

EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT

# STRATEGIC ENVIRONMENTAL ASSESSMENT

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# **STRATEGIC ENVIRONMENTAL ASSESSMENT FOR TRANSPORT**

EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT

## EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT (ECMT)

The European Conference of Ministers of Transport (ECMT) is an inter-governmental organisation established by a Protocol signed in Brussels on 17 October 1953. It is a forum in which Ministers responsible for transport, and more specifically the inland transport sector, can co-operate on policy. Within this forum, Ministers can openly discuss current problems and agree upon joint approaches aimed at improving the utilisation and at ensuring the rational development of European transport systems of international importance.

At present, the ECMT's role primarily consists of:

- helping to create an integrated transport system throughout the enlarged Europe that is economically and technically efficient, meets the highest possible safety and environmental standards and takes full account of the social dimension;
- helping also to build a bridge between the European Union and the rest of the continent at a political level.

The Council of the Conference comprises the Ministers of Transport of 40 full Member countries: Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, FYR Macedonia, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom. There are six Associate member countries (Australia, Canada, Japan, New Zealand, Republic of Korea and the United States) and two Observer countries (Armenia and Morocco).

A Committee of Deputies, composed of senior civil servants representing Ministers, prepares proposals for consideration by the Council of Ministers. The Committee is assisted by working groups, each of which has a specific mandate.

The issues currently being studied – on which policy decisions by Ministers will be required – include the development and implementation of a pan-European transport policy; the integration of Central and Eastern European Countries into the European transport market; specific issues relating to transport by rail, road and waterway; combined transport; transport and the environment; the social costs of transport; trends in international transport and infrastructure needs; transport for people with mobility handicaps; road safety; traffic management; road traffic information and new communications technologies.

Statistical analyses of trends in traffic and investment are published regularly by the ECMT and provide a clear indication of the situation, on a trimestrial or annual basis, in the transport sector in different European countries.

As part of its research activities, the ECMT holds regular Symposia, Seminars and Round Tables on transport economics issues. Their conclusions are considered by the competent organs of the Conference under the authority of the Committee of Deputies and serve as a basis for formulating proposals for policy decisions to be submitted to Ministers.

The ECMT's Documentation Service has extensive information available concerning the transport sector. This information is accessible on the ECMT Internet site.

For administrative purposes the ECMT's Secretariat is attached to the Organisation for Economic Co-operation and Development (OECD).

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In 1999 the OECD and ECMT organised a joint conference on Strategic Environmental Assessment for Transport in Poland, hosted by the General Directorate for Roads and the Ministry of Transport and Maritime Economy. The first draft of the current report was prepared for that conference as an update of the 1998 publication by Olivia Bina of ERM in London. Subsequently material from the papers presented at the conference were incorporated into this report with assistance from Paul Tomlinson at the UK Transport Research Laboratories. The executive summary of the report is based extensively on the conference conclusions developed jointly by ECMT with the OECD Secretariat, conference speakers and participants. The conference original papers can be consulted on the ECMT web site, [www.oecd.org/cem/topics/env/index.htm](http://www.oecd.org/cem/topics/env/index.htm).

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## EXECUTIVE SUMMARY

### 1. Role of Strategic Environmental Assessment (SEA)

Strategic environmental assessment (SEA) is an essential tool for effective decision-making in transport policy development and investment planning. It enables assessment of impacts that go beyond the boundaries of individual projects or unitary planning authorities, and such impacts characterise investments in expanding trunk transport capacity. SEA also functions as an early warning system, identifying potential problems, and beginning consultation on resolving conflicts of interest, early in the planning process – reducing the risks of protests late in the day and the high costs associated with the delays that result. In short, effective SEA saves both time and money.

The last decade has seen SEA developed for transport planning in many countries. It builds on the principles and experience of project environmental impact assessment (EIA), which indicate that some level of strategic assessment is necessary to deal with the fundamental choices of transport policy and its links with other aspects of society. Policy choices cannot be adequately assessed at the project level. There are also some important environmental impacts which cannot be addressed in a meaningful way by project EIA (*e.g.* greenhouse gas emissions, land use). The interaction and cumulative impacts of transport and land use decisions are especially difficult to access through EIA (*e.g.* impacts on landscape, biodiversity and road safety).

SEA is most effective when fully integrated into the strategic planning process. For this SEA needs to be tied to each stage of the planning process which leads to a decision. The outcome of the SEA has to be given adequate weight in making investment or regional planning decisions and this has to be done in a way that is transparent. The linkage to a decision will be facilitated by limiting the assessment to what is essential for a decision to be made. Conversely, if there is no planning decision to be made SEA is generally not required.

Nevertheless, SEAs can also provide valuable results when not directly linked to a decision. It is a valuable tool for promoting international and regional co-operation in strategic thinking. Joint SEA is an effective way to resolve national differences in environmental assessment methodologies and in overcoming a narrow national focus that is incapable of balancing environmental costs in one country with costs and benefits in another country. Such differences have on past occasions proved a major barrier to rational joint planning in Europe and between jurisdictions in many OECD countries. Secondly, a pilot SEA exercise might prove a valuable testing ground for developing methodologies and expertise in a country where there is no experience of SEA or similar assessment processes in government.

Transport SEA requires effective methods of handling multi-modal issues and addressing potential infrastructure and non-infrastructure measures synthetically. Moreover it requires effective linkages between the transport sector and other sectors to be built into the assessment. As experience in the implementation of SEA accumulates, an increasing divergence from the original pattern of transferring EIA methodology and procedures to the strategic level can be noted in some countries. The most significant aspect is that at the strategic level, environmental goals cannot be considered in isolation and thus SEA tends to develop towards a general strategic assessment, balancing the goals and objectives of mobility, safety, environmental protection and economic development. Opinions are divided on where the boundaries of SEA should be drawn. Most Ministries tend to view the results of SEA as only one of the inputs to making a planning or investment decision. In some countries, separate procedures for assessments of sustainability



are being developed and applied to policies as well as to projects, programmes and plans (*e.g.* review of the transport allocations in the 1997 and 1998 Danish budget proposals).

A strong spatial element is the key to what strictly constitutes a SEA and regional development land-use master-plans are the ideal basis as they are developed within an existing decision-making structure. However, even where the scope of SEA is limited to its strict sense, some form of environmental assessment is important for policies (and for programmes without a strong spatial element) in order to ensure compatibility with adopted sustainable development policies.

Whatever its scope, SEA demands a commitment to, and definition of, goals that define sustainable development nationally. It is essential to maintain a strong link between any strategic assessment and national goals for sustainability. SEA can influence strategic decision-making only if the decision-makers show a clear commitment to sustainable development in society as a whole.

Co-operation with the public is crucial. Ensuring public involvement in SEA implies effective consultation in the whole strategic planning and policy-making process. If consultation fails, SEA may fail to facilitate the planning process, even when the studies and evaluations made produce high quality information. Achieving effective public involvement is a major hurdle for all countries in making transport investment decisions. SEA can contribute to the continuing need for innovation in this field. Geographic scale is important and radically different approaches to consultation are required when compared to local project level procedures.

