of the flora and fauna of the shores and bottoms.

Environmental quality goal

Lakes and watercourses must be ecologically sustainable, and a variety of habitats must be preserved. The natural productive capacity, biological diversity, cultural heritage assets and ecological and water-conserving function must be preserved at the same time as recreational assets are maintained.

This means that the load of nutrients and pollutants must not impair the conditions for biological diversity. Non-indigenous species and genetically modified organisms (GMOs) that may jeopardize biological diversity must not be introduced. The great value of lakes, and shores and watercourses as sources of recreation - scenic beauty, cultural heritage, bathing and outdoor activities - must be protected to the extent possible. Conditions must be conducive to viable stocks of fish and other species that live in or are directly dependent on lakes and watercourses.

Targets

• It must be possible to use lakes and watercourses as sources of water supply.

• Biotopes that play an important part for the biological diversity of lakes and watercourses and in their immediate surroundings should be restored wherever possible.

• Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.

New targets

• Migratory fish species must be able to migrate through watercourses in their natural area of distribution.

• Biotopes that play an important part for the biological diversity of affected lakes and watercourses and their immediate surroundings should be restored wherever possible.

• The targets for the safeguarding of the cultural value of lakes and watercourses should be reviewed.

Flourishing wetlands

This goal reflects the fact that wetlands generally represent very important biotopes that are valuable both for species associated with these environments and species associated with surrounding ecosystems, as well as for resting migratory birds.

Sweden has one of the highest proportions of wetlands in the world. A characteristic feature of wetlands is the great variety of species, and certain types of wetlands

are among the most productive environments known to man. Wetlands cover about 9 per cent of Sweden's surface area. 70 per cent of the total wetland area consists of various types of mires (bogs, fens and mixed mires), and the rest consists of swamp, forest, shore environments and other types of wetlands. About 3 per cent of the mire area is protected in natural reserves or national parks. The biotope protection provisions of the Nature Conservation Act apply also to certain types of wetlands.

Environmental quality goal

The ecological and water-regulating function of wetlands in the landscape must be preserved, and valuable wetlands must be preserved for the future.

This means that there must be different kinds of wetlands with well-preserved biological diversity throughout the country. Moreover, wetlands must be protected as far as possible against drainage, peat extraction, road-building, and other development. Peat extraction must take place on appropriate sites, taking into account the environment and biological diversity. Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced. Wetlands' recreational assets and historical sites must be preserved.

Targets

• Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.

New targets

• At least 50 per cent of the items in the Swedish Environmental Protection Agency's mire protection plan must be protected in nature reserves or under agreements or by other means.

• The ban on ditch drainage must be extended.

A balanced marine environment, sustainable coastal areas and archipelagos

Sweden's seas and lake archipelagos are unique. Similar archipelagos occur in few other places, e.g. in Finland, Canada and outside Scotland. A wide range of ecosystems and plant and animal biotopes provide conditions for a variety of land and water species that occurs in few other landscapes. The natural beauty, the distinctive cultural heritage and the variety of archipelago landscapes also make them very valuable for outdoor activities and recreation. Most of Sweden's archipelagos have been settled for a long time, which is essential for a flourishing archipelago environment. Active agriculture and fishing are a feature of the cultural environment. There are several threats hanging over the sensitive water environment in Sweden's archipelagos. Eutrophication is the most serious threat to the environment. The occurrence of persistent organic substances and abnormally high levels of heavy metals in the water, sediments and organisms represents a major environmental problem. In the Government's view, the most valuable archipelago shallow-water areas should be given greater protection, since these areas represent very important marine biotopes.

Some important marine habitats that are particularly susceptible to disruption are seaweed communities, eelgrass communities, hard bottoms and shallow-water soft

bottoms. Sweden's coastal zone is a zone where conflicting interests compete for the right of use. It is therefore important to take into account the importance of shallow-water bays to marine life when development of the coastal zone is being considered. Shallow-water coastal areas with soft bottoms, eelgrass communities and mussel banks are very productive and important as feeding and breeding grounds for fish and invertebrates. It is therefore very important for sustainable fisheries that these breeding areas should be protected.

Environmental quality goal

The productive capacity of the North Sea and the Baltic Sea must be sustainable and biological diversity must be preserved. The coasts and archipelagos must have a high degree of biological diversity, recreational assets and natural and cultural assets. Industries, recreation and other uses of the sea, coasts and archipelagos must be compatible with sustainable development. Especially valuable areas must be protected against disruptions of various kinds.

This means that the impact of nutrients, pollutants and physical damage must not be allowed to affect the conditions for biological diversity and the productive capacity of the marine environment. Furthermore, fishing, shipping and other uses of seas and water areas, as well as settlements and other development of coastal and archipelago areas, must take into account the productive capacity of water areas, biological diversity, natural and cultural assets and recreational assets. Unique marine biotopes must be protected. Aquatic culture, agriculture, forestry and tourism must be carried on with due regard for the environment, cultural environment and biological diversity, thus helping to preserve the natural beauty of the archipelagos' landscapes, cultural assets and variety. Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced. Massive accumulations of phytoplankton due to anthropogenic activity should not occur. The area of distribution and number of plant and animal species must not diminish as a result of anthropogenic activity. The seaweed communities in the North Sea and the Baltic Sea archipelagos must be restored to their former depth. Lack of oxygen due to eutrophication must only be allowed to occur very rarely. The noise levels from boat traffic must be acceptably low. Natural and cultural environments, recreation needs and the landscape must be taken into account in connection with the location of wind power stations.

Targets

• Physical modification of shallow sea areas that are important for the reproduction and growth of fish and invertebrate larvae and effects due to eutrophication and pollutants should virtually cease.

• Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.

• Incidental catches of small cetaceans should be reduced in accordance with the guidelines adopted under the Agreement on Small Cetaceans in the Baltic and North Sea.

• Oil spills should cease as soon as possible.

• Shipping should operate in such a way that noise, air and water pollution and other disruptions are minimized.

• Environmental standards for leisure boat engines will be imposed.

• The Swedish Environmental Protection Agency should seek to ensure that the archipelago areas listed in the National Parks Plan are designated national parks wherever possible.

New targets

• The connection between eutrophication, biological diversity and other biological effects should be clarified.

• Targets should be set for the quantification of environmental effects.

No eutrophication

Eutrophication is caused by nitrogen and phosphorus compounds, i.e. nutrients released to land and water directly or indirectly through leakage or deposition. Releases of nutrients are both essential for biological production and, depending on the volumes involved, a potential threat to the environment.

