

***Strategic environmental  
assessment of bills and  
other government proposals***

***Examples and  
experience***

**Strategic environmental assessment of  
bills and other government proposals.  
Examples and experience**

***Prepared by***

The Ministry of Environment and Energy

***Translation***

David Breuer

***Paper***

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***Printing***

Jespersen Offset ApS,  
Copenhagen

***For further information, contact:***

Ministry of Environment and Energy  
Spatial Planning Department  
Højbro Plads 4  
DK-1200 Copenhagen K  
Denmark  
Telephone +45 33 92 76 00  
Telefax +45 33 32 22 27

***Price:***

DKK 85 (including VAT) from:  
Miljøbutikken - Information and Books  
Læderstræde 1  
DK-1201 Copenhagen K  
Denmark  
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Telefax +45 33 92 76 90  
or from:  
State Information Service  
P.O. Box 1103  
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Denmark  
Telephone +45 33 37 92 28  
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***ISBN 87-601-5867-0***

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Printed in Denmark

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This publication is an English translation of a Danish publication *Miljøkonsekvensvurdering af lovforslag og andre regeringsforslag - eksempelsamling* printed in 1994. The purpose of the publication is to facilitate environmental assessment for other ministries. The English translation differs slightly from the Danish publication because Administrative Order No. 32 of 26 February 1993 has been replaced by Administrative Order No. 12 of 11 January 1995.

The examples are from the 1993/1994 session of the Folketing (parliament) and are direct quotations; the facts and assumptions referred to may have changed since then.

## Preface

The desire to integrate environmental considerations into decision-making processes to promote sustainable development is an international trend. *Our common future* (the Brundtland report), the United Nations Conference on Environment and Development in Rio de Janeiro in 1993, the Convention on Environmental Impact Assessment in a Transboundary Context and the fifth action programme on the environment of the European Union are all moving towards the implementation of environmental analysis of policies, plans and programs at the strategic level.

The European Union has adopted an internal decision to integrate environmental protection aspects in the implementation of the Union's policies, including carrying out strategic environmental assessment.

The European Commission initiated an investigatory program in the form of studies, case studies and preliminary investigations to lead to the implementation of environmental assessment at the strategic level. A project on Denmark's first years of results with the environmental assessment of bills and other government proposals is part of this.

On 26 January 1993, the Office of the Prime Minister issued a new administrative order on commentaries made on bills and other government proposals.

According to this order, commentaries to bills etc. produced after 1 October 1993 were to include an assessment of the environmental effects of the bill if the bill, based on the justifiable assessment of the individual sectoral ministry, was considered to be likely to have significant environmental effects. The environmental assessment is to be carried out to the extent that the administrative and data limitations allow and be organized in such a fashion that the considerations related to maintaining a flexible legislative process continue to be upheld.

The basis of the administrative order is Report No. 1243, 1992 from the Ministry of Finance on the effects of public regulation on the economy and the environment. When the administrative order came into force on 1 October 1993, this report was the only instruction on how strategic environmental assessment can be carried out.

In December 1993, the Ministry of the Environment published *Guidance on procedures for strategic environmental assessment of bills and other government proposals*; 3000 copies of this have been distributed in Danish, primarily to government ministries and agencies.

The publication includes a checklist that can be used to identify the potential environmental effects of a proposal and whether they should be investigated further. The publication also informs about various aspects to be addressed in

the assessment of whether environmental effects are significant.

This checklist is included as Annex 1 in this publication.

The Ministry of Environment and Energy is prepared to continue to advise about and support the work on strategic environmental assessment.

As part of this work, the Ministry presents this publication of examples and experience related to strategic environmental assessment of bills and other government proposals. This collection of examples has been prepared based on the cases of strategic environmental assessment that have been carried out so far and also contains further material to advise on how strategic environmental assessment can be tackled.

This publication was written at a time when the work with strategic environmental assessment of bills and other government proposals should still be considered as in process, and better data and methods are expected to be developed in the future to continue to improve the prerequisites for carrying out the specific environmental assessment tasks.

The individual ministries and agencies are therefore recommended to contact the Ministry of Environment and Energy in advance when a proposal is considered to have significant environmental effects, to the extent that such cooperation has not already been established.

The Ministry of Environment and Energy hopes that the guidance material, including the checklist, will gradually be integrated as a commonly used tool in the ministries' legislative work and that the checklist will be completed in the earliest phase of the work with each new government proposal.

# 1. An introduction to the concept of strategic environmental assessment

Strategic environmental assessment is the assessment of the effects of a proposal in the broad sense, including effects on water, air, climate, soil, fauna and flora, landscapes, historical buildings and monuments, natural resources, waste products generated as well as human welfare, health and safety.

In relation to the working environment, the assessment of whether a proposal could result in effects related to the arrangement of the workplace, the organization of work, etc., such as the ergonomic and mental burden in the working environment, is not included here.

Strategic environmental assessment should be included as part of the legislative process at the same level as the assessment of the administrative, microeconomic and macroeconomic effects of various proposals.

Strategic environmental assessment must include the assessment of the effects of a proposal on all aspects of the environment.

The checklist in Annex 1 is a tool for identifying which parts of the environment will be affected and to what extent. Strategic environmental assessment should be carried out when significant environmental effects are likely for any of these environmental aspects or when closer investigation is required to determine whether the effects are significant.

Whether the likely effects on the environment can be considered significant can be determined based on:

- a) whether the changes to the environment influence humans and nature; and
- b) how these effects are related to the objectives and targets of environmental policy that have been adopted.

This means that strategic environmental assessment must be related to the state of the environment and environmental policies.

In the areas in which objectives and targets have been adopted, for example, through action plans adopted by the government or the Folketing (parliament) it would be natural to relate the strategic environmental assessment to these objectives and targets.

Environmental policy objectives and targets have been adopted for numerous sectors, especially the environmental action plans related to energy, agriculture and transport. Action plans under the responsibility of the Ministry of Environment and Energy include *Energy 2000: a plan of action for sustainable development* and *Energy 2000 - follow up*, the action plan on the aquatic environment, the action plan on cleaner technology and the action plan on waste and recycling (see Annex 2).

Since the Danish version of this publication was issued, *Natur- og miljøpolitisk redegørelse 1995* (available as a summary entitled *Denmark's nature and environment policy 1995*) was published; it describes the state of the current action plans.

Areas not covered by an environmental action plan often have environmental policy objectives and targets as part of administrative practice. This may be based on a binding set of rules, recommended standards or a mere direction for environmental regulation.

Strategic environmental assessment must be related to the state of the environment that will be affected by the proposal. Both direct and indirect environmental effects should be described in full based on the data available, and both positive and negative effects must be covered.

It is important that strategic environmental assessment be carried out with the requisite scientific quality. When a specific ministry does not have the necessary environmental expertise, this should be obtained from experts at universities, sectoral research institutions and consultants.

If the size of the strategic environmental assessment statement is larger than that of the normal size of commentaries to bills, it would be appropriate to prepare the statement as a background statement. It can be in the form of an official note or, for especially extensive strategic environmental assessment, as a background report.

Together with the completed checklist, the material prepared will form the basis for being able to answer questions about the bill in the legislative process.

The conclusions of the investigation should be summarized and included as a section of the commentary itself. The summary will be part of the general commentary and have the same status as commentary on the economic and administrative effects of the bill. These aspects comprise factual information and assessment for the decision-makers.

To strengthen the basis for decision-making and to ensure a qualified starting-point for the public debate, the background assessment statement should be accessible for the members of Folketing and for the public as soon as the bill is proposed.

## **2. The content and features of strategic environmental assessment**

Strategic environmental assessment should ideally include the following:

- . a brief presentation of the purpose of the proposal and which alternatives have been considered;
- . a description of which environmental effects are relevant (for example, by referring to the results of the checklist);
- . a description of the extent of the likely environmental effects: the physical effects of the proposal on the environment (including local, regional or global effects on the state of the environment);
- . any measures that will be or have been implemented to avoid harming the environment and any monitoring and follow-up programmes;
- . a comprehensive assessment of the environmental effects, including the starting-point of the environmental policy objectives and targets related to the parameters that are part of the investigation; and
- . a summary of the main conclusions of the assessment to be used in the commentary to the bill.

The strategic environmental assessment statement should be an integral part of the overall assessment of bills and other government proposals.

### **2.1. Formulating the problem and presenting the proposal's purpose and content**

The starting-point for strategic environmental assessment should be a clear description of which problems the government proposal is intended to solve.

Proposals can be distinguished as to whether the purpose of the proposal is directly related to regulating the environment.

If the purpose of the proposal is to regulate the environment, this will be reflected in the description of the purpose of the bill in the commentary. The commentary normally only indicates which environmental problem the bill is intended to regulate, and it may therefore be necessary to investigate other environmental effects. The strategic environmental assessment statement must then describe how the proposal will affect the primary environmental problem and the positive and negative effects the proposal is likely to have on other environmental aspects.

If the purpose of the proposal is not primarily to regulate the environment, the description of environmental aspects will not be part of the description of the purpose of the proposal in the commentary, which will therefore not indicate which environmental aspects should be assessed. In these cases, strategic environmental assessment must describe the indirect environmental effects of the proposal. One purpose of this is to allow the desirable effects of the proposal to be compared with the negative environmental effects and thereby to

assess whether fulfilling the purpose of the proposal can justify any negative environmental effects.

In both cases the purpose of the proposal should be included in the description of the environmental effects.

### **2.1.1. Description of alternative options**

The preparation of a government proposal often includes an analysis of various options. Only one of these options is normally selected and comprises the basis for the final proposal. To assist in the further processing of the proposal, the strategic environmental assessment statement should outline as completely as possible which alternative options have been investigated and the respective environmental effects of these options. The statement should also indicate why the final proposal was preferred.

In the preparation phase, the environmental effects of the alternative options should therefore be identified similar to the method shown in sections 2.2 to 2.5.

## **2.2. Identification of environmental effects that should be investigated: completing the checklist**

After the purpose of the proposal is described, the next step is to determine which environmental effects should be investigated further.