Perhaps most important of all, the results of SEA have to be presented to decision makers in a form that lends itself to influencing their decisions. This implies the information presented has to be simple, precise and to the point.

The use of data also has to be selective to avoid dependence on “computer miracles”. Over-reliance on large data sets can be counter-productive as it is difficult or impossible to control the quality and reliability of inputs into very large data sets and very expensive to update them. Highly aggregated data such as that input into international mapping exercises can be useful in generating some broad indicators of sustainability but are of little use in site related decisions. Multi-layered mapping exercises are very useful in informing alignment decisions but tend to generate output that is too complex for proper consideration in many decision-making environments. Data-driven assessments can mislead particularly when considering uncertain long-term outcomes as they mask the uncertainty. In some cases it will be more productive to follow a primarily qualitative approach based on structured consultation and expert judgements.

## **2. Progress**

On the local and regional level, transport SEA is increasingly integrated with and performed as a part of the land use planning process. The other main focus of transport SEA so far has been on transport corridor assessment. Network assessments at international and national levels are at an earlier stage of development. Within the next few years SEA of policies and legislation, with significant implications for the environment and natural resources, will become a mandatory procedure in many ECMT and OECD countries. Important progress has taken place on a number of fronts:

- There is increasing experience in the development and testing of SEA procedures and methods, both in the context of sectoral and broad spatial development plans;
- Several countries<sup>1</sup> have already adopted SEA-related legislation;
- There are significant legislative and institutional developments in the European Union:
  - integration of environmental concerns into sectoral (*e.g.* transport) policies has become a key-priority, as stated in the Amsterdam Treaty and the European Council's Cardiff Summit in 1998, and SEA has been identified as one of the main instruments to achieve this;
  - final approval of the proposed Directive on SEA<sup>2</sup> is under discussion;
  - there are requirements for SEA of its policies and legislation;<sup>3</sup>

- projects and programmes benefiting from the Structural Funds also require a form of SEA.<sup>4</sup> These requirements are expected to be enforced more stringently in the period 2000-2006;
- the transport and environment reporting mechanism<sup>5</sup> and the assessment of Member States progress towards integration (the *Global Assessment*) co-ordinated by the European Commission in collaboration with the EEA, will also highlight the importance of SEA with particular reference to the transport sector.
- Practical experience of SEA includes the following notable examples:
  - M4 motorway Cardiff-Newport Common Appraisal Framework, Welsh Office, United Kingdom;
  - environmental assessments of the Seattle long-range transportation plan and the State of Wisconsin multi-modal transportation plan in the USA;
  - SEA of the east-west motorway in Slovenia for the Ministry of Environment;
  - environmental assessment of the 1999 Czech National Transport Infrastructure Plan;
  - SEA of the National Development Plan of the Czech Republic, with European Union Phare assistance;
  - SEA of the high speed rail network was undertaken in 1992 by the European Commission;
  - the Commission, in co-operation with the European Environment Agency, has undertaken a pilot SEA of the multi-modal Trans European Network for transport;
  - agreements between European Union Member States and the Commission have resulted in five pilot SEA case studies related to the Trans-European Network transport corridors:
    - Gothenburg-Jönköping Transport Corridor (Sweden);
    - Trans-Pennine Corridor (United Kingdom);
    - Austrian section of the Danube Corridor (Austria);
    - Road Corridor between port of Ravenna and Venice (Italy);
    - Corridor Nord – between Paris and Brussels (France/Belgium).
  - SEA for the I-69 International Corridor of Canada-USA-Mexico.
- Several international funding institutions have recognised the need for SEA and are either setting up procedures and guidelines or are investigating the possibilities to do so. Relevant initiatives can be found in the World Bank and the EBRD amongst others.

### 3. Priorities for Improvement

Nonetheless, there are still several important areas for improvement to ensure the successful and effective implementation of SEA. Priority should be given to addressing the following issues.

- Clear political support from governments is required to ensure that the proper weight and role is given to SEA findings when making a final decision over a policy, plan or programme. Political support has to be provided through clear inter-ministerial agreements and instructions.
- The role of SEA in relation to the appraisal of overall sustainability has to be made clear. Effective co-ordination between the different types of evaluations – economic, technical, social and environmental – undertaken by Ministries and planning authorities is vital.
- Currently the practice of SEA is in most sectors limited to plan and programme levels. To make the principles of sustainability fully operational, SEA or an equivalent system of appraisal should be developed also at a policy<sup>6</sup> level. This should be done as part of the process of developing policies, rather than as an ex-post test of acceptability. The European Commission is currently looking at ways of assessing the impacts of its policies (including transport policies) through SEA-type methods.
- Attention must be given to ways in which the SEA process can be integrated into transport planning procedures from a very early stage. Creating transparent links between the results of SEA and the infrastructure investment decision to grant or withhold funding is fundamental to this. Launching SEAs late in the decision-making process will inevitably result in delays and should be avoided.

- Recruiting and training sufficiently experienced staff to provide the technical support needed by the authorities responsible for the development of policies, plans and programmes for the transport sector will become increasingly urgent. The manual on SEA for transport developed by the Transport Directorate General of the European Commission provides important support.
- Determining appropriate roles for public participation and consultation in strategic planning and developing effective mechanisms for ensuring adequate consultation, particularly with local authorities, is important.
- Resources need to be directed by environment and transport ministries at improving environmental data sets (which are often inconsistent, especially across national borders) and improving the predictive techniques on which SEAs are based. However, spending should be selective and over-reliance on large data sets avoided for the reasons explained above. Particular attention should be paid to ensuring the traffic forecasts used as input reflect the dynamics of economic development and the influence of fiscal and other policies outside the sector together with the impact of international traffic.
- A coherent SEA strategy for the TEN needs to be developed. SEA of the TEN and its corridors should become an iterative process with continuous communication between all actors involved in the planning process (European institutions, national and regional governments, funding institutions and stakeholders).
- International funding agencies play a crucial role in the development of national and international transport systems. Even though most funding agencies have recognised the need for SEA and are investigating provisions for SEA, in practice environmental assessment is still very much limited to the project level. Practice shows that projects frequently form parts of plans that are only ever assessed in a segmented manner, as each individual project is examined. Introducing SEA principles as part of funding mechanisms would help to overcome this limitation. An example of this can be seen in the application of SEA to the regional plans for European Structural Funds.
- SEA procedures must be efficient. Planning delays have real costs and must be minimised as far as possible. In introducing SEA, opportunities should be sought for streamlining planning procedures rather than simply adding additional layers of bureaucracy.

#### **4. Additional Priorities in Central and Eastern European Countries and the New Independent States**

European Union Phare funds have successfully been used to support SEAs of regional development plans in central and eastern European countries. Transport is a key to development policies at the regional government level and this success should be built on, if possible extending assistance to more regions.

The European Union Transport Infrastructure Needs Assessment (TINA) programme presents the best immediate opportunity to develop SEA experience in the region and more fundamentally raises a clear need for such an assessment. Ideally countries along pan-European transport corridors along which TINA projects have been nominated should co-operate to undertake joint SEAs. The results should help shape the eventual selection of projects for financial support from the European Union and international finance institution funds and contribute to improving the design of the projects and the overall development of the transport corridors. Further east, the new independent states need to co-operate in a similar way to undertake joint SEAs for transport corridors and the transport development regions identified at the 1998 Helsinki Conference. The recent Trans European Network transport corridor studies, co-funded by the European Commission, can provide methodological guidance.