Sweden accounts for about 6 percent of the total waterborne nitrogen load in the open part of the Baltic Sea south of Åland. However, the effects of domestic emissions of nitrogen and phosphorus dominate along Sweden's coasts. These emissions cause, in particular, eutrophication problems in coastal waters with a low turnover rate, for example in archipelago areas. Airborne nitrogen also accounts for a large share of the total load on the sea.

Environmental quality goal

Nutrient levels in soil and water must not cause adverse effects on health, the conditions for biological diversity or the possibility of varied land and water use.

This means that measures must be taken to combat an unnatural increase of nutrient levels in the environment. Groundwater must not contribute to increased eutrophication of surface water. Lakes and watercourses in forest and mountain areas must remain in their natural state. The nutrient status of lakes and watercourses in agricultural areas should be natural, i.e. nutrient-rich or moderately nutrient-rich. Nutrient levels in coastal and sea areas should be broadly similar to those that existed in the 1940s. Releases of nutrients into the sea must not cause eutrophication. The state of forest and agricultural land should be such as to contribute to preservation of the natural distribution of species.

Targets

• Releases of nutrients to coastal waters, lakes and watercourses and to groundwater should in the long term not exceed levels that cause an adverse impact on health, biological diversity or the possibility of versatile use.

• Discharges of nitrogen from Sweden to the Baltic Sea south of the Sea of Åland must be reduced by 40 per cent compared with the baseline year 1995.

• Protective areas should be established for water catchments and their most important areas of influence.

Natural acidification only

Today, acid deposition cause substantial damage to soil, lakes and watercourses and groundwater. Apart from the effects on the biology of forest land and lakes, this deposition damage technical materials and buildings. All this also gives rise to substantial costs.

Acid depositions are accumulated in nature and cause problems that can take a long time to repair. Even if acid depositions were to cease altogether, it would take at least 50-100 years for the soil to recover completely. The vulnerability of lakes and ecosystems varies between different regions in Sweden and is particularly great in western Götaland.

In Sweden, coniferous forest land, lakes and watercourses are affected most by acidification. It is estimated that about 20 percent of forest land is damaged by acidification to such an extent that this has caused major changes in the vegetation and there is a real risk of forest damage in future. About 20 percent of the lakes are so acidified that 10-20 percent of all species have disappeared. Acidifying substances, together with other airborne pollutants, have also caused great damage to historical monuments and buildings and have adverse effects on human health.

Environmental quality goal

The acidifying effects of acid depositions and land use must not exceed the limits that can be tolerated by land and water. Depositions of acidifying substances must not increase the corrosion rate of technical materials.

This means that unnatural acidification of the soil must be combated in order to preserve natural productive capacity and biological diversity. Sweden should endeavour to ensure that depositions of acidifying substances in the long term remain below the critical load for soil and water. Furthermore, airborne levels should be lower than 5 micrograms of sulphur dioxide/m^3 and 20 micrograms of nitrogen dioxide/m^3 (annual mean) in order to protect technical materials.

Targets

- The Community acidification strategy will apply:
  - the number of ecosystems where the critical load is exceeded must be reduced by 50 per cent in Europe by 2010 compared with the baseline year 1990
  - Sweden's emissions of sulphur dioxides into the air must be reduced by 25 per cent by 2010 compared with the baseline year 1995
- Emissions of nitrogen oxides from traffic must be reduced by 40 per cent by 2005 compared with the baseline year 1995.

New targets

- Emissions of ammonia must continue to be reduced.
- A special investigator has been instructed to present proposals for a joint project aimed at promoting cost-efficient development of production, distribution and use of biogas in motor vehicles.

Sustainable forests

Most of Sweden's forests are part of the extensive coniferous forest belt that extends round the northern hemisphere. A smaller proportion consists of deciduous forests similar to those in the more southerly parts of Europe. Despite the great extent of the coniferous forest belt, it only occurs in a small number of countries. The proportion of remaining naturally regenerated forest in Russia and Canada, for example, is larger than in Sweden, although the forests are being harvested much more rapidly in those countries and little forest conservation takes place.

The coniferous forests and their fauna and flora are an equally indispensable element of the global natural heritage as the tropical rain forests. The Swedish forests generally have less species than tropical rain forests, but they are nevertheless very rich in lichen and moss species. Therefore, Sweden has a special international responsibility in this area.

The forest landscape is affected both by forestry and other use of forests and by various airborne pollutants from Sweden and other countries. Today, about 95 percent of the productive forest land is used for forestry. Many valuable natural forests and other valuable biotopes are threatened by felling. Naturally regenerated forests have been replaced by high-production forests and forest roads have left their mark on the unspoiled landscape. Furthermore, the amount of deadwood and old-growth forest has diminished. The number of endangered species in forests is about 1,800. More than 30 percent of these depend on deadwood or old trees.

Forests are an important source of renewable raw materials and are therefore of increasing importance to ecologically sustainable development. Increased consumption of biofuels based on forest raw materials are important, for example, as a means of reducing net emissions of carbon dioxide and thus achieve the targets that have been set up with respect to the climate change. The quantities of forest raw materials that are extracted must also be limited if production is to be sustainable and if biological diversity is to be preserved. This makes it even more necessary to manage and use resources efficiently, e.g. by increased reuse and recycling of fibre raw material.

The National Board of Forestry has been instructed by the Government to evaluate the 1993 Forest Policy Resolution. The evaluation of the effects of forestry on biological diversity was carried out in co-operation with the Swedish Environmental Protection Agency. These agencies reported their findings to the Government in January, 1998. The Government intends to present the findings of the evaluation and its position on the agencies' proposals to Parliament in a Bill later this year.

Environmental quality goal

Forests and forest land must be protected for the purpose of biological production at the same time as biological diversity and cultural heritage and recreational assets are preserved.

This means that the natural productive capacity of forest land must be preserved. The natural functions and processes of forest ecosystems must be maintained. Domestic flora and fauna must survive in natural conditions and in viable stocks. Endangered species and landscape types must be preserved. Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must

not be introduced. Historical monuments and cultural environments must be protected. The value of forests for recreation and outdoor activities must be recognized.

Targets

• Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.

• A further 275,000 hectares of forest land should be protected in nature reserves, as biotope items, under agreements or by other means.

New targets

• Measurable targets and parameters for preservation of forest biological diversity will be developed by the relevant sectoral authorities.

• The National Property Board's forests will undergo environmental certification.

A varied agricultural landscape

Modern agricultural technology and livestock farming have in a short space of time changed the farming landscape drastically. The landscape is also affected by the abandonment of agricultural holdings and reforestation of agricultural land. Arable land has diminished by a quarter, hay meadows have almost disappeared and grazing land has been reduced by half of the area in the 1950s. As a result, the habitats of many species have diminished or disappeared. The number of endangered species in farming country amounts to almost 2,000.