The best way to identify and delimit the environmental effects is to complete the checklist in Annex 1 for each of the alternative options.

This will create an overall sense of the environmental effects of the various options, as they are sorted according to whether they are "significant", "should be examined", "of minor significance" or "insignificant".

The further strategic environmental assessment should generally include the effects considered to be "significant" or that "should be examined", but the assessment statement should also indicate which effects are being ignored because of their minor significance.

Remember that many environmental effects that are of minor significance by themselves can comprise a significant effect as a whole that should also be assessed.

Strategic environmental assessment should include all the direct and indirect effects of the proposal.

Direct effects are effects on the environment that are narrowly related to the fulfilment of the purpose of the proposal.

Indirect effects are secondary effects on the environment related to the direct

effects of the proposal when it causes structural changes in society.

For example, the direct environmental effects of an increase in the tax on petrol would be the effects on the emission of pollutants, noise pollution and road accidents that result directly because the increased tax reduces the volume of car traffic. The indirect effects are related to the effects of the tax increases on the consumption of other goods and services, including public transport.

### **2.3. Description of the extent of the effects**

The extent of the environmental effects can be described at several different levels.

The environmental effects can often be described as part of a causal chain  typically exemplified by the effects on various types of pollution in the environment:

- . emission from the source to the surroundings;
- . the concentration of the emitted substance in the surroundings;
- . the significance of this for the state of the environment; and
- . the effect on humans and nature.

The description of the changes in the environment and the effects these have on humans and nature are the desired end result of strategic environmental assessment. Nevertheless, the basis for the links of the causal chain are often so incomplete that the description of effects must concentrate on either projections of emissions or environmental burden or on descriptions of the projected state of the environment.

Some effects can be quantified: the number of people, tonnes, liters, hectares, etc. The description of effects should use the physical unit that is customary in the given context.

In other cases it would not be appropriate to express the effects in this way because the effects cannot be quantified: for example, aesthetic value. In these cases and cases in which the necessary quantitative data are not available, a qualitative description is appropriate: great, minor, good, poor, etc., expressed in as much detail as possible.

Among the environmental effects that are included in the checklist in Annex 1, the information on environmental burden within the groups 1) water, 2) air, 3) climate, 4) surface of the earth, soil and percolation, 7) other resources and 8) waste would typically be quantifiable given data availability, whereas the effects for 5) flora and fauna, including habitats and biodiversity, 6) landscapes, 9) historical buildings, 10) the population's health and welfare and 11) safety in the production, handling or transport of hazardous or toxic substances can often better be described qualitatively.

The description of the extent of the likely environmental effects should in

clude the following aspects:

- . a description of the null alternative in relation to which the effects are compared;
- . a description of the geographical extent of the effects;
- . a description of the chronological placement of the effects; and
- . a description of the uncertainty connected with the projection of the effects.

### **2.3.1. The null alternative**

The environmental effects should be assessed to the extent possible in relation to the situation or the course of events that is likely to occur if the proposal being examined is not carried out. This situation or course of events can be called the null alternative.

It is not always relevant to consider the current state of the environment as the null alternative, as the development of society will change the environment in numerous ways in any case. In these cases the most natural action is to use the likely environmental trends as the null alternative.

As the null alternative comprises the starting-point for understanding and interpreting the assessed effects, it is crucial that the null alternative be described clearly.

### **2.3.2. The geographical aspects**

Another important aspect in strategic environmental assessment is the description of the geographical extent of the environmental effects.

The effects on the local environment include all the effects in immediate proximity to the source of the effects. These include local pollution of air, soil, water and ecosystems, local resource consumption and waste generation and noise, congestion, effects on the landscape, the visual environment and the quantity of open space available.

The effects on the regional environment typically include all effects on material streams in air, soil, water and ecosystems, significant changes in large natural areas and widespread effects on fauna and flora. The regional level normally includes both national and transboundary effects.

The global environment includes effects that are disseminated throughout the world. Examples include climate change, destruction of the stratospheric ozone layer, changes in sea currents and the marine environment, global resources (including fossil fuels and metals), global natural resources (including rain forests and desertification) and biodiversity.

In most cases the environmental effects of national rules will especially affect the local and regional (national) environment. If the effects are global, the statement must include Denmark's share of responsibility for international

environmental problems.

### **2.3.3. The time perspective and uncertainty in the analysis**

Sometimes it is important to draw out the effects over time. It can be important in the assessment of a proposal to determine when the desired or undesired environmental effects are likely to occur. In addition, the targets of the various government environmental action plans (Annex 2) typically also have time frames in which, for example, targets for emission reduction are to be fulfilled.

Finally, the uncertainty related to the environmental assessment should be described.

## **2.4. Measures to avoid harmful effects on the environment: monitoring and follow-up programmes**

Strategic environmental assessment should include a special description of any harmful effects of a proposal. If harmful effects are likely, the strategic environmental assessment statement must describe the potential options for effective countermeasures as well as how and in which time period the harmful effects can be reduced.

In addition, the strategic environmental assessment statement should describe any initiatives for monitoring and follow-up programmes that ensure that the harmful effects do not exceed an acceptable level or that the countermeasures initiated produce positive results. The same applies to any uncertainty in connection with strategic environmental assessment.

The account of the total environmental effects must finally consider the effects of the planned countermeasures such that the net harmful effects are determined.

## **2.5. Assessing the environmental effects: weighing various environmental effects and other considerations**

Strategic environmental assessment must be carried out in the context of assessment of the other effects of the relevant proposal. The final bill or government proposal will thus normally be prepared based on weighing of the various effects.

The specific environmental assessment of proposals would normally be based on the applicable targets related to the environment (Annex 2).

The targets for environmental policy can be part of the basis for determining how significant the described environmental effects are. If the proposal is in general contradiction with the government's environmental policies as a whole, this should be explained.

An important aspect in the assessment is thereby to describe the extent to which the relevant proposal contributes to or detracts from fulfilling environmental policy targets. Nevertheless, many environmental areas do not have precisely formulated targets. In these cases, the assessment must be limited to assessing the environmental and societal significance of the positive and negative effects in a broad sense.

If the proposal is likely to have environmental effects that contradict the general government environmental targets or rules, special attention is required. It should always be assessed whether the proposal can be modified so that it fulfils its main purpose while reducing or avoiding the negative effects on the environment.

The description of the environmental effects in the commentary to the bill must explicitly describe the contradictions so that they can be weighed when the bill is dealt with by the Folketing. This is especially important when negative environmental effects cannot be avoided.

If the environmental effects are very fundamental, such as direct harm to the health of the population, pollution of groundwater or an increased threat to endangered species, it must be assessed whether the purpose of the proposal is so important that the bill should be submitted. If it is submitted, the environmental effects should be sufficiently clear that they will be weighed in the political handling of the proposal.

## **2.6. Summary of the strategic environmental assessment statement**

The commentary to bills, which is part of the decision-making basis for the Folketing, should have a separate section explaining the environmental effects of the proposal.

For this purpose, a summary of the strategic environmental assessment statement should be prepared that includes the main conclusions of the assessment, including a description of the weight given to various aspects and the alternative options examined. When a proposal is likely to affect the environment negatively, it is also important that the commentary state clearly why the government decided to submit the proposal anyway.

As the summary comprises part of the basis for decision-making, it must include a thorough, easily understood and non-technical description of the environmental effects of the proposal. The summary is important to understand the environment effects of a proposal with a longer background assessment

statement and of a proposal for which the full text of the assessment

statement is in the commentary.

Any background assessment statements and other relevant reports should be publicly accessible when a bill is submitted.

## 3. Examples

### 3.1. Introduction

Administrative Order No. 31 of 26 February 1993, which has been replaced by Administrative Order No. 12 of 11 January 1995, stipulates that the commentary to bills and other government proposals should describe the environmental effects of the proposal if the bill, based on the justifiable assessment of the individual sectoral ministry, is likely to have significant environmental effects. The environmental assessment is to be carried out to the extent that the administrative and data limitations allow and be organized in such a fashion that the considerations related to maintaining a flexible legislative process continue to be upheld.

In the Folketing's 1993-1994 session the government submitted 261 governmental proposals, including bills, proposed decisions and official reports. In accordance with the Administrative Order, the commentary to 35 of these proposals described the likely environmental effects of the proposals.

The specific proposals and the assessment statements are very diverse. Some of the most detailed descriptions accompany proposals that are intended to improve the environment. These comprise especially proposals from the Ministry of the Environment and bills or proposed decisions based on environmental action plans for the various sectors (such as *Energy 2000* follow-up). In addition, Transport 2005, which follows up the government's transport action plan for environment and development, contains an assessment statement.

When the purpose of the proposal is to improve the environment, the strategic environmental assessment statement is often integrated into the description of the purpose and the rest of the commentary, including annexes, which can be very detailed in some cases. The descriptions of environmental effects in these proposals are therefore not always assembled in the special section on the environmental effects of the proposal and are therefore difficult to summarize.

In the commentary to other types of proposal, the likely environmental effects are usually described more briefly and in general terms. This applies especially to administrative proposals, in which it is not always possible to predict and describe the environmental effects a proposal is likely to have. In some cases the description is limited by the available data.

The description of the environmental effects varies depending on whether the likely effects are related to the landscape and nature or emissions and pollution effects. Effects on landscape and nature are often described in qualitative terms, whereas effects on emissions and pollution can be quantified to some extent.

The specific assessment statements reviewed here are from proposals from the Ministries of Housing and Building, Energy, Communication and Tourism, Agriculture, the Environment, Taxation, Health and Transport.

Sections 3.3-3.8 provide selected examples among the proposals as illustration.

The work with strategic environmental assessment is still a relatively new process. Effort in the coming years must be focused on developing new data and methods and thereby better prerequisites for the specific assessment in each case, such that strategic environmental assessment can become an integral part of the legislative process to an even greater extent.

As additional illustration, section 3.2 presents two constructed examples that are prepared and structured based on the instructions in Chapter 2 and the individual points of the checklist (Annex 1).