#### **5. Transport Ministries' Response**

National governments must develop the necessary capability and expertise to undertake adequate SEAs. This implies that governments will have to establish central SEA units to support the overall development of SEA and its linkages to national sustainability policies. At the same time, Transport Ministries will need to develop their own expertise on transport-related SEA procedures and methodology.<sup>7</sup>

International exchange of information on the experience of SEA in practice should help accelerate the learning process and ensure compatibility between national approaches when assessing infrastructure decisions with an international dimension. Joint SEAs between Ministries in neighbouring countries is the most effective way to achieve this.

Without the clear political support and transparent integration of SEA results into decision-making recommended, there is a risk that money is wasted on appraisals that are not subsequently fully utilised. Weakness in terms of institutional linkages between Ministries and between different departments (road, rail, aviation, etc) within Ministries (and indeed in the European Commission) increases the risk. All countries are exposed to this risk, but the exposure is probably greatest in central and eastern Europe where government resources are most limited and where the transport sector is entering a period of rapid change with a great many investment plans that have major strategic implications. When SEA is successfully incorporated into the decision making process it should help avoid wasted expenditure and at the same time speed up decision making by helping to avoid the lengthy and costly delays that often result when strategic issues are raised only late in the planning process.

SEA methodologies are undergoing rapid development in many western European countries in response to a clearly perceived need in government to improve the planning and decision-making process. The need is as pressing in central and eastern European countries, even if sometimes less clearly perceived. Development of cost-effective SEA methodologies should, therefore, be given priority by governments in the region. SEA should facilitate rather than delay decisions on the investments that are expected to transform the transport sector, and particularly the road network, and help in ensuring that the investments made are sustainable and strike the best balance possible to fulfil social and economic development goals and ensure environmental protection. The proper role of government is as honest broker rather than advocacy.

## 6. Recapitulation

Among the conclusions discussed above, four stand out:

- Link SEA clearly to the planning process leading to an investment decision and begin it early;
- Keep the output of SEAs simple and to the point to maximise the impact on decision-makers;
- The only way to develop effective SEA methodologies and procedures is through practice;
- SEAs along pan-European corridors should be undertaken in conjunction with the TINA programme.

## 1. INTRODUCTION

Integrated decision-making requires that environmental impacts be considered not only at project level but also at the policy,<sup>8</sup> plan and programme levels. Internationally, there is a growing consensus that the development of strategic environmental assessment (SEA) is essential to ensure that environmental considerations are incorporated at all levels of decision-making. Although SEA is still a domain in full development, various countries have during the last decades developed operational SEA systems on either a mandatory or voluntary basis.

In the transport sector, SEA proves to be particularly useful in assisting the environmental analysis and assessment in inter-modal approaches. It helps structure and focus the environmental analysis on the key environmental benefits and costs of each transport mode, comparing alternative options in an integrated way and providing the relevant information needed for environmentally sound decision making.

There are now numerous research initiatives aimed at developing SEA methods and there have been several practical applications of SEA to policies, plans and programmes at national and international level. It is clear that especially where the evaluation of transboundary actions is concerned (*e.g.* the trans-European transport networks), international co-ordination of initiatives and optimal exchange of information is a prerequisite. The European Conference of Ministers of Transport can play a crucial role in this regard. The objective of the present report is therefore to assist the ECMT in identifying its future SEA policy and research strategy.

After defining the concept of SEA and clarifying the link with environmental impact assessment (EIA) on project level, the second chapter gives a short outline of the role and existing procedures of SEA. The third chapter gives an overview of the recent developments and the experience and practice of SEA in the sector of transport at national and international level. This includes a summary of the assessment of the trans-European transport networks (TEN). Chapter 4 focuses mainly on the ongoing SEA research in the European Commission and the OECD. Based on the findings of this review, policy and research recommendations are formulated and proposals for priority actions are made in chapter 5.

### Concepts and Definitions

Planning processes can generally be divided into several progressive levels. One possible division is policies, plans, programmes and projects, which can be defined as:

- **policy:** in the context of this report, policies refers to guidance drawn up by government administrations (and not electoral commitments made by political parties);
- **plan:** a set of co-ordinated and timed objectives for the implementation of a policy in a particular sector or area;
- **programme:** a set of projects in a particular sector or area.

This report uses “**strategic action**” as a generic term for policies, plans, and programmes.

An effective environmental assessment process requires a tiered approach, *i.e.* a step by step application of environmental assessment to each planning stage. The main objective of a tiered approach in environmental assessment is to ensure that each possible impact is assessed at the most appropriate planning level.

Environmental assessments can broadly be divided into two categories:

- **Environmental impact assessment (EIA)** is the term used for the assessment of individual projects.
- **Strategic environmental assessment (SEA)**, *i.e.* the assessment of strategic actions.

Although SEA is variously defined and applied, the present report adopts the following definition:

**Strategic environmental assessment (SEA)** is the term used to describe the environmental assessment process for policies, plans and programmes which are approved earlier than the authorisation of individual projects. More specifically, SEA can be defined as the formalised, systematic and comprehensive process of evaluating the environmental impacts of a strategic action and its alternatives, including the preparation of a written report on the findings of that evaluation, and using the findings in publicly accountable decision making.<sup>9</sup>

## 2. ROLE AND KEY ELEMENTS OF SEA

### A. The Role of SEA

Internationally, there is growing interest in SEA. A number of reasons for this are examined below.

#### A.1 SEA characteristics and benefits

During the early 1990s growing concern about the effectiveness and efficiency of the existing systems for EIA of projects led to the development of EA processes for earlier and more strategic levels of decision-making. EIA review studies – such as the 5-year review of the implementation of the Directive 85/337/EEC and various country status reports – resulted in the detection of a number of major problems and limitations of project-level EIA. These included:<sup>10</sup>

- The evaluation of environmental impacts which may result from indirect and induced activities from a major development is difficult at project level.
- The foreclosure of alternatives: at the project assessment stage the number and range of options is often restricted. Decisions on projects are constrained by decision making at higher levels and these are taken with too little consideration of environmental effects.
- Project EIA is insufficient for the assessments of cumulative and large-scale impacts.

There is now evidence of a variety of approaches and applications of SEA. Such diverse experience is partly in response to the realisation that the original distinction between policies, plans and programmes was perhaps too simplistic and artificial, and that it rarely coincides with real decision-making procedures. This is true for the transport sector, but also for many other areas. Thus, examples of SEA can be found responding to a wider range of needs and objectives, including:

- to select from a large number of projects which may be linked to existing inventories or past plans or programmes which were not subject to a systematic assessment of their environmental implications;
- to assess the cumulative impacts of a plan or programme;
- to identify priority areas and types of projects for funding;
- to identify priority areas and types of projects which will require more detailed evaluation before being approved;
- to promote multi-modality in policies, plans or programmes for the transport sector;
- to choose between (or propose a combination of) structural and non-structural alternatives (*e.g.* new or upgraded infrastructure, demand management strategies, etc);
- to help define the key elements of a sustainable policy for the sector.