The new environmental goal for farming land specifies target environmental quality for farming land as a whole. Therefore, the goal relates to the environmental pressure caused not only by agriculture but also by other activities. The food policy goal adopted by Parliament, which includes an environmental quality goal for agriculture, will remain unchanged. The continuing evaluation of the food policy being carried out by the Swedish Board of Agriculture, the National Heritage Board and the Swedish Environmental Protection Agency will provide data for future revisions of the goal, should these prove necessary. The ongoing discussion on continued reform of the Common Agricultural Policy (CAP) is also a process that may lead to changes. The Government states its position on the reform of CAP in "Guidelines for Sweden's Contribution to EU Agricultural and Food Policies".

Environmental quality goal

The value of agricultural landscape and land must be protected for biological and food production at the same time as biological diversity and cultural heritage assets are preserved and strengthened.

This means that the nutrient status of agricultural land must be balanced, with a good structure and humus content and pollutant levels that are sufficiently low not to threaten the functioning of ecosystems and human health. Furthermore, agricultural land must be cultivated in such a way as to minimize adverse environmental effects and promote biological diversity. The genetic variation of domestic flora and fauna must be preserved. Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced. Biological and

cultural heritage assets in the agricultural landscape, which are the result of traditional methods applied for a long period of time, must be preserved or improved. Endangered species and nature types must be protected and preserved.

Targets

• The area of organically farmed land should total 10 per cent by 2000.

• The function of agricultural land as a natural resource for supplies of food and biological raw materials, as well as providing the conditions for preservation of natural and cultural heritage assets associated with open landscapes, should be maintained.

• Meadows and wooded pastures, which are valuable for natural and cultural heritage assets, should be appropriately managed.

• The ecological and hydrological functions must be restored by the gradual establishment of wetlands and ponds to agricultural land that was drained in conjunction with extensive structural rationalization.

• Suitable conditions must be created for building up viable populations of endangered species, local breeds and strains.

New targets

• Preservation and strengthening of endangered animal and plant species in agricultural landscapes.

• Preservation of cultural heritage assets.

A magnificent mountain landscape

The mountains in the north are among Sweden's and Europe's most unspoiled environments and have very substantial natural and recreational value even by international comparisons. People have lived in these mountains for thousands of years, and they therefore have significant cultural heritage assets. Their ecosystems comprise relatively few species and the climate is characterized by cold winters and short summers. The productive capacity of land and water ecosystems is generally low and the sensitivity to external disruptions is often high. Basically, the whole mountain region is used for reindeer husbandry. The mountains are also an attractive area for recreation and outdoor life in various forms. The pressure of reindeer husbandry and cross-country, off-road driving has increased in recent years. The mountains' environmental quality has gradually deteriorated over a long period, and certain areas display serious damage. Noise from motor and air traffic has also increased substantially and areas with low noise levels are now rare.

Environmental quality goal

A large share of the mountain region's original biological diversity and recreational, natural and cultural heritage assets must be preserved. These assets must be respected in connection with all activities in the mountains in order to promote sustainable development. Particularly valuable areas must be protected against disruptions.

The majestic mountain scenery with its pastures and extensive continuous open spaces must be preserved. The biological diversity of the mountain region must be preserved. Non-indigenous species and genetically modified organisms that may jeopardize biological diversity must not be introduced. The specific mountain cultural heritage, particularly the Sami heritage, must be preserved and developed. Reindeer husbandry, tourism, hunting, fishing and other development must be compatible with nature's sustainable productive capacity, biological diversity, and natural and heritage and recreational assets. Low noise levels must be aimed for.

Targets

• Endangered species should be given a chance to spread to new locations in their natural areas of distribution so as to ensure viable populations.

• Motor and air traffic in the mountains should be such as to minimize noise, air pollution and other disruptions.

• The damage caused by driving on areas without a snow cover must be reduced to a negligible level.

New targets

• Fishing in mountain lakes and watercourses should be sufficiently extensive to allow the reproduction and regrowth of local fish stocks.

• The Sami natural and cultural heritage must be preserved.

• Regional targets for the extent of lichen cover.

A good urban environment

Our cultural heritage enriches our living environment, tells us about the development of our culture and strengthens the identity of the locality and its inhabitants. It is therefore important that this heritage should be preserved and that the continuity of urban environments should not be broken.

Closeness to parks and nature areas is also very important for the quality of life in urban areas. Parks and open spaces help to improve the quality of the air and the local climate. Open spaces in urban areas also help to clean polluted surface water and should therefore be protected and preserved at the same time as every opportunity should be taken to create new attractive areas.

The biological diversity of flora and fauna in urban areas is often surprisingly rich. However, this variety is greatly affected if the area covered by open spaces diminishes and the ecological links between these areas are cut off. It is therefore important to protect open spaces in an integrated fashion and to preserve continuous park and nature areas, as well as migratory corridors between them.

Transport is crucial to the functioning and development of society. At the same time, traffic is one of the main causes of many of today's environmental problems in urban areas. Today, traffic dominates our cities and towns. The environmental problems caused by traffic, e.g. airborne pollution, noise, interference, barriers and discomfort, must be addressed.

The purpose of the Government's proposals is to ensure that energy, water and other natural resources are used efficiently and economically and that the main energy sources are renewable.

The large quantities of waste generated in urban areas also represent a major problem. Nevertheless, there are good prospects of developing efficient recycling and waste disposal systems. Towns depend on the surrounding countryside for their water supply, as a market for their waste products etc. It must be possible to intensify the recycling of waste products in closed cycles. This necessitates better pre-separation and elimination of toxic substances.

Environmental quality goal

Open spaces must represent a good, healthy living environment, and they must contribute to a good regional and global environment. Natural and cultural heritage assets must be preserved and developed. Buildings must be located and designed in an environmentally appropriate fashion and in such a way as to promote the sustainable management of land, water, energy and other natural resources.

This means that urban areas should provide the inhabitants with beauty and comfort and should offer a range of housing, workplaces, services and culture that will offer everybody the possibility of a rich and rewarding life, while reducing the volume of day-to-day transports. The cultural, historical and architectural heritage in the form of buildings, urban environments and places and landscapes of special value must be preserved and developed. Areas of unspoiled nature and open spaces close to built-up areas must be protected so as to satisfy the need of play, recreation, local agriculture and a healthy local climate. Biological diversity must be preserved and developed.