One example shows how a strategic environmental assessment statement could be made if the existing ministerial order on the storage of solid manure were enacted into law. The other example shows how the environmental effects could be described for a bill submitted in 1991 to amend the Forestry Act if Administrative Order No. 12 of 11 January 1995 had come into force at that time.

## **3.2. Constructed examples**

### **3.2.1. Strategic environmental assessment of a hypothetical bill on the regulation of the storage of solid manure**

This example illustrates the following checklist points:

- 1.1) surface water: the discharge of organic or inorganic substances, including toxic substances, into lakes and watercourses;
- 1.2) groundwater: percolation to groundwater;
  - 4) the percolation or accumulation of toxic or hazardous substances in the soil; and
- 10) the health and welfare of the population.

The example is based on the hypothetical event that Part 5 of Ministerial Order (Environment) No. 15 of 14 January 1986 on the storage of solid manure is to be enacted into law, and strategic environmental assessment is carried out.

#### ***The purpose of the proposal***

The storage of animal manure may cause the direct discharge of black liquid, urine or slurry from farms. This discharge causes severe pollution in especially smaller watercourses because of the content of organic matter. In addition, the phosphorus content of the discharge can negatively affect the quality of the lakes and coastal waters. Inadequately constructed storage

facilities for manure may also result in groundwater contamination.

The direct discharge arising from the storage of animal manure can be hindered for manure yards by constructing the yards so that all black liquid can be collected and piped to a storage tank or liquid manure container. In addition, it must be ensured that surface water cannot run into the manure yard such that the production of black liquid is limited.

Provisions on the construction of storage facilities for animal manure are stipulated in the environmental regulations established in accordance with the Environmental Protection Act. The provisions of these regulations, however, only apply to manure storage facilities built after the Environmental Protection Act came into force in 1974. A survey has shown that 72% of the manure yards were built before 1974, and only about half of the yards are surrounded by walls and only about half of the drains from the yards lead to some type of container.

The proposal thus extends the provisions of the environmental protection regulations to include all manure storage facilities. This includes manure heaps in the fields, which are banned in practice.

The proposal thus aims to stop the direct discharge of farm waste.

***Identification of environmental effects that should be investigated***

Examination of the checklist resulted in the assessment that the proposal is likely to significantly affect surface water and groundwater and, to a certain extent, the health and welfare of the population. The proposal can also have minor effects on odour nuisance and affect the use of chemical fertilizer. The proposal is assessed to have no significant effects on the landscape or on climate.

***The environmental effects of the proposal***

The proposal, which will ban the discharge from manure yards, is estimated to reduce the discharge of nitrogen to surface water and groundwater by about 20,000 tonnes per year.

The discharge of farm waste is one of the predominant sources of pollution in small watercourses. The addition of nitrogen, phosphorus and organic matter to watercourses directly or indirectly reduces the quality of the habitats for many of the organisms that normally live in watercourses.

The addition of nitrogen, phosphorus and organic matter to lakes similarly reduces the quality of the habitats for most of the organisms in lakes. The addition of nitrogen and phosphorus are especially important for the eutrophication of lakes.

With regard to human health, the limit value for nitrates in drinking-water is 50 mg/l. Some of the nitrate from manure yards leaches to the groundwater, causing nitrate pollution of the groundwater. The leaching of nitrates to the groundwater from manure yards is considered to be of the same order of magnitude as the leaching to surface recipients.

The ban on farm waste discharge will thus contribute significantly to reducing the nutrient leach to watercourses, lakes and the groundwater. This will reduce the adverse effect on the local and regional environments.

The reduction of nitrate discharge from manure yards will allow animal manure to maintain a higher concentration of nitrogen. If this is integrated into fertilizing planning, farmers can purchase less chemical fertilizer equivalent to the reduction in nitrate leaching.

Some of the nitrogen can be lost through ammonia volatilization under unfavourable conditions. The amount of nitrogen that might be lost cannot be determined, but ammonia volatilization is estimated to occur to a minor extent, and the proposal is therefore not considered to significantly change the ammonia volatilization from the storage of manure. Thus, the current effects of ammonia volatilization on climate change are not affected.

### ***Monitoring and follow-up programmes***

Comprehensive monitoring programmes are carried out annually for the entire aquatic environment as part of the action plan on the aquatic environment of the Government of Denmark (adopted in 1987). In addition, the municipalities regularly inspect farms, including the storage facilities for manure.

### ***Assessment of the environmental effects***

The target of the action plan on the aquatic environment is to reduce the emission to the aquatic environment of nitrogen by 50% (from 290,000 to 145,000 tonnes annually) and phosphorous by 80% (from 15,000 to 3000 tonnes annually).

This plan specifies that agriculture is to contribute 127,000 tonnes of the total reduction in nitrogen (88% of the reduction) and 4000 tonnes of phosphorus (33% of the reduction).

The proposal to ban discharge from manure yards is thus expected to reduce nitrate leaching by 20,000 tonnes per year and will thus provide a substantial contribution to fulfilling the action plan.

### ***Summary***

The proposal provides that manure yards established before the Environmental Protection Act came into force in 1974 will also be covered by the provisions of the environmental protection regulations in accordance with the Environmental Protection Act. Manure yards shall hereafter be constructed so that the water draining from such yards is collected and piped into a storage tank or liquid manure tank.

This will prevent the discharge of water draining from manure yards to surface water and groundwater. This will stop the pollution of watercourses and lakes with nitrogen, phosphorus and organic matter. In addition, the leaching of nitrate to the groundwater from manure yards will cease.

The proposal is expected to reduce the emission of nitrogen to surface water and groundwater by about 20,000 tonnes per year and will thus contribute to fulfilling the target of the action plan on the aquatic environment: to reduce the discharge of nitrogen from agriculture to surface water and groundwater by 127,000 tonnes.

### **3.2.2. A constructed strategic environmental assessment statement for a bill submitted in a previous Folketing session to amend the Forestry Act (L87, introduced 17 November 1988)**

This example illustrates the following points of the checklist:

- 5) flora and fauna, including effects on habitats; and
- 10) recreational experiences and opportunities and the visual environment.

This proposal was introduced before Administrative Order No. 12 of 11 January 1995 came into force. The following strategic environmental assessment statement is therefore a fictitious example based on the consideration of how a section on environmental assessment would look if a similar bill were to be prepared today.

#### ***Purpose***

The main focus of forestry has been on the production of timber for construction and industry and as an energy source. The bill paves the way for future forests to be cultivated with the aim of increasing and improving the production of timber and taking into account natural history, landscape, historical and recreational concerns.

#### ***Point 5: flora and fauna***

The most likely main effect of the bill on flora and fauna is related to new provisions that ensure conservation of the deciduous forest fringe, conservation of oak undergrowth, protection of small forest biotopes and promotion of deciduous forests, as described in detail below.

#### ***Conservation of the fringe of deciduous forests***

It is important for forests to maintain a stable and robust fringe of deciduous trees and bushes. Such a stable fringe helps to reduce wind and drafts in the forest, which can otherwise negatively affect wood production as well as the environment and have some influence in preventing storm damage. Many people consider the forest fringe to be an important visual element of the landscape. In addition, the forest fringe is important for fauna and flora and, among other reasons, therefore valuable and of interest for open-air recreation. This proposal will ensure that the forest fringe is conserved.

#### ***Conservation of oak undergrowth***

This bill will prevent oak undergrowth in forests scheduled to remain as forests from being converted to other forest types. Such conversion has occurred, although there is no apparent economic or environmental advantage to this. Oak undergrowth is a biotope that used to be used in

moorland cultivation and that has a very characteristic ground flora. Much oak undergrowth is divided into very small parcels that have been cut down to provide wood for the individual farm. This conservation of oak undergrowth provided for by this bill thus has natural historical and historical significance.

***Protection of small biotopes etc. in forests scheduled to remain as forests***

In accordance with the proposal, lakes, watercourses, heaths, bogs, marshes and moors, salt marshes, swamps and coastal meadows, humid permanent grasslands, uncultivated, dry meadows, etc. are conserved when the area of such habitats is less than the minimum size required for protection in accordance with 3 ff. of the Protection of Nature Act. The proposal extends 6, subsection 5 of the current Act and replaces the right of the forest owner to not afforest such areas to an obligation to not cultivate, reclaim, afforest or in any other way change the land use. The proposal will protect the characteristics of these biotopes and the wild fauna and flora.

***Promotion of deciduous forests etc.***

Coniferous trees have shorter rotation than deciduous trees, and many forest owners have therefore decided since 1930 to afforest previously deciduous forest areas with, for example, spruce trees after clear-cutting. Some coniferous trees, however, are not well adapted to Denmark's soil and climate. In addition, deciduous forests are often more diversified than coniferous forests, and deciduous forests are a valuable habitat for many species of fauna and flora. This bill makes it possible to grant subsidies to forest owners that wish to convert coniferous forests to deciduous forests. Subsidies can also be granted for, for example, establishing new forest fringes as mentioned previously.

The bill also ensures compensation to forest owners for the financial loss incurred if they decide to promote especially environmentally valuable growths in a forest or to allow valuable forests to remain untouched to benefit wild fauna and flora. Parallel with the provision for subsidies to, for example, private natural forests, numerous areas in state-owned forests will be designated for future extensive operations, be protected as a natural forest or be managed by such traditional regimes as coppice forests and selected harvesting.

These measures have in common the fact that they will create biotopes that allow a more diversified fauna and flora.

***Point 10: the health and welfare of the population: landscape, history and recreation***

The aspects of the bill mentioned will contribute to ensuring varied landscapes, more diversified forests and the protection of historical interests related to forests and thereby the recreational opportunities for the population.

### **3.3. Example: bill on the amendment of the Act on Chemical Substances and Products (ban on pesticides that contain certain active ingredients), L 179**

This example illustrates the following points on the checklist:

- 1.1) surface water: discharge of inorganic substances into lakes and water-courses;
- 1.2) groundwater: percolation to groundwater;
- 4) the percolation to or accumulation of toxic or hazardous substances in the soil;
- 5) the quality of habitats for wild flora or fauna, and cultivation methods in agriculture; and
- 10) health risk in connection with food, drinking-water or the handling of hazardous or toxic substances.