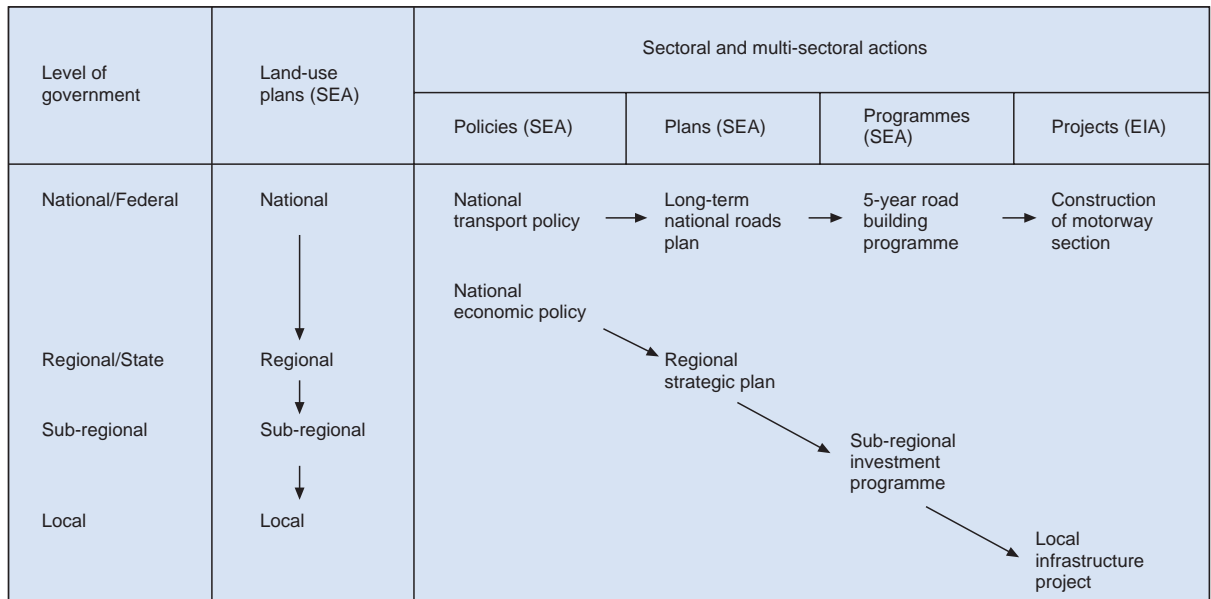
These objectives can be partly linked to the three main benefits expected from strategic-level EAs:

- strengthening project EA;
- advancing the sustainability agenda; and
- addressing cumulative and large-scale effects.

The SEA procedures and methodologies proposed and tested in the 1990s in Europe and in other parts of the world, aimed to respond to these and other deficiencies (see also Figure 1):

- The **scope** of SEA is wider than that of project EIA:
  - The geographical scale of a SEA tends to be considerably greater than that of an EIA. Also, the proposed action generally contains a number of different elements rather than a single project;

Figure 1. Sequence of actions and assessments within a tiered planning and assessment system



**Note:** This is a simplified representation of what, in reality, could be a more complex set of relationships. In general, those actions at the highest tier level (e.g. national policies) are likely to require the broadest and least detailed form of strategic environmental assessment.

**Source:** University of Manchester, EIA Leaflet Series: Strategic Environmental Assessment.

- The scope and range of alternatives that may be considered is greater: the comparison of alternative actions is one of the main objectives of the SEA process;
- The range of environmental impacts to be assessed is different: SEA is generally used for assessing impacts – both positive and negative – related to sustainability issues (e.g. use of natural resources, greenhouse effect, acidification, biodiversity, etc.), global and regional effects, whereas EIA focuses on more local impacts. In some SEA systems, the scope is broadened to include socio-economic impacts.
- SEA is an **objective-led** process: environmental objectives (in terms of quantitative targets or qualitative statements) provide the framework for testing the performance of the action in relation to environmental and sustainable development policies.
- The **time interval** between planning, approving and implementation of an action is much longer in a SEA. Therefore, the content of the proposed action is likely to be known in less detail; it is more likely to change at earlier stages in the planning process; the impact predictions are subject to greater uncertainty. This means that the SEA procedure should be a dynamic and flexible assessment process.
- The degree of **detail and accuracy** of information needed for policy, plan or programme decision making is generally less than that needed for project evaluation, especially at the highest level in the planning process.

Although the generalised process of SEA and EIA are partly similar, SEA will always be fundamentally different from EIA on project level as it requires greater simplicity, flexibility, adaptability, incorporation of value-judgements and best-guess science. SEA needs its own approach designed to integrate with the process and rationale of policy development.



Table 1. Characteristics and benefits of SEA

Key benefit/characteristic	Description
Environmental and sustainability data	<p>Data on the state of the environment and natural resources and on the main sources of pressure is a precondition for SEA and for sustainable planning in general. Where such data is not readily available, SEA offers a valuable opportunity to collect and organise data, identify gaps and needs for future investment.</p> <p>SEA can outline methods, schedules and responsibilities for data collection and management during programme or project implementation.</p> <p>The data will also be essential in monitoring environmental changes over time and overall performance against a baseline.</p>
Sustainability in decision-making	Strategic-type initiatives are more likely to call for a consideration of sustainable development issues and objectives. The SEA process, if integrated with the planning process, can actively promote sustainability within decision-making.
Alternatives	By taking place at the very early stages of planning, SEA can identify and evaluate alternative policies, plans and programmes, enabling the planner to balance economic objectives with social and environmental ones. Thus, it can take into account the costs and benefits, particularly the environmental and social costs that are often ignored in least-cost planning.
Institutional Issues	It is the public sector that normally carries out or commissions SEAs. They therefore have the authority and remit to address institutional issues at such a "strategic" level of planning. At this level it is possible to analyse the overall institutional and legal framework and identify gaps, make recommendations ( <i>e.g.</i> on institutional strengthening, creation of new environmental standards, training, technological needs) also with respect to potential funding problems. This reduces the need for such analysis downstream.
Collaboration and co-ordination	The SEA process should be integrated as much as possible with the planning process and in this way provide a basis for collaboration and co-ordination across responsibilities (agencies, ministries, etc.) and sectors. This will enhance understanding and information exchange, and should minimise the potential for conflicting decisions or policy directions. It also helps to avoid duplication of efforts.
Transparency	By promoting collaboration and consultation between various institutions involved in a sector or region, SEA clarifies the planning process and intermediate choices, which combine to explain the final decision. It can identify at an early stage alternatives/decisions that might lead to environmentally harmful sub-projects, and eliminate or alter these. Thus SEA reduces negative impacts and can eliminate the need for project-EA of such alternatives (see also Tiering).
Long term views	SEA enables sectoral or regional development to be planned according to more long-term views and objectives, including environmental and social ones.
Cumulative impacts	Cumulative impacts (positive and negative, direct and indirect, long-term and short-term) arise from a range of activities throughout an area, where each individual effect may not be significant if taken in isolation. By taking a more comprehensive view of a sector or region's development, it is sometimes possible to analyse the cumulative impacts of multiple (ongoing, planned or considered) investments, as well as impacts from relevant policies.
Mitigation	Similarly to the treatment of alternatives, upstream SEAs enable planners to identify a wider range of mitigation options which can involve changes in related policies or legislation as well as specifications for structural design.
Tiering	<p>The different levels of environmental assessment relate to each other in the same way as different levels of planning (<i>e.g.</i> policies, plans/programmes and projects). By introducing environmental assessment upstream of specific project decisions, at a more "strategic" level, a significant number of adverse impacts and obstacles to development should be avoided during the more detailed stages of planning and evaluation.</p> <p>The process of project-EIAs will benefit in a variety of ways from the completion of a SEA upstream. The latter can, for example:</p> <ul style="list-style-type: none"> <li>• reduce the need for project-EIAs;</li> <li>• simplify the screening of projects for EIAs by providing clear criteria on the basis of the information gathered at sectoral or regional level;</li> <li>• simplify and reduce the cost and time needed for project EIAs by, for example, informing the scoping stage;</li> <li>• strengthen preparation and implementation of sub-projects by producing standards and guidelines for their implementation.</li> </ul>
Public Participation	The SEA process can provide a vehicle for public participation at the very early stage of project (or plan, policy) selection and design, helping to build the necessary public support for the initiative. This is particularly important both for the type of projects to be funded and for the choice of location and related social and environmental implications.