Transport and transport facilities should be designed in such a way as to limit the harmful impact on the urban or natural environment and so that they do not constitute health and safety risks or otherwise disrupt the environment. High-quality environmentally sound public transport systems should be available, and there should be good facilities for pedestrian and cycle traffic. People must not be exposed to harmful air pollution, noise, harmful radon levels or other unacceptable risks to health and safety. Land and water areas should be free from toxic and harmful substances and other pollutants.

Energy, water and other natural resources must be used efficiently and economically, and the main sources should be renewable. Gravel must only be used where appropriate substitutes are not available. Gravel deposits that are of great value for the water supply and the natural and agricultural landscape must be preserved. The quantities and hazardousness of waste must be reduced. Waste and residues must be pre-separated by categories and recycled on a co-operative basis between the town and its surroundings.

Targets

• Noise levels in urban areas must be reduced so that they do not exceed the existing guideline values.

• Municipal plans must take into account the need of open spaces in urban and surrounding areas.

• Cultural, historical and aesthetic assets must be protected and enhanced.

• The total quantities of landfilled waste (excluding mining wastes) should fall by 50-70 per cent by 2005 compared with the baseline year 1994.

• The use of gravel must be minimized.

New targets

• Elaboration of programmes and plans for traffic systems (in the three largest cities) which specify how improvements are to be made in public transport systems and motor traffic will be reduced by 2010.

• Elaboration of regional and local programmes for the rehabilitation by 2020 of land and water areas where toxic substances and other pollutants have been stored.

A non-toxic environment

Modern society is greatly dependent on large quantities of chemicals. Today, over 30,000 different chemical substances are in use all over the world. Hazardous chemical substances can enter the environment by being released from the manufacturing industry. However, it is more common for chemicals to be included in products that are circulated all over the world by trade. These substances then leak out into the environment when the products are used or disposed of. In the environment, they are circulated even further afield by winds, currents and other natural processes.

Many substances are persistent, and some can also be accumulated and circulated in the environment in unpredictable ways. It may be mentioned, for example, that some of the most notorious environmental toxins today occur in high concentrations in mammals in the polar regions far from the places where the substances are produced and used.

Today, the scientific data concerning many substances that are harmful to health and the environment is inadequate to allow the formulation of quantitative environmental quality goals. Furthermore, there are unknown synergies between different substances. We are now becoming increasingly aware of previously unknown effects such as disruption of the hormone balance. A large number of potentially hazardous substances that are generated by anthropogenic activities probably exist in the environment, although they have not yet been identified. Unexplained biological effects occur in the environment and in man, and one of the reasons for this may be the circulation of chemicals. Examples of such effects are elk diseases, the death of salmon fry in the Baltic Sea and the increase in infant allergies.

The conclusion that may be drawn from this is that hazardous man-made substances should not be accumulated in the environment. Preventing this is the only reliable way of avoiding adverse health and environmental effects; such action is consistent with the precautionary principle, according to which the absence of conducive scientific evidence must not, where there is a risk of serious damage, be used as an excuse for postponing cost-effective measures.

Environmental quality goal

The environment must be free from man-made substances and metals that represent a threat to health or biological diversity.

This means that the levels of substances that occur naturally in the environment must be close to background levels, while the levels of man-made substances must be

close to zero. This goal is based on the Esbjerg Declaration, according to which discharges of hazardous substances into the North Sea must cease by 2020.

Targets

• The pollution of the Baltic Sea, and its catchment area, and the North Sea must be terminated by a gradual process during which discharges and leakage of hazardous substances must be reduced gradually to zero by 2020.

A safe radiation environment

Cancer and genetic damage are the most serious threats to human health on account of radiation.

Under the Radiation Protection Act, people, animals and the environment are to be protected against harmful radiation. The regulations issued by the Swedish Radiation Protection Institute on dose limits due to radiation activities specify the maximum exposure doses. Separate target values can be specified for various activities. One example is exposure from nuclear power stations, which will be limited to 0.1 millisievert per year. The rules also cover exports and disposal of materials from nuclear installations and radioactive wastes generated by other activities.

The Nuclear Technology Act lays down that safety in nuclear installations must be maintained by measures designed to prevent events that can lead to accidents involving radioactive discharges. The Nuclear Power Inspectorate is responsible for ensuring that such measures are taken.

Environmental quality goal

Human health and biological diversity must be protected against the harmful effects of radiation in the external environment.

This means that radiation doses must be as low as reasonably achievable (the ALARA principle). The annual limit of intake (effective dose) for the general public must be limited to 1 millisievert per year. Serious incidents in nuclear installations must be prevented. If an incident occurs, the spread of radiation to surrounding areas must be prevented or controlled.

A protective ozone layer

In accordance with this environmental quality goal, Sweden will commit itself to measures that ensure that levels of chlorine, bromine and other ozone-depleting substances in the stratosphere do not exceed natural levels. The threat to health and biological life presented by depletion of the ozone layer justifies an environmental quality goal involving termination of global emissions of ozone-depleting substances.

Due to emissions of ozone-depleting substances the global quantity of ozone in the stratosphere has been reduced by 5 percent in the last 13 years and by about 10 percent in the last 25 years. Depletion of the ozone layer varies at different latitudes. It is least at the equator and greatest at the poles. More than 70 percent of the normal ozone layer has disappeared in large areas of Antarctica.

Today, international agreements under the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol limit the use of ozone-depleting substances. The levels of ozone-depleting substances in the stratosphere are now increasing at a slower rate than before. They are expected to peak at the beginning of the next century and then diminish slowly. The global use of HCFCs and other substitutes for CFCs are increasing fast, however. Consequently, the levels of HCFCs in the atmosphere are expected to continue to increase.

Environmental quality goal

The ozone layer must be replenished so that it gradually provides protection against harmful UV radiation. Sweden should urge that levels of chlorine, bromine and ozone-depleting substances in the stratosphere must not exceed natural levels.

Target

• The use of ozone-depleting substances should be virtually phased out within a generation.

New targets

• The use of HCFCs should eventually be discontinued.

• The effects of air traffic on the ozone layer should be studied in greater depth.

Limited (influence on) climate change

The most important greenhouse gases are carbon dioxide, methane, nitrous dioxide and persistent hydrocarbons and sulphur hexafluoride. The relative effects of emissions can be expressed in GWP (Global Warming Potential) for a given period, usually 20, 100 or 500 years. This makes it possible to express greenhouse gases as carbon dioxide equivalents and to aggregate them so as to obtain a measure of the overall greenhouse effect. Over a hundred-year period carbon dioxide accounts for about 80 percent of all emissions in Sweden. This is somewhat higher than the OECD average. In many developed countries, carbon dioxide emissions account for less than 50 percent of all emissions. The main determining factor for these emissions is the quantity of methane emissions.