#### ***Purpose***

In continuation of the action plan on pesticides of the Ministry of Environment and Energy, the purpose of this bill is to ensure that the pesticides that are most harmful to human health and to the environment can no longer be sold or used in Denmark.

The proposal allows pesticides that become listed in List A of Annex 2 of the Act can be prohibited; substances in List B are already prohibited in accordance with a European Union directive.

The purpose of the bill is to protect the environment, and the environmental effects are therefore not only described in the strategic environmental assessment statement but also comprise an important part of the normal commentary to the bill referred to in the statement. The commentary to the bill also includes an annex that describes in detail the six substances that are intended to be listed in List A initially. This description explains how the six substances are used, their harmful effects on the environment and alternative substances or methods that can be used.

#### ***Description of the environmental problems: effects on groundwater (1.2)***

The normal commentary to the bill has the following description of the environmental problems associated with the use of pesticides:

"Pesticides affect the environment directly through their toxic effects on plants and animals and indirectly by removing the subsistence basis for numerous animals. The problems in connection with effects on the subsistence basis can only be ameliorated by reducing the number of applications, whereas the problems associated with the toxicity of the substances can be ameliorated to a certain extent by establishing which pesticides are permitted to be used.

Several previously used pesticides such as DDT were very fat-soluble and accumulated in the fatty tissue of living organisms. They accumulated

through the food chain with numerous negative environmental effects as a result. This unintended accumulation led to the development and use of more water-soluble pesticides that seldom accumulate in living organisms. In contrast to the fat-soluble pesticides, the water-soluble pesticides usually bind poorly to the soil. They can therefore somewhat follow the percolation of precipitation to the groundwater and later the movement of groundwater to watercourses, lakes and the sea.

The leaching of pesticides occurs in a complex interaction between several factors, including the rate at which the pesticide is metabolized, the type of soil and surplus of precipitation, the crop being cultivated, the application time and dose, the application frequency and the properties of the pesticide used. The rate of metabolization is often reduced substantially in deeper levels of the soil, where oxygen-dependent microbial and chemical activity is often reduced. Less mobile pesticides that are persistent (slow to be metabolized) reach the groundwater but are transported more slowly than more mobile substances. The amount of a given substance that can reach the groundwater completely depends on these factors, and the amounts therefore differ vastly in different localities. Finally, several pesticides degrade into mobile or persistent metabolites that can also percolate to the groundwater.

A monitoring programme to determine the risk of groundwater contamination with pesticides was initiated in 1989 in connection with the action plan on the aquatic environment. The results from 1989 to 1992 show that most of Denmark's groundwater is threatened by pesticide contamination. Given the vast increase in pesticide use in the early 1980s, this problem can be expected to worsen.

The monitoring programme surveys eight pesticides. All eight have been found in groundwater. The substances monitored are (or were) among the most common used previously. Two of them are now prohibited, and the others are being reassessed by the Danish Environmental Protection Agency or their use is already restricted. The eight substances were chosen because of their frequent use and characteristics that make them bind poorly to soil and easily transported with the natural percolation of water through the ground. The eight substances are therefore indicator substances that indicate the general risk of groundwater contamination with pesticides. Several other pesticides are therefore likely to threaten the groundwater.

Pesticides have been demonstrated in the groundwater in 11 of Denmark's 14 counties (not yet in Frederiksborg, Ringkøbing and Nordjylland Counties). Some pesticides have been found in all parts of Denmark regardless of the main type of groundwater; others have only been found where the groundwater is oxygen-free or oxygen-poor and without nitrate. Most of the places in which pesticides have been found are in groundwater magazines in a layer of sand relatively close to the surface and in sand pockets under layers of moraine clay: the predominant geological formations in Denmark.

Pesticides are often found in the upper part of groundwater magazines: about 65% of the cases in the upper 20 metres. Nevertheless, in many cases they have been found under a layer of moraine clay up to 20 metres thick: places

where groundwater contamination with pesticides was not expected, because the layers of clay were considered to be an effective filter. New investigations show that these layers of clay are riddled with small holes through which substances can be transported down to the groundwater.

Investigations outside Denmark have also demonstrated pesticides in groundwater. Several of the pesticides used today in Denmark have been found in concentrations exceeding the limit values in such countries as Sweden, the Netherlands, Germany and the United States. As climate and soil types differ, the results cannot always be directly transferred to the conditions in Denmark, but these results show that there is a risk.

The pesticides found in groundwater are considered mainly to originate from the large quantity of pesticides used in agriculture and forestry. Cultivated land in Denmark is sprayed with pesticide an average of three times per year. In some cases, however, the contamination could result from the use of pesticides near borings or contamination from point sources (buried deposits of pesticide residues).

Continuing application of pesticides in agriculture and forestry must be expected to cause the percolation of certain pesticides towards groundwater reservoirs. This applies especially to the application of pesticides to fields with a clay base in the spring and autumn or if it rains heavily, causing rapid percolation through either holes in the clay layers or through thin layers of sand to groundwater reservoirs with little or no oxygen.

Knowledge of the processes in the groundwater and especially the effect of pesticides, their metabolites as well as mixtures of these substances is still so limited that there is no scientific basis for arguing for the acceptance of any level of these substances in the groundwater.

In any case, it is proposed that pesticides containing ingredients that can contaminate the groundwater be prohibited to prevent future groundwater contamination on the basis of the cautionary principle."

The subsequent sections of the statement explain in more detail the special effects that harm the environment, including the harmful effects and characteristics of persistent and mobile substances and explain that the effects of these substances on the groundwater are the most important effects of these substances on the environment and human health. The six substances are then reviewed briefly, as the statement refers to the annex to the bill, which includes commentary to List A.

### ***Summary of the environmental assessment of the bill***

The environmental assessment statement is summarized as follows:

"The bill will create an administrative framework that allows the sale and use of pesticides considered to be likely to have unacceptable environmental and health effects to be rapidly and effectively stopped. The proposal follows up the objective of the 1986 action plan on pesticides of the Minister for the

Environment that pesticides that are especially hazardous to human health or to the environment may not be sold and used in Denmark.

When active ingredients are included in List A, the burden on human health and the environment is reduced, and the harmful effects described in III.1 and III.3 [earlier sections of the statement] are countered. It is not possible now to generally and precisely account for the environmental effects of specific future bans. Nevertheless, the basis for making decisions on whether to include substances in List A will describe the likely environmental effects of each specific ban: in particular, which environmental harm can be avoided. The likely effects of the bans on human health will also be described.

In Denmark all groundwater is considered to be drinking-water as a matter of principle, and it is not desired to carry out extensive purification of the groundwater before it can be used as drinking-water.

Section III.4 includes specific proposals to ban the sale and use of pesticides containing any of six active ingredients based on an assessment of two characteristics of the substances that makes them harmful to the groundwater.

The characteristics of active ingredients that are significant in protecting the groundwater and that have been assessed initially are persistence and mobility: whether the substances are difficult to metabolize or bind poorly to the soil. Each of these characteristics makes a pesticide harmful to the environment. If they are combined, the risk of groundwater pollution is very high.

The bill will avoid increased contamination of the groundwater with these six substances in the future.

The bill cannot change the previous use of these substances and any harm caused as a result, and contamination resulting from previous use is likely to continue for decades. Similarly, a long time period elapses from when a pesticide is applied to when the contamination can be demonstrated, because groundwater is created over a long time period. Contaminated groundwater cannot be purified without great expense, because this would require that the structure of water supply be centralized. The increased use of substances that replace the substances that are proposed to be included in List A may also cause harmful effects. Nevertheless, the Danish Environmental Protection Agency believes that these new substances will not have greater negative effects.

As the commentary to List A on the individual substances shows, these six substances also have other environmentally harmful effects than persistence and mobility. Several are toxic to other living organisms than the target organisms in the soil and surface water, and the substances also have negative effects on human health. These effects can also be avoided through a ban.

In accordance with the Act on Chemical Substances and Products, the prohibition on the use and sale of the relevant substances is enforced. The normal monitoring of groundwater does not include these substances."

### **The annex to the statement**

The annex to the environmental assessment statement includes a very detailed description of the effects of the six substances, the assessment of their effects by the Danish Environmental Protection Agency and the authorities in other countries and alternatives to their use. The following section is the description of one of the substances in the annex:

#### **"Cyanazine (three preparations, including two mixtures)**

Cyanazine is a powder that is mixed with water and used as a herbicide. It is absorbed by plants through the roots and also through the leaves. Cyanazine retards photosynthesis.

Cyanazine was classified by the Poison Control Board in 1972 and was selected for re-assessment in 1988. The Danish Environmental Protection Agency rejected the application for approval, and this decision was appealed to the Environmental Board of Appeal on 30 May and 18 June 1991 and on 5 February, 22 February and 26 March 1993. About 55 tonnes of cyanazine was sold in Denmark in 1991 and 53 tonnes in 1992.

Approval is being sought for the use of these cyanazine preparations to kill weeds in the cultivation of peas, broad beans (*Vicia faba*), maize, grain and all plants on uncultivated fields. The dose of active ingredient applied for is 150-1250 g/ha. The preparations are sprayed onto the fields before or shortly after germination.

It is not known when the European Commission will reassess the use of cyanazine.

#### **The assessment of the Danish Environmental Protection Agency**

All of the metabolites of cyanazine that have been investigated are similar to pesticides, and the complex of cyanazine plus its metabolites is very persistent in the soil (see the general discussion on persistence in section III.3). This statement is based on a half-life of more than 3 months found by three of four studies and a metabolization time for 90% of the substance of more than 1 year in four of four studies.