Source: Based on World Bank (1999) Case Studies on Regional and Sectoral EA: An analysis of lessons learned. A Report prepared by Environmental Resources Management for The World Bank.

## A.2 SEA as an instrument to promote sustainable development

SEA is an important tool for considering environmental concerns at the policy/programmes/planning level and as such could be used to promote sustainable development (Andersson, 1999). In defining the terms of reference for SEA, consideration must be given to the environmental objectives of policies towards sustainable development. Various international and national agreements and treaties set sustainability targets and objectives. For example, the European Environment Agency has now launched a Sustainability Targets and Reference Database (known as the STAR database). This is an inventory of international and national sustainability reference values (SRVs) and policy target values, including:

- current international policy targets in force in Europe;
- selected national environmental targets where these are more stringent compared with international policy targets, and reflect national policy on transboundary environmental problems;
- European and global SRVs for each environmental theme;
- selected national SRVs where these provide interesting or innovative approaches.

The database includes coverage of the transport and agriculture sectors, as well as 12 key environmental themes.

In establishing to what extent a strategic action conforms and contributes to sustainability targets SEA would be an essential tool for incorporating environmental factors into sectoral policies at all levels of decision making. However, one aspect that needs further development is the integration of the results of SEA with the assessment of economic and social impacts. In particular, integrating environmental impacts into evaluation techniques such as cost-benefit analysis is problematic as these are not readily translated into prices (Gühnemann, 1999).

## A.3 SEA's role in relation to the transport sector

With respect to strategic actions in the transport sector, SEA is particularly useful in assisting the environmental analysis and assessment in inter-modal approaches. It helps structuring and focusing the environmental analysis on the key environmental benefits and costs of each transport mode, comparing alternative planning and management options in an integrated way and providing decision-makers with the relevant information to take the most sustainable decision.

The scope of a transport SEA (the alternative options and impacts that are to be assessed) and the degree of detail of the assessment depend largely on the level of planning (environmental, socio-economic

Table 2. Impacts and indicators for transport SEA

Impact	Examples of Indicators
Climate Change	Emissions of greenhouse gases (CO <sub>2</sub> , CH <sub>4</sub> ,...), vehicle km, fuel consumption.
Acidification	Emissions of SO <sub>2</sub> , NO <sub>x</sub> .
Use/Depletion of Natural Resources	Resource intensity, energy consumption, land take (especially to compare modes).
Loss of Biodiversity	Land take and fragmentation of ecologically sensitive areas, loss or damage to key species or habitats.
Air Quality	Emissions or concentrations of pollutants, exposure of the population to pollutant concentrations.
Water Quality	Number of water sources affected, concentration of pollutants, distance of infrastructure from sensitive sites.
Visual Impacts	Scale and key physical characteristics.
Severance	Barriers, population numbers in affected areas.
Noise and tranquillity	Noise levels, affected surface, population affected.
Accidents	Fatality and injury rates.
Historical, Archaeological, Nature Conservation	Loss or proximity to recognised sites and areas of importance.

and traffic) objectives by which the strategic action is led. The assessment of global / regional effects such as climate change and acidification are typically conducted on a high planning level (*e.g.* transport policy or network level), where options can include modal choices, infrastructure and non-infrastructure alternatives (*e.g.* traffic demand management, fiscal measures). More local effects, which also depend on the local characteristics of the environment (noise, visual impacts, etc.) are easier to assess at lower planning levels (*e.g.* corridor assessment), where the SEA would focus more on location alternatives.

The impacts of transport can be caused by either the traffic or by the construction and maintenance of infrastructure. An overview of impacts and indicators that should be assessed at the appropriate tiers of the planning process is given in Table 2. In addition to assessing the direct impacts from transport systems, SEA should also address cumulative impacts and impacts from secondary developments which, at project level, are difficult to assess.

The recent initiative for a Transport and Environment Reporting Mechanism, initiated by the European Commission will play a very important role in raising awareness about the impacts of transport policies. Its promotion of an EU-wide set of indicators should provide a useful starting point for SEAs of transport policies, and to a lesser extent of plans and programmes, particularly by highlighting all aspects of transport's interaction with the environment (not only the ones relating to infrastructure development).

## B. The SEA Process

A number of **principles** can be used to define the essential parts of a SEA process:<sup>11</sup>

- SEA should be applied, at the earliest stage, to all transport infrastructure plans and programmes that will have significant environmental consequences;
- The authority which proposes and develops the transport infrastructure plan should be responsible for the preparation of an SEA report, with the support and co-operation of the environmental authorities;
- The SEA report should be reviewed by environmental authorities and other interested parties and by the public;
- The competent authority should take the SEA report into account in making decisions about the proposed transport infrastructure plan;
- Consultation and participation are an integral part of the SEA process and should be planned at various stages (*e.g.* defining objectives, scoping, identifying alternatives, etc., see below).

The first and last of these principles aim to ensure maximum integration, support and influence to the planning process. Although SEA processes can vary depending on the level of the strategic action, the sector, and the country planning procedures, the following general SEA steps tend to be commonly adopted:<sup>12</sup>

1. Screening to determine the need for SEA at this stage of the planning process;
2. Determining the objectives of the strategic action and the environmental goals and/or targets;
3. Scoping: identification of:
  - the physical/regional limits;
  - the impacts to be addressed;
  - the alternative actions that need to be assessed;
4. Carrying out of the assessment:
  - predicting the environmental impact of the action and its alternatives;
  - evaluating the significance of the impact (*e.g.* through comparison with environmental objectives)
  - proposing recommendations: preferred alternative, mitigation and monitoring measures;
5. Preparation of the SEA report and review by competent authority (see also Table 3);
6. Decision: taking into account the findings of the SEA and the consultation;
7. Making arrangements for monitoring;
8. Conducting further environmental assessments (at later stages of planning process, *e.g.* as project EIA).