Global emissions of carbon dioxide are attributable mainly to combustion of fossil fuels in the transport sector, the energy sector and manufacturing industries. Emissions in Sweden have been reduced by almost one-half since 1970. The trend in most other countries is the opposite, and global emissions have increased continuously, although at a slower rate, during the 1990s. Sweden's emissions of carbon dioxide per capita in relation to GDP are now among the lowest in the OECD countries. On the other hand, energy consumption per capita is among the highest, which may be attributed to our energy-intensive basic industries and our cold climate.

Emissions of methane derive from the dumping of organic wastes and from animal management (ruminants and manure), from coal mines and leakage from natural gas pipes and paddies. Extraction of oil and natural gas also contributes to emissions. The principle sources in Sweden are municipal landfill sites and agriculture. Our knowledge of emissions of nitrous dioxide is insufficient. Emissions from the storage and use of manure, fuel combustion and the manufacture of artificial fertilizers are

among the most important global sources. Combustion is the main source of emissions in Sweden.

Fluorocarbons have a number of applications, e.g. as cooling agents, blowing agents for the manufacture of certain plastics and, to some extent, fire extinguishing agents.

The use of sulphur hexafluoride (SF_6) has so far mainly been confined to the electricity sector, where it is used as an insulating gas in substations and an insulating and cooling agent in transformers.

The statistics on emissions of greenhouses gases other than carbon dioxide are less reliable.

Emissions of greenhouse gases are partly compensated by the absorption of carbon dioxide in forest ecosystems, i.e. carbon sinks. During the 1990s, growth in Swedish forests has been considerably larger than the volume of cut timber. Consequently, a fixed substantial timber reserve in the form of carbon dioxide is being built up. Substantial quantities of carbon are also fixed in soil and sediments. Not enough is known, however, about the size of, and changes in, these reserves of carbon and therefore developments in this area should be followed closely.

Globally, the situation is different, and deforestation in the tropics is a source of accumulation of carbon dioxide in the atmosphere.

Environmental quality goal

The content of greenhouse gases in the atmosphere must, in accordance with the UN Framework Convention on Climate Change, be stabilized at a level at which human activities will not have a harmful effect on climate systems. This goal is to be attained in such a way and at such a rate that biological diversity is preserved, food production is assured and other sustainable development goals are not jeopardized. Together with other countries, Sweden is responsible for achieving these global objectives.

This means that measures must concentrate on stabilizing the levels of carbon dioxide in the atmosphere at less than 550 ppm and ensuring that the levels of other greenhouse gases in the atmosphere do not increase. Attainment of this goal depends crucially on the measures taken by all countries.

Targets

• A Climate Committee will be set up. On the basis of the Kyoto Climate Conference and the climate objectives adopted by Parliament the Committee will propose targets and a programme of action.

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4. The division of responsibilities for implementation and monitoring of the goals

The Government intends to present annual reports on progress towards achievement of environmental goals to Parliament and in greater depth once during each term. The first detailed report will be presented during the second half of the next term.

The Government intends to appoint a parliamentary committee whose task will be, in co-operation with the competent authorities, to make a comprehensive review of

the targets, strategies and measures that are necessary to ensure that the proposed environmental goals will be achieved within a generation in a sustainable and effective manner.

The Swedish Environmental Protection Agency is responsible for the continuous monitoring of goal achievement and will co-ordinate the work on achievement of the environmental goals. The Board should in this connection also make balanced assessments together with the authorities concerned of cost-effectiveness and other criteria necessary to the achievement of national environmental quality goals.

The sectoral authorities will be responsible, together with the Swedish Environmental Protection Agency and other authorities, for proposing, on the basis of the national environmental quality goals, measures to develop and define these goals in greater detail in the respective sectors.

County administrative boards and certain other regional bodies will have corresponding responsibility in their areas of responsibility and regions. The municipalities will be responsible, together with the inhabitants of the different districts, associations and other local bodies, for developing and monitoring achievement of the national environmental quality goals in their planning and for setting local goals and programmes of action on this basis.

The Swedish Environmental Protection Agency, the other authorities and the county administrative boards will fulfil their tasks on a continuous basis using the environmental goals adopted from time to time by Parliament and the Government as their point of departure.

5. Efficient use of resources in an ecocycle society

The earth's resources have been used for a long time without disrupting nature's own cycles other than locally or marginally. In the last few centuries population growth and the increasing consumption of materials and energy per capita have assumed such proportions that important ecosystems are being threatened. The rich world has a special responsibility. Less than one-fifth of the world's population accounts for the lion's share of consumption of the earth's natural resources and thus for the environmental impact caused by this consumption. To achieve global sustainable development, the available resources must be used more efficiently. Conversion to ecologically sustainable development in the space of one to two generations cannot be achieved by a single long-term programme of action, but the policy orientation can be established and the magnitude of the task assessed. Having established its policy orientation and adopted the ambition to set a good example, Sweden can now take the first step.

The economy is becoming increasingly global. Raw materials and products are increasingly sold on a global market. Sweden's economy is closely linked to the economies of the other EU Member States, which in turn are increasingly linked to economies in other parts of the world. Environmental pollution knows no national boundaries. Conversion to ecologically sustainable development on a wide front can help to create growth and employment and thus promote the conditions for growth even in vulnerable regions.

Efficient use of materials and energy is essential to achievement of the environmental quality goals (see section 3). The extraction and use of natural resources can involve major disruption of the environment, high energy consumption and emissions of hazardous substances both at the extraction, transport, processing and waste stages.

A concept that is mentioned increasingly often in the international debate is Factor 10, which means that the use of resources, not only fossil fuels, but all energy and all materials, must on average become ten times more efficient within one or two generations. Many scientists, industrialists and politicians consider such a development necessary if we are to meet the challenge of population growth and reduce pollution without effects to prosperity. Factor 10 gives a general indication of the degree of increased efficiency that is required, rather than being a precise calculation of the targets involved. Factor 10 may be regarded as a compass, an instrument that will stimulate the necessary new thinking. More work needs to be done, both nationally and internationally, on specification and development of Factor 10. Work is being done in international fora by the OECD, the Nordic Council and the UN Commission for Sustainable Development. Sweden should take an active part in this work.