Cyanazine and its pesticide-like metabolites are mobile in soil, and the Danish Environmental Protection Agency believes that it is likely that they can leach to the groundwater (see the general discussion on mobility in section III.3). This statement is based, among other things, on field studies and on the fact that cyanazine has been found in groundwater in numerous countries at concentrations that exceed the limit values for drinking-water established by the European Commission. In addition, cyanazine has been found at high concentrations in watercourses in North America.

Cyanazine is harmful to very toxic to aquatic organisms, and cyanazine is likely to harm small aquatic ecosystems through its normal use. Studies also indicate that cyanazine can harm insects etc. living in the soil.

### ***The assessment of authorities in other countries***

The authorities in Sweden consider cyanazine's metabolites to be "considerably more persistent" than the mother substance. Cyanazine is considered to have medium high mobility, whereas the metabolites are likely to have high mobility. There is considered to be a risk that cyanazine and or its metabolites will leach to the groundwater.

The authorities in Sweden also consider that cyanazine will harm algae at very low concentrations and that it also seems to accumulate in algae. Cyanazine will be reassessed in Sweden in 1994.

The authorities in Norway consider cyanazine to be "clearly mobile". They have emphasized the fact that cyanazine is the fifth most common pesticide found in groundwater in the United States, both in groundwater and surface water.

No assessment of cyanazine has been received from Germany.

The authorities in the Netherlands report that the half-life for cyanazine is between 9 and 38 days in the field and that the main metabolite has a half-life of 13 to 34 days. One year after application they found about 10% of both metabolites I and II. The mobility of cyanazine is considered to be low to moderate based on specific finds and modelling. The mobility of metabolites I, II and III is considered to be greater than that of cyanazine.

### ***Chemical pesticides and methods that can be used instead of cyanazine***

Cyanazine is used as a selective herbicide in the cultivation of peas, broad beans, winter and spring rape, winter wheat, winter barley, winter rye, spring barley, oats, maize and in killing all vegetation. Mixed with atrazine, cyanazine is used as a herbicide in the cultivation of maize, forests, ornamental shrubs and roses, nurseries and on uncultivated land.

Nevertheless, the holders of the approval permit for atrazine have taken it off the market. This is also likely to happen for mixtures including atrazine.

The Danish Environmental Protection Agency assesses that the withdrawal of approval from cyanazine will not present problems in combating weeds in grain production.

The agricultural organizations in Denmark said in 1993 that the withdrawal of cyanazine would present problems in the following crops: peas intended for canning and those intended for ripening, rape, maize, cucumbers and beans.

Cyanazine has been used extensively on peas. Nevertheless, the Danish Environmental Protection Agency considers that trifluraline and napropamide are other substances that can be used for soil treatment. As leaf substances, the Danish Environmental Protection Agency considers that a pendimethaline and bentazone mixture can be used instead of a cyanazine and bentazone mixture. Nevertheless, bentazone is also being reassessed. The Danish Environmental Protection Agency has rejected approval because bentazone

risks contaminating the groundwater, and this decision has been appealed.

Cyanazine has been used extensively in rape. The Danish Environmental Protection Agency considers that trifluraline, napropamide, benazoline and clopyralide can generally be used instead of cyanazine in rape. The effect of these substitutes on charlock, one of the problematic species of weeds, is weaker, which can create problems on some rape fields.

The Danish Environmental Protection Agency recently approved a new pesticide for use in maize. Thus, it is considered that the withdrawal of cyanazine is not likely to have substantial effects on maize cultivation.

Cyanazine is not approved for use in cucumbers.

It is generally believed that there are other pesticides to combat weeds in beans, ornamental shrubs, roses and nurseries.

Cyanazine is used in forestry in a mixture with atrazine, and this mixture has been very heavily advertised after the use of pure atrazine was restricted to maize fields. Other pesticides can replace this mixture for forestry purposes, although they are slightly more expensive and have a slightly reduced effect on certain weed species. Other pesticides include terbuthylazine and glyphosate. It is thus not considered that a ban on cyanazine will have notable effects on forestry."

### **3.4. Example: bill on certain stretches of main highway (bypass road near Næstved, Assentoft-Sdr. Borup and bypass road near Faaborg), L 242**

This example presents the part of the strategic environmental assessment statement related to the bypass road near Faaborg.

The example illustrates the following checklist points:

- 1.1) surface water;
- 1.2) groundwater;
- 2) air;
- 3) climate;
- 5) flora and fauna;
- 6) landscapes;
- 9) historical buildings; and
- 10) the health and welfare of the population.

#### ***Purpose***

This act authorizes a specific development project including the construction of three different stretches of road. They resulted from a package of measures to promote employment in 1993; in the area of roads, this allowed projects to be initiated that reduce the burden of traffic on cities and towns with sub

stantial traffic and that benefit the environment and road safety.

The commentary begins by stating that the environmental effects of the projects have been assessed and negotiations have been conducted with the relevant local government authorities as the basis for the final decision on implementing these road construction projects.

The environmental effects are mentioned in the commentary to the bill. These environmental effects are described in more detail in three reports for each stretch of road: 1) environmental assessment; 2) visualizing the project and aesthetics; and 3) the summary of the environmental impact statement. In addition, there is a description of the technical aspects of the roads.

The project near Faaborg includes a 2.5-km bypass road east of Faaborg and connecting roads to the town as well as bicycle paths.

The commentary related to environmental aspects for the Faaborg bypass road is included in the sections entitled "Effects on traffic and the environment" (4.4), "Effects on the landscape and nature" (4.5), "Surface water and groundwater" (4.6) and "Waste sites" (4.7).

#### **Surface water (1.1)**

The statement describes how the runoff water will be processed and how it is proposed to be discharged into the sea.

"All water will be collected in troughs and closed pipes and transported to rain water basins that have a considerable purification effect, especially for heavy metals. The rain water basins are equipped with oil filters that reduce the amount of oil products and prevent pollution in case of oil and chemical spills in tank truck accidents.

The runoff water is piped in closed pipes to Sundrenden (the edge of a sound), where it is discharged into Faaborg Fjord. The total amount of runoff water that will be transported to Sundrenden is 10,000 m<sup>3</sup> per year, which is 0.6% of the water being discharged at Sundrenden. For brief periods, however, the runoff water will comprise 25% or more of the water discharged at Sundrenden. The regional plan for Fyn County does not specify standards for the state of Sundrenden.

#### **Groundwater (1.2)**

The statement describes which catchment areas for drinking-water extraction will be affected.

"The bypass road will be built in an drinking-water catchment area for the municipal Anneks waterworks. However, the water extraction from this waterworks is being reduced, and this extraction is planned to be taken over by Kaleko waterworks."

For both sources of water the problems that can arise from two waste sites over which the road is to be built are described and potential solutions are discussed.

"The road will be built on top of two waste sites at the southern edge of Sundet (a sound). These sites contain normal household waste, industrial waste and paint residues, and biogas is forming in these sites.

When it is documented that the waste sites will not leach pollutants to surface water or groundwater, the road can be constructed on top of the sites. The hydrogeological situation and the composition and quantity of the deposited waste will be investigated. The preliminary requirement is that the waste may have to be removed, and the construction budget therefore includes DKK 3 million for this purpose.

### ***Air (2) and climate (3)***

The statement describes the likely effects on energy consumption and the total air pollution and assesses that the nuisance caused by air pollution will be reduced as a result of the rerouting of traffic.

"As the bypass road is shorter than the present route through the town, the total number of vehicle-kilometers will decline by 123,000 per year. This will reduce energy consumption and total air pollution. Energy consumption is expected to decline by 1800 GJ per year, carbon dioxide emissions by 200 tonnes per year, carbon monoxide by 20 tonnes per year, nitrogen oxides by 1 tonne per year, hydrocarbons by 1 tonne per year and particulate by 34 tonnes per year."

### ***Flora and fauna (5)***

The statement discusses the biotopes that will be affected.

"The most important natural areas in the project area are near Sundet. The lake area is near the foot of Svanninge Bakker (a hill formation), which contains valuable natural areas from which fauna and flora can disperse to and from Sundet.

From the east, Rislebækdalen (a valley) drains into Sundet. This valley has marshes and moors and vigorous deciduous forests, which are important natural areas in terms of the exchange of fauna and flora with the lake area.

As the main road will be located west of Sundet, it will not disturb the ecological link between Svanninge Bakker and Rislebækdalen. Nevertheless, the road will be built over two small meadows south of the lake and a large meadow with strong human influence northwest of the lake. This meadow area will also be affected by the extension of Engvej and will therefore lose some of its significance as a wetland in connection with the lake."

### ***Landscapes (6)***

The statement describes the value of the landscape, including the historical value, and which measures have been taken and which changes will take place.

"The landscape around Faaborg is full of contrasts and is valuable. Svanninge

Bakker and its moraine formations rises high over the sea and the flat Horne-land (a plain). Between Svanninge Bakker and the sea is Faaborg with the original town on a little peninsula between Faaborg Fjord and Sundet.

There is a plan to re-establish the lake area found previously in Sundet. This nature management project and the bypass project are compatible in a number of ways.

The location of the main highway on a dike near Sundet will strengthen the peninsula's eastern boundary along Sundet, when this in the future will appear as a lake.

To protect the opportunities for views from the town over Sundet and towards Svanninge Bakker, the road will be located as low as possible in relation to the town while taking account of the necessary height of the dike above the future water level of Sundet.

The terrain between the road and the town will be designed and greened with consideration for the character of the area and to further demarcate the town boundary at the same time that the view is protected."

"The location of the town of Faaborg and its façade towards the east have largely been determined by the presence of Sundet. Sundet offered both a useful natural harbour, opportunities for fisheries, reed beds and meadows for grassing. The re-establishment of the lake will make it possible in principle to re-create parts of this link between the landscape and the historical context. In practice, however, the old town has only been preserved around Klosterkirken (a church).

The location of the main highway between the town and Sundet will reduce the opportunity to re-create the historical landscape. The effects of the road will be reduced, however, because the road will lie low in relation to the town. Noise barriers and tall plants are thus not included in the project.

The National Forest and Nature Agency has approved the project in principle in accordance with 20 ff. of the Protection of Nature Act on the condition that the road is not lighted."