Table 3. Contents of a SEA report for a transport infrastructure plan

Executive summary	Brief technical account of the main findings of the SEA
The decision-making framework	Description of the higher tiers of decision-making, such as spatial, transport or environmental policies, plans and programmes. This section should also summarise the scoping decision.
Environmental baseline	A description of the study area and any foreseeable developments, and the current and foreseeable environmental situation using the indicators employed in the SEA.
Objectives of the plan	Summary of the transport objectives, and description of the environmental objectives, including their legal and political basis. Translation of objectives into indicators and targets which form the environmental criteria for plan assessment and development.
Summary of the proposed plan	Summary of the proposed transport infrastructure plan, detailing those elements relevant to the environment. It is useful to include maps, graphs, etc.
Analysis of alternatives	Overview of alternatives and options which have been assessed including the alternatives that were identified in the scoping phase. If alternatives are rejected, the reason for rejection should be included.
Environmental impacts	Description of the magnitude and significance of impacts, using the selected indicators. Impacts may be assessed quantitatively or qualitatively. It is useful to illustrate with maps, graphs, and photographs. If comprehensive assessment is not possible, typical examples of situations that will occur can be described.
Environmental protection measures	Description of actions that are proposed with the aim of reducing environmental impacts. These may include, for example, i) a strategy for mitigating impacts at lower levels of decision-making, ii) weighting methods in lower-level SEA and EIA, iii) screening guidance for lower levels, and iv) identification of sensitive areas that should be avoided.
Report of consultation and participation	Report on the steps taken in the assessment phase in order to base the planning criteria on input from agencies and affected groups. Discussions of the way external views were accounted for.
Analysis of uncertainty	Information which, if available, could have contributed to a better comparison of alternatives.
Environmental action and monitoring plan	A plan for monitoring plan implementation (including subsequent decision-making at lower levels of government) and environmental impacts.
Source: European Commission (1999) Manual on Strategic Environmental Assessment of Transport Infrastructure Plans. Report prepared by DHV for DGVII.	

If the screening stage (Step 1 above) reveals that a SEA is indeed required, it then becomes necessary to organise such a process. The European Commission *Manual on SEA of Transport Infrastructure Plans* provides general guidance on how to initiate and undertake the SEA of plans or transport corridors.<sup>13</sup> It recommends that a plan should be prepared at the start of the SEA process, to ensure effective communication with other agencies and with the public. The plan would help the different individuals and institutions involved by:

- setting **clear targets** for the SEA report;
- setting up an **interdisciplinary team**;
- ensuring good **collaboration** exists between the planning and environmental authorities;
- enabling effective **feedback** to be made;
- providing sufficient **time and resources** to carry out public participation;
- ensuring that the results of the evaluation are taken into consideration in the **final decision**.

### C. SEA Techniques

A range of techniques assists the SEA process. A combination of two or more mechanisms is usually required to carry out the different stages of SEA mentioned above. SEA techniques can generally be ascribed to the following categories:

- Those already used in project level EIA, adapted for use at a more strategic level of assessment. In particular: checklists, matrices and modelling.

- Those already used in policy analysis and planning studies which can be adapted for use in SEA. This comprises various forms of scenario and simulation analysis, regional forecasting and input-output techniques, site selection and land suitability analysis, geographical information systems (GIS), systems modelling (*e.g.* traffic networks), policy and programme evaluation techniques (multi-criteria analysis, goals achievement analysis, cost-benefit analysis, sensitivity analysis, etc);
- New assessment methods and tools that are currently being developed to address specific issues of SEA: *e.g.* methods for life cycle analysis (LCA) and for cumulative impact assessment (*e.g.* network and systems diagrams).
- Literature search, expert judgement (Delphi survey, workshops, interviews), consultation of non-experts.

The choice of SEA techniques will be strongly influenced by the nature of the initiative that needs to be assessed. As a general rule, the more strategic initiatives (such as transport policies) will need to use techniques that allow more qualitative evaluations. In contrast, SEAs of detailed programmes (which, for example, may include a list of potential projects) may adopt more complex techniques, including tools that look at spatial implications such as map overlays and GIS.

### 3. SEA EXPERIENCE AND PRACTICE

#### A. General Country Experience and Practice of SEA

During the last decades, various countries have developed SEA systems for the evaluation of strategic actions. The SEA systems of California (where SEA has been in operation for more than 20 years) and the Netherlands provide particularly good examples. Both Australia and New Zealand have legal provisions for more strategic forms of environmental assessment, although these are only seldom put in practice. Various EU Member States (*e.g.* the Netherlands, France, Germany, Belgium, United Kingdom, Denmark, Sweden, Finland) have during the last years made some provisions for the environmental assessment of certain actions.<sup>14</sup> Some key examples of SEA practice in various countries are listed in Box 1 (SEA cases relating specifically to the transport sector are reviewed later in this section).

##### A.1 United States

The National Environmental Policy Act (NEPA) of 1969 includes provisions for the environmental assessment of major Federal actions. Environmental impact statements may be prepared, and are sometimes required, for broad Federal actions such as the adoption of new agency programs or regulations. Agencies shall prepare statements on broad actions so that they are relevant to policy and are timed to coincide with meaningful points in agency planning and decision making. When preparing statements on broad actions (including proposals by more than one agency), agencies are encouraged to evaluate the proposal(s) in one of the following ways:

- a) Geographically, including actions occurring in the same general location, such as body of water, region, or metropolitan area.
- b) Generically, including actions that have relevant similarities, such as common timing, impacts, alternatives, methods of implementation, media, or subject matter.
- c) By stage of technological development including federal or federally assisted research, development or demonstration programs for new technologies which, if applied, could significantly affect the quality of the human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

All agencies of the Federal Government have to include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on:

- a) the environmental impact of the proposed action;
- b) any adverse environmental effects which cannot be avoided should the proposal be implemented;
- c) alternatives to the proposed action;
- d) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and
- e) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

## Box 1. Some key examples of SEA

**Canada: The Canadian Federal Budget**

SEA of the Federal Budget is a preliminary commentary on the environmental implications of government expenditures and is limited to three major sectors (energy, agriculture and industrial policy). The conclusions of the analysis highlight the most important discrepancies between stated commitments to economic and environmental integration and fiscal priorities. The process has demonstrated the value of scrutinising annual budgets and illustrates what can and should be done in this regard.

**Denmark: SEA of the Danish Bill on standards for the energy efficiency of energy consuming equipment, 1994**

The Bill follows from the Danish environmental action plan on energy-efficiency ("Energy 2003") and the European Commission's Directive on energy labelling of household equipment. The Bill enables the Minister of Energy to set standards for equipment design and energy consumption. The SEA was conducted for setting standards on household refrigerators and washing machines.