The Government proposes the following guidelines for the work of achieving a more efficient and sustainable use of resources:

- Materials and energy must be used as efficiently as possible, taking into account all available resource assets.
- The use of fossil fuels should be kept at a low level. The total consumption of biomass must not deplete biological diversity.
- The majority of products must be material-and-energy efficient and upgradable, and their content of materials or energy must be reusable or recyclable.

6. A chemicals policy for the 21st century

6.1 A new approach to chemicals policy is necessary

More than a decade has passed since the Chemical Products Act entered into force and the National Chemicals Inspectorate was set up. Great progress has been made in the work of reducing the risks associated with the use of chemicals. This success has been achieved, inter alia, by providing better product information about risks and safety precautions, by phasing out especially dangerous chemicals and by introducing an approval system for the use of pesticides. Better knowledge has been acquired about the properties of chemicals, not least from the environmental point of view. These successes are due to a combination of the work done by the agencies concerned and the industry's own efforts. The industry has achieved significant results, including those within the framework of "Responsibility and Care", which is the chemical industry's joint programme of action for health, safety and environmental matters. A large majority of Swedish enterprises have joined this programme, which enjoys broad international support.

Despite this progress, people are still injured at workplaces and in the home as a result of the careless handling of hazardous chemicals. Improper handling of chemical products can still trigger environmental disasters. This was recently illustrated by

the Halland Ridge tunnel building project. Nevertheless, it is not the risk of serious accidents that dominates the risk scenario for future chemicals policy. Rather, it is the more intangible and diffuse dissemination in the environment of a very large number of chemical substances, whose health and environmental affects are little known, that must be addressed. The Chemicals Committee notes in its report that it is difficult to say whether the risks today are greater or less than those 10-15 years ago. Some risks have diminished, while new ones have emerged. However, the risks today are evidently more complex and difficult to assess than before. The problems associated with chemicals are increasingly of a transboundary nature, and the role of products as disseminators of chemicals is increasing at the same rate as the expansion of world trade.

Ecologically sustainable development is threatened by certain organic, persistent and bioaccumulable substances. Such substances tend to spread over the world in a way that is unpredictable and impossible to prevent. Two such substances are PCT and DDT. In future, substances that are in general use today, such as brominated flame retardants, may cause major problems. New findings on the hormone-disrupting effects of certain chemicals at very low doses and their effects on learning, behaviour etc. indicate, moreover, that the possibility of new unpleasant surprises cannot be excluded.

However, implementation of the Esbjerg Declaration will necessitate implementation of a more stringent chemicals policy. One of the objectives of the Declaration is that discharges of hazardous substances into the North Sea must cease by 2020. The final objective is for the levels of man-made hazardous substances in the environment to be close to zero and for the levels of natural substances to be similar to those occurring in nature.

In order to speed up the work and meet the new requirements imposed by the objectives set by the Esbjerg Declaration, a new approach to chemicals policy must be applied. In the Government's view, it is necessary to find a method that is aimed directly at the most dangerous substances and that disregards the fact that our knowledge of the behaviour of chemicals is insufficient. Faster and more vigorous progress can be made if, as the Chemicals Committee proposes, substances are identified which in view of their intrinsic characteristics should not normally occur in products and processes. This approach should be directed at organic, man-made substances that are bioaccumulable and persistent, at cadmium, lead and mercury, and at substances that are known to be harmful.

At the same time, work on the familiar issues must be intensified. The broadly successful efforts devoted to reducing the risks of chemicals during the last few decades, and the increase in our knowledge in this field, form a platform for the fulfilment of our task. In addition, Sweden's accession to the EU has partly opened up new possibilities, even though our efforts to reduce the risks inherent in chemicals has always focused on international co-operation. New possibilities are also opened by the quality and environmental management systems (EMAS, ISO 9000 and ISO 14000) that are being introduced in companies all over the world, not least in Sweden. Consequently, it is important that we develop the existing instruments and make them more stringent.

6.2. Further guidelines for a chemicals policy

As a step towards achieving the objective of an end to the discharges, emissions and losses of hazardous substances into the Baltic Sea, its catchment area and the North Sea by the year 2020, the following guidelines should be observed:

- New products introduced onto the market are largely
  - free from man-made organic substances that are persistent and liable to bioaccumulate, and from substances that give rise to such substances and
  - free from man-made substances that are carcinogenic, mutagenic and endocrine disruptive - including those which have adverse effects on the reproductive system.
- New products introduced onto the market are largely free from mercury, cadmium, lead and their compounds.
- Metals are used in such a way that they are not released into the environment to a degree that causes harm to the environment or human health.
- Man-made organic substances that are persistent and bioaccumulative occur in production processes only if the producer can show that health and the environment will not be harmed. Permits and terms of the Environmental Code are devised in such a way as to guarantee this guideline.

The guidelines should provide guidance for manufacturers' product development and serve as a goal for their chemicals strategies. Considerable efforts are already being made today to eliminate hazardous substances.

The Government intends to set up a Committee to study how to define the properties and effects on which the guidelines are based, and to analyse possible further need for instruments of control, such as licensing reviews and prohibitions in order to ensure stricter control of the substances included in the guidelines, and in such cases make recommendations on how these can be drawn up in line with EU legislation. Recommendations should also be made about the pace of implementation. The socio-economic consequences of the proposals should be analysed and should provide an important basis for decisions about the measures that should be taken and the timing of their implementation. The industry's own experiences should be taken into account and the results of its work on chemicals safety should be noted. The proposals will therefore be drawn up in close and extensive dialogue with the business sector.

The Government intends to work to ensure the implementation of these guidelines within 10-15 years.

The Government intends to conduct a review of the chemicals policy objectives and control instruments in 2003.

Finally, the Government intends to pursue, together with other countries, the question of chemicals policy objectives in accordance with these guidelines.

6.3. Conditions for future work

Work must continue to be done on the task of restricting or phasing out the use of certain especially harmful chemicals. Great efforts will still have to be made in order to increase our knowledge of the harmful effects of chemical substances on health and the environment and of their occurrence and use. Stricter control and, when necessary, special regulatory measures, which may include prohibitions and approval

procedure, will be directed at the substances dealt with in the guidelines. The Environmental Code will increase the scope for controlling the use of chemicals in connection with decisions on applications for licencing to carry on environmentally harmful activities.

Substances will be banned or restricted where the need arises. In such cases, Sweden will primarily use the possibilities provided by its membership of the EU in order to impose bans or restrictions at the EU level, thus ensuring a broad impact. However, this should not prevent Sweden from implementing national measures when strong reasons exist. At the international level, Sweden will urge the phase-out or restriction of use and emissions of hazardous chemicals within the framework of binding conventions.