### ***Historical buildings (9)***

Under this point the statement mentions briefly:

"There are no protected historical monuments near the proposed road."

### ***The health and welfare of the population (10)***

The statement describes the extent to which the new road relieves the traffic on the present road, the changes in noise levels, the barrier effect, a reduction of accidents with personal injury and the reduction in driving time for motorists.

The shift in traffic is described as follows:

"The bypass is expected to have annual average traffic of 5700-6400 vehicles

per day and to relieve the present main highway of 2800-6000 vehicles per day (at the projected traffic levels for 1996)."

The barrier effect is described as follows:

"The road will increase the barrier effect and the risk experienced in travelling between home and the schools around Sundet and between the town and the recreational areas in Sundet. These effects will be reduced substantially, however, by a system of paths established as part of the road construction."

Reduction of accidents with personal injury:

"The bypass will reduce the number of accidents with personal injury by 0.4 accidents per year."

The reduced driving time:

"The bypass will reduce motorists' driving time by more than 42,000 hours per year."

Noise levels:

"The noise levels in the urban area and the experienced risk of walking on the streets in town will be reduced as a result of the rerouting of traffic."

"The road will subject part of Sundet to a noise level exceeding 50 dB(A), which is the recommended limit value for recreational areas of the Danish Environmental Protection Agency. The National Forest and Nature Agency has stated that, in this specific case, they consider the visual link between the recreational area and the town to be more important than noise reduction. Fyn County has said that the area is considered a recreational area near an urban area and that the noise level is therefore not in contradiction to the guidelines of the regional plan."

### **3.5. Example: bill on amending the Road Safety Act (periodic inspection of personal cars), L 208**

This example illustrates the following points of the checklist:

- 2) emissions into the air;
- 3) emissions of greenhouse gases or other substances affecting the climate or temperatures; and
- 11) other effects on the security and safety of the population.

#### ***Purpose***

The proposal implements a European Council directive on the inspection of motor vehicles that requires them to be inspected periodically. The purpose of the proposal is to improve road safety and to ensure that cars fulfil the applicable standards for noise and emissions.

#### ***Emissions into the air (2) and emissions of greenhouse gases or other***

### ***substances affecting the climate or temperatures (3)***

The strategic environmental assessment statement states that the national targets for reducing air pollution caused by emissions from transport are in the 1990 transport action plan for environment and development of the Government of Denmark and are maintained in Transport 2005, the Government's follow-up to this plan from 1993. The targets are not reproduced in the commentary.

The effects of the proposal on the environment are projected quantitatively for cars without catalytic converters and those with them.

"For cars without catalytic converters it is estimated that carbon monoxide emissions can be reduced by 10-20% and hydrocarbons by 5-20%, but nitrogen oxides will increase by 0-10%. Energy consumption and thereby carbon dioxide emissions are expected to decline by 2%."

The changes are especially attributed to the fact that some cars will be tuned to a more lean carburetion to fulfil the limit values for carbon monoxide while idling.

"For newer cars (0-5 years) with catalytic converters, the periodic inspection is expected to reduce the emission of carbon monoxide and hydrocarbons by 6-7% and nitrogen oxides by about 1%. Energy consumption and carbon dioxide emissions are expected to be reduced by about 0.5%. For older cars with a catalytic converter the data are not yet available, but a substantially larger reduction in emissions of carbon monoxide, hydrocarbons and nitrogen oxides is expected, because a defective catalytic converter increases emissions vastly, and such defective converters are discovered at the next periodic inspection."

### ***Other effects on the security and safety of the population (11)***

The statement says that investigations outside Denmark indicate that the worst part of the vehicle fleet will disappear through periodic inspection and that the maintenance standard of cars will be improved.

"Based on the information available, it is possible that periodic inspection will improve road safety, and most of this effect will be on cars that are more than 10 years old."

## **3.6. Example: bill on standards for energy efficiency of energy-consuming equipment, L 69**

This example illustrates the following point on the checklist:

3) climate.

### ***Purpose***

This proposal is part of *Energy 2000-follow-up*. The purpose of the bill is to

contribute to reducing energy consumption to fulfil the target of reducing carbon dioxide emissions in Denmark by at least 20% by the year 2005. The Minister for Energy (currently the Minister for Environment and Energy) is empowered to establish standards for the design and energy efficiency of various types of energy-consuming equipment. The first phase includes refrigerators and freezers, washing machines and dishwashers, to be followed by other types of energy-consuming equipment.

The proposal promotes environmental policy targets and thereby has substantial positive environmental effects. The strategic environmental assessment is scattered in several parts of the commentary and is thus not assembled in the assessment statement portion of the commentary.

***Emissions of greenhouse gases or other substances affecting the climate or temperatures (3)***

The rest of the normal commentary describes the targets in *Energy 2000*, and an annex describes the likely effect of introducing standards that include the equipment that will be covered by the standards in the later phases.

The assessment statement itself details in quantities and percentages the expected annual reduction in energy consumption, fuel consumption and carbon dioxide emissions in the year 2005 and thereafter. The bill will introduce standards for several types of equipment, and the effects of implementing ministerial orders for each type of equipment will be assessed before they are prepared.

The likely effects on the first type of equipment are determined to be as follows:

**"Refrigerators and freezers in households**

The European Council directive is expected to provide a net annual reduction in energy consumption of 460 GWh in Denmark in 2005, which will save the equivalent of 4 PJ of fuel and 0.35 million tonnes of carbon dioxide per year. In the longer term, the net savings will approach 40% or about 700 GWh per year.

**Washing machines and dishwashers for households**

The total result of the standards is expected to be net savings of 64 GWh in 2005 (5%). In the longer term the saving is expected to increase to 15%."

The annex provides more detail on these calculations and provides similar calculations for other types of equipment that will gradually fall under the standards.

### **3.7. Example: proposal for a Folketing resolution on the accession to agreements on the protection of small whales in the Baltic Sea and North Sea and of the European bat**

The example illustrates the following point of the checklist:

#### 5) fauna

##### ***Purpose***

The purpose of the proposal is that the Folketing consents that Denmark accedes to an agreement on the protection of bats in Europe and an agreement on the protection of small cetaceans in the Baltic Sea and North Sea. Both agreements have been entered into within the framework of the Convention on the Protection of Migrating Species of Wild Animals of 23 June 1979 (the Bonn convention). The purpose of this convention is to protect the stock of migrating wild animals that regularly cross national borders.

##### ***Fauna (5)***

The statement describes the status of the species of bats in Denmark. Most species are considered to be in decline. The statement describes which factors have contributed to the decline, including intensive forestry and the transition from deciduous to coniferous forest.

The statement then describes measures that could gradually improve this situation, including the strategy of establishing natural forests, subsidy schemes to promote the planting of deciduous forests and the provisions of the new Hunting Act on the protection of nesting trees.

Similarly, the situation for small types of cetaceans in Denmark, the porpoise, which is the only breeding type, and the other species that exist are described.

The statement then explains the factors that threaten these cetaceans: especially toxic substances in their environment but also excessive depletion of their food supply by fisheries as well as accidental catches of cetaceans and shipping traffic can affect the stock negatively.

The statement concludes that the two agreements under the framework of the Bonn convention and the establishment of secretariats for these agreements is a substantial extension of the international cooperation on the protection of these species. The agreements will increase coordination and strengthen the efforts within research, administration and information of each individual country. The agreements will also result in more effective and targeted protection through a comprehensive assessment of the status of each species with regard to number and condition and an overview of the most important threats.

### **3.8. Example: Bill on amending the Planning Act and the Protection of Nature Act (protection of coastal areas), L 191**

This example illustrates the following checklist points:

- 5) fauna and flora;
- 6) landscapes; and
- 10) the health and welfare of the population.

#### ***Purpose***

The purpose of this bill is to improve the protection of Denmark's coasts and to secure and maintain natural and landscape assets through targeted regulation of the development along the coasts. The public access to the coasts is also to be secured and functions that need to be located near the coast are to be fit into the coastal landscape.

Since the purpose of the bill is largely to maintain the present state of nature along the coasts and to prevent settlement and development projects that do not have to be located near the coast, the bill's normal commentary contains arguments related to the environment.

The strategic environmental assessment statement itself describes and assesses the landscape as it is today and assesses how the rules brought into force by the bill can maintain this.

The statement begins by considering the overall effect of the amendments to the Planning Act to be overwhelmingly positive in relation to protecting environmental interests in the coastal zone.

The amendments to the protection of Nature Act are assessed as being positive in relation to the environmental interests within the extended protection line along the coast.

#### ***Fauna and flora (5)***

The statement mentions that the bill will maintain the opportunity of flora and fauna to be protected and develop, as the coastal area as a transition zone between land and water and with its diverse forms of habitats and landscapes are central habitats of and dispersal corridors for fauna and flora.

This important function is to be protected by:

- keeping the open coastal areas from being changed substantially through the establishment of a 3-km coastal zone through the provisions of the Planning Act; and
- extending the protection lines along the coasts from 100 m to 300 m in accordance with the Protection of Nature Act.

The overall effect of the amendments to the Planning Act on flora and fauna is considered to be overwhelmingly positive.

Nevertheless, the section on the Planning Act mentions that increasing pressure on the coastal areas through their use for human recreation increases the likelihood of negative effects on flora and fauna in especially vulnerable areas.

Efforts will be made to ameliorate this through increased public information and nature restoration.

The overall effect of the amendments to the Protection of Nature Act on flora and fauna is considered to be positive.

### ***Landscapes (6)***

The aim is to strengthen the targeted regulation of development along the coasts to ensure that the coasts continue to comprise a significant natural and landscape resource and that the coastal landscape can be experienced as an open, unspoiled landscape interacting with the sea.

Denmark's coasts are unique because of their variation and extent. The purpose of the bill is to protect these landscapes by keeping especially the open, unspoiled coasts free of construction and cultivation.

Development is to take place with even more consideration for the protection of the overall nature of the coastal landscape.