**France: Special zones for quarries in the Yvelines**

Since 1993 the law on the exploitation of quarries regulates the elaboration of regional exploitation plans. The plans are intended to assist the consultative authorities and the Prefects in the authorisation of individual quarries. The new authorisation procedures involve the drawing up of an environmental assessment on feasible locations for quarries. In the case of the Yvelines (Region Ile-de-France), new quarry zones have to be investigated to respond to the growing demand of marly and clayey calcareous materials for the cement making industry. The objective of the environmental assessment is to identify the zone(s) where future exploitation can be envisaged, and to optimally reconcile economic and environmental considerations, taking account of technological possibilities and limitations.

**Ireland: National Plan 1994-1999**

This Plan is a multi-annual, multi-sectoral regional economic development plan, drawn up in accordance with the European Union structural Funds regulations. The development sectors covered include transport and environment infrastructures, agriculture and rural development, human resources, tourism, energy and telecommunications, local development, fisheries and industry. A SEA of the plan formed part of the basis for the preparation of the Community Support Framework.

**The Netherlands: Structural plan for electricity supply (SSES)**

The national SSES serves for selecting fuel types, site selection for major power plants, routing of power supply lines, etc. In the SEA, prepared under the EIA Decree, the impact on environmental indicators covering *inter alia* global warming, biodiversity, waste, safety, was estimated for several alternatives.

**The Netherlands: Policy plan for drinking water supply**

This SEA, made according to the EIA Decree, has been successful in generating and evaluating options for development of new sources for drinking water. The effects on drying out of aquifers and soils, and its effect on biodiversity were studied in detail by means of impact models using GIS.

**United Kingdom: Revised Lancashire Structure Plan**

The Structure Plan organises land use in Lancashire in a broad sense. The Plan covers 13 policy areas (rural landscapes, environmental measures, green belts, agricultural land, tourism and recreation, etc.). Each policy area contains a number of short policy statements. The environmental impacts of each statement are scored in a matrix. The total of the scores is used as an indication of sustainability of each statement.

**United States: The US Environmental Restoration and Waste Management Program**

The US Department of Energy prepared this SEA for the development of an integrated environmental restoration and waste management programme. The programme includes environmental restoration activities, spent nuclear fuel management and waste management activities (high-level waste, transuranic waste, low-level mixed waste, greater than class C-level waste, hazardous waste).

Source: CEC (1994), SEA: Existing Methodology; THERIVEL, R., *et al.* (1992) Strategic Environmental Assessment; SADLER, B. and VERHEEM, R. (1995), 2nd Draft SEA report.



In practice, most federal agencies have established separate regulations that incorporate the SEA requirements of NEPA. Since 1972 several hundreds of SEAs (or “programmatic environmental impact assessments”) have been conducted by various agencies. Several states have introduced their own systems of regulations. The best developed is the California Environmental Quality Act.

## A.2 Canada

The Canadian Environmental Assessment Agency views SEA as a promising way of incorporating environmental considerations into the highest levels of decision making. The Agency has established a non-legislated environmental assessment process for all policy and programme proposals that are to be submitted for Cabinet considerations by Departments and Agencies. This is the result of the package of reforms to the federal Environmental Assessment and Review Process (EARP), announced in 1990 by the Government of Canada. The reforms also included the proposed Canadian Environmental Assessment Act.

The Government decided that a public statement outlining anticipated environmental effects of a policy or programme initiative would, as appropriate, accompany announcement of the initiative. The statement will be determined through an environmental assessment and will demonstrate that the assessment has been undertaken. The environmental information derived from examination of proposed policy or programme initiatives is intended to support decision-making in the same way that other factors (economic, social, and cultural) are now considered in evaluating proposals. A listing of the various types of policy and programme decisions for which environmental assessment is required, follows.

- a) Proposals for policies or programmes considered by Cabinet.
- b) Considerations by Cabinet, or by Ministers regarding the development of new regulatory instruments.
- c) Proposals for policies and programmes considered by Ministers on their own authority.

Much of the methodology for conducting environmental assessments of policy and programme initiatives is still evolving. However, the government is committed to the concept in order to ensure that the principles are applied consistently at an early stage of development. In recognition of this fact, the Federal Environment Assessment and Review Office (FEARO) and its successor Agency, in co-operation with federal departments will continue to develop materials which will help in the environmental assessment of policy and programme initiatives. This includes suggested methods, manuals and further readings on the subject as required.

## A.3 EU Member States

In 1998 Directorate-General XI of the European Commission in co-operation with Environmental Ministry of the State of Brandenburg and Federal Environmental Agency (Germany) organised a workshop – *Strategic Environmental Assessment in Europe*. Some of the most interesting results of the workshop are summarised in the following two sections.

### a) SEA: Overview of experience and procedures

Most countries have recognised the need for SEA for plans and programmes as an improvement on EIA, or a means towards more sustainable development. In a number of countries, legislation and procedures are being developed, either integrated in existing EIA legislation or under separate laws, and pilot studies can now be found in most Member States (see also Annex I for details).

In the Member States, the majority of SEA examples relate to land-use planning. Based on this experience the benefits and difficulties of SEA have become clearer. Particular emphasis is placed on the issue of alternatives and the stage in which the plan or programme are when the SEA is carried out. As regards the selection of alternatives, environmental authorities tend to focus on environmental quality objectives while other sectoral authorities require technically and/or economically feasible alternatives. SEA can contribute to combine different points of view, especially if it is initiated at a very early stage in planning, which will allow for the consideration of a wide range of issues.



Economic, social and environmental matters have to be considered when a decision on a plan or programme is made. In practice, the consideration of environmental concerns is often still weak, especially in comparison to economic considerations. As a result, the workshop highlighted a clear need for methods that can allow balanced comparisons.

Experience has focused on applying SEA to formal plans with spatial reference, whilst very little has been done in relation to plans or programmes without spatial reference or indeed to private sector plans and programmes.

SEA of policies differs considerably from SEA of plans and programmes. It deals mainly with the environmental consequences of draft bills and ministerial decisions. In several countries, provisions for SEA of policies either already exist or there is a plan to introduce them. The introduction of “help-desk” in the Netherlands for “environmental tests” is an example of provisions made to encourage co-operation between different ministries, which is seen as an essential element of the SEA process at such strategic level.

#### *b) Some constraints on implementation*

According to the experts at the workshop the legal and/or political constraints are the most significant. The need to adopt SEA is often questioned, linked to fears that it will lead to delays and difficulties without providing additional benefits. The experts concluded that the environmental sector should make a greater effort to highlight and explain the possible benefits of SEA and to overcome political constraints. The experts also identified difficulties in the practical implementation of SEA where planning and environmental responsibilities are shared between different agencies or different administrative levels. This was found to be particularly true of countries with federal structures.

Finally, the shortage of information on practical examples remains an important limitation to the effective development of SEA practice. For a better understanding of the procedural and practical application of SEA, the improvement of documentation and information exchange is a priority.