Under the current legislation, the responsibility for handling chemical products in such a way as not to present risks to health and the environment rests squarely on the enterprises that manufacture, market or otherwise handle the products. This should be emphasized even more strongly in future chemicals policy. Enterprises should develop effective environmental management systems (such as EMAS and ISO 14000), and also co-ordinate their efforts with the authorities and other interested parties. Furthermore, better information to the public on industry's use of chemicals could play an important role.

An important feature of chemicals policy is the classification and labelling of chemical products to indicate risks. Classification, which will determine how a product should be labelled, will be based on the product's properties and be made on the basis of internationally adopted criteria. The label will inform the user of the risks involved in the use of a product and of the precautions that should be taken.

Information about a product's content of hazardous substances, formulated in readily understandable terms, is, however, also essential to allow purchasers and individual consumers to make informed choices when purchasing products. Therefore, information about any hazardous chemicals included in a product and their characteristics should also be given with respect to product categories other than those that are defined as chemical products within the meaning of the law. Those who buy large quantities of chemicals on a commercial basis are an especially important target group who are in the position to make demands on producers and suppliers, and who may also be expected to better understand sophisticated technical information. Environmental labels, and in some cases possibly also environmental product profiles, can therefore play a significant part in speeding up progress towards products that contain less hazardous substances. Generally speaking, efforts should concentrate more on products and market mechanisms.

A factor that is of fundamental importance to efforts to reduce health and environmental hazards is better knowledge about the risks involved in the use of chemicals. It is important in this connection that Swedish research on chemicals should continue to be integrated into international research. An important element of achieving better knowledge is testing, evaluation and assessment. These are tasks that must primarily be undertaken by manufacturers and importers.

The precautionary principle is already an essential element of chemicals policy. This fundamental principle must be given a more significant role in future. Chemicals policy must be based on a greater readiness among authorities and enterprises to act as soon as they suspect a risk for damage. Consequently, greater attention must

be paid to substances that can cause health and environmental hazards owing to their intrinsic properties. The draft guidelines reflect this approach.

6.4 Restrictions on and phase-out of certain hazardous substances

Chemicals are used on a large scale in the production and handling of *textiles*. The chemicals that remain in the products are primarily those that are added to give the products certain characteristics, for example dyes, and these involve the risk of injury to the user. Manufacturers and importers of textiles should make sure that substances that can be harmful to health or the environment are not used in textiles. Pentachlorophenol (PCP) should be banned in imported textiles. The Government has instructed the National Chemicals Inspectorate to submit proposals on the formulation of such a ban. The content of free formaldehyde - which can cause contact allergies and hypersensitivity - in textiles should be limited. The Government intends to ban the use in textiles of azo-dyes which can give rise to carcinogenic arylamines, and also imports of products containing such substances.

Medical products are carefully controlled as regards their effects on humans and animals at the prescribed doses. However, residues of drugs and cosmetics and sanitary products enter the environment after use via sewage systems and landfill sites. The need of measures to ensure that drugs and sanitary and cosmetic products do not cause an adverse environmental impact should therefore be investigated. Municipalities and county administrative boards will be responsible for supervision of cosmetic and sanitary products. Sweden will pursue the issue of environmental risk assessments of cosmetic products within the EU.

All use of *lead* should eventually be phased out. Since 1990, the use of lead in Sweden has diminished sharply in several areas, while it has remained at the same level or even increased in others. The Government intends to ban the use of lead shot for hunting and virtually all forms of shooting from January 1, 2000 and in certain shooting sports from January 1, 2004. The use of lead in PVC products must cease by the year 2002. The target set applies also to lead in batteries. However, there are at present no commercial alternatives that are superior from an environmental point of view.

The remaining use of *mercury* should be phased out by 2000. The use of mercury in the chloralkali industry should, however, be allowed to continue up to 2010. Analytical chemicals with a content of mercury should also be permitted for the purposes of certain analyses until acceptable alternatives are available. Fluorescent lamps containing small amounts of mercury should also be permitted.

A study should be made of *materials containing PCBs* that circulate in Sweden and the rest of the Baltic Sea region, and wherever possible they should be collected for destruction by a method that is environmentally acceptable. During the spring of 1999 the Government intends to propose provisions laying down that certain types of fluorescent lamps, sealed insulating glass units and removed sealing compounds must be disposed of in accordance with the same rules as those applying to PCB products. The Swedish Environmental Protection Agency will be instructed to report by the end of 2000 on progress with the disposal of PCBs and products and materials containing PCBs.

The use of *brominated flame* retardants must be restricted. PBB and PBDE will be phased out. The National Chemicals Inspectorate will present a phase-out timetable by March, 1999. Further measures are needed in order to achieve a substantial reduction in the circulation of the other substances belonging to this group.

The remaining use of short-chain highly chlorinated paraffins will be phased out by 2000. All use of chlorinated paraffins as plasticizers or flame retardants in PVC products must cease by 2000.

The use of *nonyl phenol ethoxylates (NFEs)* is estimated to have dropped by 70-80 per cent since 1990. The remaining use of NFEs, which cause direct emissions, will be phased out by 2000.

All use of *phthalates and other plasticizers* with harmful or potentially harmful health or environmental effects should be phased out on a voluntary basis. The use of DEHP and other plasticizers with harmful or potentially harmful effects in PVC for outdoor use in coated woven fabrics and coated plate and for corrosion protection in cars should be phased out on a voluntary basis by 2001. Other uses of DEHP as a plasticizer in PVC etc., with the exception of medical products and drugs, should be phased out on a voluntary basis by 2005.

Plasticizers in toys for children under the age of three will be banned. The Government intends to instruct the National Chemicals Inspectorate to monitor the phase-out of the use of plasticizers with harmful or potentially harmful health or environmental effects and to present proposals for further measures, e.g. a prohibition, if they have not been phased out on a voluntary basis.

The use of *tin stabilizers in PVC* should be restricted on a voluntary basis by manufacturers and importers of plastic products. The use of the most environmentally harmful tin stabilizers should be phased out quickly. The Government intends to instruct the National Chemicals Inspectorate, in consultation with other authorities, manufacturers and importers, to present proposals for the phase-out of the most harmful tin stabilizers by 2000.

Efforts to reduce the environmental and health hazards associated with the use of *pesticides* etc. will continue. Sweden will give high priority to the testing and approval of pesticides at the EU level and will urge that the high level of protection afforded by the Plant Protection Directive and the Biocide Directive be maintained.

The level of protection against cadmium, arsenic, tin organic boat bottom paints and PCP that exists in Sweden should be maintained, as should the Swedish rules on the mercury content of batteries. In conjunction with its accession to the EU, Sweden was given the right to apply its stricter rules up to the end of 1998.