This is to be accomplished by:

- rules in the Planning Act that stipulate that new development is to be located away from the coast or in connection with existing settlements; and
- extending the coastal protection line in accordance with the Protection of Nature Act from 100 to 300 m.

### ***The health and welfare of the population (10)***

The commentary on the Planning Act includes the following:

The effects of new development projects on the visual environment need to be described to assess the impact of development in an area.

The bill will support changed use, renovation and the reuse of existing installations and buildings near the coast and make them more attractive.

The bill will support the improvement of the already designated summer cottage areas, including their use for more intensive forms of holidays.

The bill will greatly affect the recreational opportunities of the population, as large stretches of coast will be protected for this purpose. The public access will not only be protected but improved, as the bill aims to promote access to the coast.

Finally, it is assessed that the strengthening of the planning basis, including the requirement of continual reassessment of the plans applying to the coastal zone combined with the fact that the Minister for Environment and Energy is obligated to monitor trends, will improve the opportunities to assess developments.

## ***Annex 1***

### **Checklist for determining the need for the strategic environmental assessment of a bill or other government proposal**

The purpose of the checklist is to enable the rapid assessment of whether a bill or government proposal is likely to have any significant environmental effects. If the conclusion is that the bill or government proposal is likely to have minor or insignificant environmental effects, it should be stated in the commentary to the bill or government proposal that it is not likely to have significant environmental effects. If the bill or government proposal involves multiple environmental effects, each of which is minor, these may, taken together, represent a significant environmental effect that would require the proposal to be subject to strategic environmental assessment.

If the results of the analysis based on the checklist lead to the conclusion that the bill or government proposal may have significant environmental effects in relation to one or more of the items on the checklist or to the conclusion that more detailed assessment is required, strategic environmental assessment should be carried out.

The environmental effects can be both beneficial and adverse, and account should be taken of short-term and long-term as well as direct and indirect effects. Direct environmental effects include those associated with construction projects, such as the building of power stations, and increased production or consumption, such as car purchases. Indirect environmental effects include those associated with using the construction project or product, such as the effect of increased energy consumption or motoring.

Account should also be taken of transboundary environmental effects. This applies especially to pollution, climate change and natural resources.

## Identification of the environmental effects of the bill or any other government proposal

Is the bill/government proposal believed to cause a change in or an effect on:

significant    should be    minor  
                  examined    significant    insignificant

### 1. Water

#### 1.1 Surface water

- Discharges of organic or inorganic substances, including toxic substances, into lakes and watercourses?
- Discharges into coastal areas or marine waters?
- Quantity of surface water or water level?
- Quality of salt water or freshwater?
- Natural ecosystems and habitats in salt water or freshwater?
- Drinking water supply or reserves?
- Consumption/withdrawal of water?

#### 1.2 Groundwater

- Percolation to groundwater?
- Groundwater quality?
- Quantity of groundwater?
- Drinking water supply or reserves?
- Consumption /withdrawal of water?

### 2. Air

- Emissions into the air?
- Air quality (e.g. acid gases, particulate or toxic substances)?
- Obnoxious smells?
- Change in precipitation quality?

### 3. Climate

- Emissions of greenhouse gases or other substances affecting the climate, temperatures?
- Other factors, including deforestation, which may cause local or global changes in climate?

10

Is the bill/government proposal believed to cause a change in or an effect on:

significant    should be    minor  
                  examined    significant    insignificant

### 4. Surface of the earth, soil and percolations

- Applicability or cultivation value of the soil?
- Percolation or accumulation of toxic or hazardous substances in the soil?
- Water or wind erosion?
- Soil in the case of changes in groundwater level?
- The structure of the strata?

### 5. Flora and fauna, including habitats and biodiversity

- The number of wild plants or animals of any species or the distribution pattern of species?
- The number or distribution pattern of rare or endangered species?
- Import or export of new species to/from this country for deliberate release into the environment, including the deliberate release of genetically modified organisms?
- Quality or quantity of habitats for fish and wildlife?
- Structure or function of natural ecosystems?
- Vulnerable natural or uncultivated areas (e.g. bogs, heaths, uncultivated dry meadows, salt marshes, swamps and coastal meadows, watercourses, lakes, humid permanent grasslands and coasts)?
- The reproduction or natural patterns of movement or migration of fish and wildlife species?
- Cultivation methods or land use in the agricultural or forestry sectors?
- Fisheries, catches or the methods applied in deep-sea or freshwater fishing?
- Open-air activities or traffic in the countryside which may affect the flora and fauna or cause wear and tear on the vegetation?

11

*Is the bill/government proposal believed to cause a change in or an effect on:*

significant      should be examined      minor significant      insignificant

**6. Landscapes**

- The total area of the land use within areas used, for example, for farming, towns, summercottages, industrial plants and installations as well as forests or coastal and natural areas (dunes, heaths, bogs, etc.)?
- Geological processes such as formation and erosion of the coast, sand drifts, soil drifts, water erosion?
- Geological structures in the landscape like river valleys, ridges, coastal structures (e.g. cliffs and dunes)?
- Permanent restrictions on the land use which reduce the future possibilities of use of the open land?
- The extent or appearance of archaeological or historical sites, buildings and plants, parks or other material assets?

**7. Other resources**

- Cultivation, cutting, catching or use of renewable resources, e.g. trees, fish or wildlife?
- Exploitation or use of non-renewable resources such as fossil fuels, minerals, raw material, (gravel, sand, stone)?

**8. Waste**

- Wastes, residues or quantities of waste disposed of, incinerated, destroyed or recycled?
- Treatment of waste or its application on land?

**9. Historical buildings**

- Buildings, with architectural, culture or historical value and with possibilities of preservation and restoration?

*Is the bill/government proposal believed to cause a change in or an effect on:*

significant      should be examined      minor significant      insignificant

**9. Historical buildings**

- Buildings and historical monuments which require repair because of a change of the groundwater level or air pollution?

**10. Population's health and well-being**

- Acute and/or long term health risk (including mental health) in connection with food, drinking water, bathing water, soil, air, noise or handling of hazardous or toxic substances etc.?
- Risk associated with ionising or non-ionising radiation?
- Risk associated with exposure to noise?
- Recreational experiences and facilities, including changes in the physical appearance of landscapes, natural or uncultivated areas?
- The function and environment of towns, including green areas in towns and recreational facilities?
- Aesthetic values or visual experiences (e.g. scenery, urban environment or cultural/historical monuments)?

**11. Production, handling or transport of hazardous or toxic substances**

- Risk of fire, explosions, breakdowns or accidents and emissions?
- Risk of leaks of environmentally alien or genetically engineered organisms?
- Risks associated with the effects of electromagnetic fields?
- Risk of radioactive leaks?
- Risk of breakdowns or accidents during transport of substances and materials?
- Other effects related to the security and safety of the population (e.g. traffic, accidents, chemical substances or leaks)?

## **Annex 2**

### **National action plans that include objectives and targets related to environmental policy**

This annex outlines Denmark's most important national action plans that target improving the environment.

The annex is intended to provide an overview that can be used in connection with the checklist in Annex 1 to relate strategic environmental assessment to some of the relevant objectives and targets related to environmental policy.

Most of the action plans are plans adopted by the Government of Denmark, and some have been approved by the Folketing (parliament).

In addition, numerous international conventions and protocols in which Denmark participates have objectives and targets, but since these are extremely diverse in nature and since they are implemented in very different ways, it would be too distracting to include them here.

Other objectives and targets are adopted in legislation related to the environment, such as the Environmental Protection Act, the Protection of Nature Act and the Planning Act and their concomitant ministerial orders, circulars and guidelines.

Some of these are implemented in municipal and regional planning: for example, the regional plans prepared by the counties include guidelines on water quality, noise and air pollution, the extraction of raw materials, natural areas and urban growth.

Reports on the state of the environment in Denmark (the latest is *Environment and society*, a report on the trends in the state of the environment prepared by the National Environmental Research Institute, report no. 93, 1993) contain a comprehensive overview of the state of the environment as well as references to the environmental policy objectives and targets in various sectors, both in international protocols and conventions and in the national environmental action plans for specific sectors.

The Ministry of Environment and Energy can provide further information on the various objectives, targets and regulations, and it is therefore often advantageous to contact the Ministry in advance in the early stages of the legislative process and strategic environmental assessment.

The discussion of action plans and objectives and targets is structured based on the points of the checklist.

## **0. Cleaner technology**

The action plan on cleaner technology for 1993-1997 (adopted in 1992) is a continuation of the previous action plan for 1990-1992.

The main aims of the plan are:

- . to ensure that the results of previous plans are put to use;
- . to continue and initiate selected activities; and
- . to shift the emphasis from production processes to products.

The objective of the action plan is to reduce the total consumption of natural resources and the direct pollution from the production and consumption of products and to contribute to reducing the growth in the waste generated.

Several industries have developed cleaner production technologies based on the two previous action plans. The new action plan is intended to contribute to increasing the use of these technologies in Denmark's industry through numerous activities. Making use of the results achieved requires active and constructive cooperation with enterprises to promote maximum investment in environmentally sound production.

Cleaner technology still needs to be developed and made use of in several other industries. This will not take place without initiatives based on an action plan on cleaner technology.

The work on cleaner technology in the new action plan will be shifted from production processes to products. The reason is that the direct pollution caused by much manufacturing has been reduced substantially. The future environmental efforts will be directed towards products, to reduce resource consumption, to reduce the direct pollution resulting from consumption and to limit the growth of and environmental burden of waste.

The efforts will include the total environmental burden of products, including production, the use of alternative substances and materials, incorporating environmentally sound features in the products and disposing of the spent product.

The action plan includes the following priority areas of action:

- . industrial processes
- . agriculture
- . transport and energy
- . products
- . materials
- . substances
- . intersectoral information.

In the short term, the action plan will increase awareness of the responsibility of each enterprise for environmental problems and will thereby reduce industry's emissions of polluting substances and use of resources.