7. Community planning for ecologically sustainable development

The national environmental quality goals will represent guidelines for spatial planning and the construction sector. By co-ordinating community planning across sectoral boundaries central and local government agencies will promote ecologically sustainable development and a good living environment for all.

Municipalities and county administrative boards should collaborate in defining and monitoring, in a co-ordinated fashion and across sectoral boundaries, the national environmental quality goals in local and regional community planning. The

goals should be incorporated into the county administrative boards' strategies for regional environment. Monitoring environmental quality goals and adapting central government sectoral planning to regional and local needs will require special measures in certain areas. The work on regional environmental and resource management programmes that has been launched in certain archipelago areas should be extended to include other areas with especially serious environmental and resource management problems. The work of developing spatial planning methods with a view to sustainable development of urban and built-up areas should be intensified. For example, the National Board of Housing, Building and Planning will present methods and procedures that have been developed by municipalities in order to achieve better co-ordination between spatial planning, measures to increase social welfare and the ongoing work on local Agenda 21 programmes. The Board will also play a part in ensuring that the undertakings adopted by the UN Habitat II Conference are implemented in Sweden. Furthermore, closer collaboration should be organized between the nature conservation authorities and the bodies responsible for protection of cultural heritage assets.

8. The roles of industry and consumers in environmental work

Both consumption and production give rise to significant environmental effects. These effects are both direct, in the form of emissions, waste from private activities and consumers etc., and indirect to the extent that consumers and producers affect one another's behaviour in the market. In the Government's view, the efforts to achieve the environmental goals described in section 3 must include efforts to reduce the direct environmental impact of consumption and production and to persuade the market to adopt a philosophy that is more compatible with ecologically sustainable development. The functioning of the market can be influenced, for example, by market-oriented instruments, such as fiscal incentives, public procurement, technology procurement, environmental labelling and environmental certification.

Rules relating to permission review procedures and fiscal incentives have for a long time determined the behaviour of market participants by establishing permissible and profitable operations. However, the dialogue that has emerged during the last decade between the market participants has encouraged many enterprises to go beyond the requirements of existing legislation in their efforts to minimize the environmental impact of production and products. This has created new horizons for environmental policy.

The task of central government in relation to the market is, inter alia, to establish clear-cut rules. The Environmental Code recently presented by the Government will lay the foundation for this work. Moreover, greater use should be made of various instruments where they contribute to the effective achievement of environmental goals.

Enterprises, consumers and authorities have different roles, and consequently their opportunities for influencing developments vary. Consumers and households can influence production by demanding environmentally sound products and services. Apart from their interest in the environmental properties of individual products, the consumers' interest in enterprises' environmental reputation as a whole is growing,

which is a factor that encourages enterprises to intensify their pro-environment efforts.

Procurement by purchasing officers in private enterprises and public organizations has an impact on the development of environmentally sound goods and services. Purchasing officers have greater scope for exercising direct influence since they buy larger volumes and can make specific demands relating to product design. They also have more time and resources to evaluate alternatives. Demanding purchasers may often be a significant driving force in technological development. Hitherto, consumers' demands have mostly influenced producers of consumer products and high-profile brands.

Producers are best placed to exercise direct influence on the design and environmental impact of products. Their choices of materials, chemicals, manufacturing processes, transport systems, energy utilization etc. affects the environment not only at the raw material and manufacturing stages, but also during use and the waste stage. An integrated approach to environmental work requires efforts to concentrate on preventive measures and the development of new technologies and new production processes. Nowadays, enterprises frequently make environment-related demands on suppliers, a factor which is also taken into account in environmental management systems such as the EU system EMAS and the international standard ISO 14001. Environmental product profiles also make it easier for enterprises to make specific product demands. These systems must be quality-assured, especially since they have an impact at many stages. The retail trade and importers are in a good position to drive developments forward both by offering environmentally sound products and by passing on demands from consumers to manufacturers.

Small and medium-sized enterprises are sometimes at a disadvantage compared with large companies when it comes to pursuing environmental goals. Lack of resources and skills are the main reason for this. Since 1995 the Swedish National Board for Industrial and Technical Development (NUTEK) has led a project called Environmental Management in Small Enterprises, the purpose of which is to inform and assist enterprises that wish to obtain EMAS registration. The establishment of networks between enterprises and local development centres improves the possibility of exchanges of information between enterprises. There are several good examples of the work done by local development centres in various parts of the country, for example in several municipalities and counties. The Government intends to instruct NUTEK to present proposals on the design and financing of continuing measures to assist small and medium-sized enterprises with environment-related activities. These proposals should focus on local and regional solutions.

By supplying producers with capital, lenders and investors are well-placed to influence the enterprises' environmental efforts. Now that environmental issues are being incorporated into business strategy, there are increasingly often economic motives for taking environmental aspects into account in credit rating and investment. Apart from the large institutional owners, private individuals have also started to invest in funds that concentrate on environmentally sound enterprises.

Measures that offer consumers the chance to make informed environmental choices include product tests, appropriate environmental information about goods and services, efficient public transport services and readily accessible waste disposal systems.

9. Guidelines for Sweden's environmental policy in the EU and other international fora

9.1. The EU

Sweden's efforts in the EU should concentrate on making Community rules stricter where necessary, using Swedish and European environmental quality goals as criteria. Furthermore, Sweden should seek to develop a strategy for ecologically sustainable development in all EU policy areas.

The EU's activities are crucial to the achievement of many of the environmental quality goals proposed by the Government. Priority Swedish issues are:

- measures to combat acidification and climate change
- measures to promote ecologically sustainable development
- preservation of biological diversity and review of the rules relating to genetically modified organisms
- a high level of ambition in the EU when it comes to pesticides and chemicals

Membership of the EU has so far not led to any compromises with Sweden's environmental standards, and such compromises are unacceptable.

9.2. Other international fora

In international fora other than the EU high priority should be given to the following *horizontal objectives*:

- strengthening of the implementation and development of international agreements and conventions
- more efficient use of resources
- integration of environmental aspects into security, trade and development co-operation policies

In addition, the following areas of international co-operation should be given high priority:

- climate change
- protection of the ozone layer
- reduced acidification
- improvement of the Baltic Sea environment
- international co-operation on chemicals

Furthermore, special efforts should be made to improve the information supplied to other countries about Sweden's priorities concerning the environment and a strategy for environmental co-operation with Asia should be elaborated. Finally, an investigator should be appointed to analyse the coherence of Sweden's environmental policies at national and internal level.