In the long term, the objective of the plan is to reduce society's generation of waste and consumption of resources through fundamental change in the production technology and by producing goods that are more environmentally sound and require fewer resources, thereby contributing to the development of products, processes and quality assurance in Denmark's economy.

## **1. Water**

### **1.1. Action plan on the aquatic environment**

The target of the 1987 action plan on the aquatic environment is to reduce the discharge into the aquatic environment of nitrates by 50% and phosphates by 80% through such measures as improved wastewater treatment and reducing the use of fertilizer in agriculture. The targets are concurrently expressed in the regional plans, which contain guidelines for water quality in watercourses, lakes and the sea, and in the adopted plans for sustainable development in agriculture. A nationwide monitoring programme was adopted to follow up the action plan on the aquatic environment; this programme includes the systematic collection of information on the size and sources of nutrient discharge into the aquatic environment.

### **1.2. The action plan on pesticides**

The 1986 action plan on pesticides targets a 50% reduction of pesticide use by 1997. The target applies to both the amount of active ingredient and the application frequency, which indicates the intensity of application. The application frequency indicates how many normal doses a given field may be sprayed with pesticide each year. One purpose of this action plan is to protect the groundwater by not allowing the use of pesticides that can leach.

Another purpose of the plan is to protect human health: both users of pesticides and the general population, who need to be protected against the intake of pesticides through food and drinking-water. The plan is also intended to protect the environment: both harmless organisms and useful organisms among flora and fauna on land and in water.

### **1.3. Action plan for sustainable development in agriculture**

The 1991 action plan for sustainable development in agriculture maintains the targets of the action plan on the aquatic environment of reducing nitrate discharge into the aquatic environment by 50%, but the time limit was postponed to the year 2000. The plan also contains several new initiatives to reach this target.

### **1.4. Groundwater**

In 1994, the Government of Denmark presented a ten-point strategy for the protection of Denmark's groundwater and drinking-water. The main elements of this strategy are:

- Certain pesticides harmful to human health and the environment are to be removed from the market.

- . The pesticide application frequency is to be reduced by 50% before 1997. The Folketing (parliament) has decided to increase the excise tax on pesticides to achieve this target.
- . Monitoring of, among other things, pesticide concentrations in drinking-water and groundwater is to be improved and also cover more pesticides and their metabolites.
- . Nitrate emission into the aquatic environment is to be reduced by 50% by the year 2000.
- . The drinking-water supply in the whole country is to be safeguarded. This includes requiring the counties to designate areas of special interest in protecting groundwater resources in connection with the revision of the regional plans in 1997.
- . The Government of Denmark intends to ensure that landfills threatening the groundwater within the areas designated by the counties are cleaned up within ten years.
- . Set-aside of farmland, afforestation and organic agriculture are to be promoted, and the possibility of restricting conventional agricultural practices may be considered.

## **2, 3. Air and climate (and the part of point 10 related to noise)**

### **2.1. The transport action plan for environment and development and Transport 2005**

The 1990 transport and action plan for environment and development discusses numerous global, regional and local environmental problems related to transport. The following targets for reducing of the environmental burden of transport were adopted:

- . Emission of nitrogen oxides and hydrocarbons should be reduced by 40% by the year 2000, 60% by 2010 and reduced further by 2030.
- . Particulate emission should be reduced by 50% in the cities and towns by 2005 and reduced further by 2030.
- . Energy consumption and carbon dioxide emissions should be stabilized by the year 2005 at the 1988 level and reduced by 25% by the year 2030.
- . The noise burden on dwellings should be reduced such that fewer dwellings are subjected to a noise level exceeding 55 dB(A) and no more than 100,000 dwellings are subjected to 65 dB(A) in 2010.

Transport 2005 from 1994 maintains the targets of the 1990 action plan but adjusts the time frame for implementing the first phase of the action plan.

In addition, Transport 2005 has a stricter target for noise: no more than 50,000 dwellings are to be subject to more than 65 dB(A) in 2010.

### **3.1. Energy 2000 and the follow-up**

*Energy 2000: a plan of action for sustainable development* covers all energy consumption except for transport. The main purpose of *Energy 2000* is to ensure that Denmark's energy system develops sustainably with regard to environment and resources.

The action plan includes a target to reduce carbon dioxide emissions by at least 20% in the year 2005 compared with the 1988 level. Sulfur dioxide and nitrogen oxide emissions will be reduced as a consequence of the action plan.

The target is to be achieved through an energy action programme that includes comprehensive initiatives in the following main areas:

- . reducing energy consumption by continuing to increase energy efficiency and reducing the demand for energy in all final consumption sectors;
- . change in and improving the efficiency of the energy supply system;
- . use of more environmentally sound energy sources; and
- . research and development.

Initiatives in the building and housing sectors include increasing insulation standards for new construction to reduce heating consumption and efficiency standards for the most important household appliances combined with labeling and general information to reduce electricity consumption. In the supply system, increased reliance on combined heat and power production using new, efficient conversion technologies plays an important role combined with increasing the use of cleaner fuel and forms of energy that pollute less.

The energy planning is strategic planning, which means that the action programme is revised at regular intervals. *Energy 2000* (originally from 1990) was last revised in 1993 (*Energy 2000* □ *follow-up*), and a new energy action plan is scheduled to be released in 1996, including a new action programme.

## **5. Fauna and flora**

### **5.1. Biodiversity**

In May 1995, the Ministry of Environment and Energy published *Biologisk mangfoldighed i Danmark* □ *status og strategi* (Biodiversity in Denmark □ status and strategy) to follow up the Convention on Biological Diversity. The publication describes the status of biodiversity in Denmark and the efforts that have been made to protect biodiversity. Based on this, a strategy for future efforts is presented.

The strategy includes ecological networks; integration of biodiversity considerations into Denmark's and the European Union's agricultural policies; more nature restoration projects; designation of areas for natural succession; conservation of genetic resources, including the genetic resources of domesticated plants and animals; conservation of biodiversity in urban areas; and increasing the awareness of the public.

The publication will be translated into English and published internationally.

## **5.2. Strategy on natural forests**

The purpose of the strategy on natural forests is to protect the biodiversity of Denmark's forests, including the genetic resource it comprises, to protect viable stocks of as many of the forest's animals, plants and microorganisms as possible and to ensure their opportunities for dispersion.

The strategy aims to establish about 5000 ha of natural forest and 4000 ha of forest subject to traditional management regimes by the year 2000. In privately owned forests, conservative methods of operation (selective harvesting, meadows in the forest and coppice) will be promoted by subsidies.

As a supplement to the strategy on natural forests, the National Forest and Nature Agency has prepared a strategy for the protection of the genetic resources of trees and bushes. The strategy is also supported by a political target of doubling Denmark's forests within one tree generation (80-100 years).

## **5.3. Strategy for sustainable forest management**

The overall objective of the strategy for sustainable forest management is to ensure the sustainable development of forests, such that all areas of the forest are managed diversely to the greatest extent possible. This is to be achieved by targets on:

- . doubling the forest area during one tree generation;
- . expanding the area of deciduous forests in private forests by 1000-1200 ha per year to a total of 120,000 ha; and
- . ensuring areas subject to forest management, as outlined in the strategy on natural forests.

In addition to the instruments available in accordance with the Forestry Act and the Protection of Nature Act, numerous activities have been initiated in forestry, such as a project on environmentally sound forestry and product development for wood and wood-based products.

The strategy includes the establishment of a programme to monitor the indicators of sustainable forest management.

# **8. Waste**

## **8.1. The action plan on waste and recycling**

The overall objective of the action plan on waste and recycling for 1993-1997 is to reduce the quantity of waste generated and the environmental burden of all types of waste.

The plan includes a target of 50% recycling by the year 2000 and the following subtargets:

Household waste	40-50%
Large items from households	25%
Waste from gardens and parks	85%
Commercial and office waste	60%
Industrial waste	50-60%
Construction waste	60%
Sludge from wastewater treatment	50%
Residual products from energy production	56%
Residue from incineration	53%

The waste strategy comprises four aspects: environmentally sound technology, recycling, energy recovery through incineration and landfilling.

Environmentally sound technology for waste is a preventive strategy that can ensure that less waste is generated through such means as improving resource efficiency. The efforts to promote such technology are described in a separate action plan on cleaner technology for 1993-1997.

Recycling is the waste treatment method given highest priority, as the resources contained in the waste are thereby conserved optimally. The target for recycling of normal waste and residues is 50% of total waste by 2000.

Incineration of waste recovers the energy content of the waste, and air emissions can be reduced substantially by effective flue gas cleaning. It is therefore a target to redirect all burnable waste that is not to be recycled and does not present special incineration problems to incineration with energy recovery by 2000.

Depositing of waste at landfills is the last choice for waste treatment, as there is no resource recovery and risk for contamination of soil and groundwater from waste sites. The objective for deposition of the remaining waste is therefore that this be redirected by 2000 from landfills and other waste sites to large waste sites located as close to the coast as possible without creating conflicts with interests in the protection of nature.

## **9. Historical buildings**

Cultural Environment 2000, a national strategy related to the historical heritage of cities and the countryside and their relationships to land use, including listed and preservation-worthy buildings, ancient monuments and cultural landscapes, is being prepared.

## **10. The health and welfare of the population**

### **10.1. Health**

Both the 1989 health promotion programme of the Government of Denmark and the Government's 1993 action plan to increase the efforts to prevent asthma and allergy include numerous targets related to environmental policy.

The health promotion programme includes the contribution of the Ministry of Environment and Energy to fulfil several of the regional targets for health for all established by the World Health Organization for the European Region and national targets on environment and health that comprise the basis for much of the regulation conducted by the Ministry.

The action plan to increase the efforts to prevent asthma and allergy includes targets on reducing in air pollution and on regulation of the content of allergenic substances in products.

### **10.2. Welfare**

The 1993 national planning report from the Minister for the Environment, *Denmark towards the year 2018*, presents a vision on Denmark's spatial development in the future Europe.

It includes general goals for the development of Denmark's cities and towns, the overall transport system, rural districts and tourism.

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