### **A.4 Regulatory requirements for SEA in the EU Member States**

In the context of the Global Assessment of progress on the implementation of the EU Fifth Environmental Action Programme (1992), the European Environment Agency has carried out a review of the state of implementation of SEA in the fifteen Member States. The main findings are summarised in Table 4.<sup>15</sup>

In terms of regulatory requirements, questionnaires and a review of existing literature were used to establish the extent to which Member States now require SEA in national/regional legislation for policies, plans or programmes. Where no legal requirement exists, consideration was given to whether there are plans in the pipeline to develop appropriate legislation. Column A in Table 4 summarises the results. Answers were evaluated as follows:

- “none to date” – no requirement for SEA, awaiting developments on proposed Directive;
- “planning”- no requirement for SEA but actively planning new legislation;
- “Legislation (PP)” legislation exists for SEA of Plans and Programmes;
- “Legislation (PPP)” – legislation exists for SEA of Policies, Plans and Programmes.

Although the SEA Directive is not yet adopted several countries and administrative regions have already anticipated the EC legislation:

- Denmark, Finland and the Netherlands have requirements in place for SEA for Policies, Plans and Programmes.
- regions of Spain and Belgium (Walloon Region) require SEA for plans and programmes, but not yet for policies.

Ten of the fifteen countries are still awaiting legislation, but many reported making inputs to influence the scope and nature of the Directive. The UK and the Netherlands have taken legislation to sectoral level, for transport and energy (UK) and energy and agriculture (Netherlands) respectively. A

Table 4. SEA in the EU Member States, legal requirements (A), examples (B) and other mechanisms (C)

Country	Question	A	B	C		
				Other Mechanisms for Integrating Environment into Policies, Plans, and Programmes		
		Legal Status	General Examples*	Institutional Mechanisms	Strategies/ Policies	Land Use Planning
Austria		None to date	Yes		Yes	Yes
Belgium (Brussels)		None			Yes	Yes
Belgium (Flanders)		Planning	Yes			
Belgium (Wallonia)		Legislation PP				Yes
Denmark		Legislation PPP	Yes			
Finland		Legislation PP	Yes	Yes		
France		Legislation PP	Yes			Yes
Germany		None to date	Yes			Yes
Greece		None to date	Yes			
Ireland		Planning	Yes	Yes		Yes
Italy		Planning	Yes			
Luxembourg		None to date	No		Yes	Yes
Netherlands		Legislation PPP	Yes	Yes		
Portugal		None to date	Yes			
Spain		Planning/ Legislation PP	Yes			
Sweden		None to date	Yes	Yes	Yes	
United Kingdom		None to date	Yes	Yes	Yes	

\* The examples considered range from SEAs of local plans to assessments of national strategies and do not reflect the number or the importance of the examples for each country.

Source: Adapted from European Environment Agency (1999) Monitoring Progress towards Integration – a contribution to the Global Assessment of the Fifth EAP, Interim Report (31 March 1999). Report to the EEA by Environmental Resources Management.

Guidance Manual on the Strategic Environmental Assessment of Multi-Modal Studies is to be issued in the UK during the current year. Regardless of whether or not SEA legislation exists, the majority of Member States have started to produce pilot SEAs along the lines of the Draft Directive (see Section C.2).

Member States were also asked whether there are examples of SEA which have been used to examine the environmental implications of sectoral or regional policies, plans and programmes. The answers to these questions were evaluated as yes or no in Table 4, column B. This reveals that many countries have prepared pilot SEAs, at least on a trial basis and several others have actually carried out practical SEAs more than once (*e.g.* the Netherlands, the United Kingdom, Sweden, Spain).

The table shows that some countries have no formal initiatives set up to anticipate the SEA Directive. Some of these Member States are using other mechanisms to integrate environmental or sustainable development issues in policies, plans and programmes (see Column C). These are:

- *Institutional integration*: Taking into account environmental considerations through formal institutional mechanisms to foster dialogue and promote or non legally-binding measures such as National Environmental Plans, sectoral strategies, etc. which the government has formally committed itself to;
- *Land-use planning*: In some cases, environmental considerations are taken into account through the country's existing planning laws which require that EIAs be carried out for a regional plan;
- *Other measures*: Any other measures which countries employ to integrate environmental considerations into strategic decisions.

Encouragingly, there are a large number of examples of other approaches and mechanisms for strategic environmental assessments, mostly in relation to spatial planning, inter-ministerial consideration of national strategies and policies. There are also a number of examples of institutional mechanisms, one of the most common being networks/committees of green ministers or civil servants in different ministries charged with ensuring that environmental considerations are taken into account in sectoral strategies.

### A.5 Central and Eastern European Countries

In most Central and Eastern European countries (CEEC) SEA is being introduced in their first national EIA laws as a new procedure for the environmental assessment of strategic decision-making levels. EIA laws in most CEECs were based on the EIA Directive 85/337/EEC and are thus not fully adapted to enabling early and effective assessment. The following main problems occur in relation to transport planning, many of them common also to western Europe:

- lack of strategic environmental assessment of national transport policies and regional transport programs;
- lack of co-ordination between EIA and land-use planning – especially insufficient environmental assessment of regional territorial (land-use) plans that often pre-determine the location of all transport projects;
- lack of adequate public participation in environmental assessment – late and inadequate public participation in EIA (poor notification, poor practices of public hearings and treatment of public comments) that stimulate public conflicts rather than contributing to rational resolution. EIA on transport projects may thus become subject of political debate, instead of being subject to rational evaluation;
- lack of systematic and generally applicable methodologies for assessment of cumulative and synergistic environmental impacts of transport development schemes;
- lack of systematic and generally applicable methodologies for assessment of socio-economic impacts of transport projects despite the positive claims of transport project on “social and economic cohesion”.

Some elements of SEA are not entirely new to these countries. Prior to 1990, comprehensive socio-economic plans – economic plans for different sectors and spatial plans for regions and localities – provided the framework for development planning in these countries. Spatial planning provided – in theory – the basis for integrating environmental considerations (see Annex 1 for details). In practice however, the weight assigned to economic and political factors often caused environmental issues to be perceived as of secondary importance.<sup>16</sup>

In 1998, the Sofia EIA Initiative reviewed in its report “SEA in Transitional Countries: Emerging Practices” state of SEA applications within EIA and land-use planning systems in CEECs. In the countries surveyed only the laws of the Czech Republic, Slovakia, and Bulgaria required environmental assessment of programs, plans and policies. The laws of several other countries, including Lithuania, Slovenia, and Poland have more narrow strategic environmental assessment provisions relating specifically to land use planning, physical or territorial plans. Practical SEA experience is still limited in the CEEC, mainly due to a lack of methodological knowledge. Table 5 provides an overview of the provision of EIA and SEA legislation in CEECs, with the following examples providing an overview of emerging experience.

- In the Slovak Republic, the application of SEA to development policies and regional planning documentation has been mandatory since 1994 under the Act on EIA (No 127/1994). In 1996-1997 a draft of SEA Regulation was prepared. The draft determines a more detailed procedure of environmental assessment for development policies, territorial planning documentation and proposals of legislation. While the SEA Regulation is planned to be in-place in 1999, in 1997-1998 a SEA of the Energy Policy of the Slovak Republic was undertaken.
- In Slovenia, the Environmental Protection Act of 1993 requires former regional plans to be replaced by “environmental vulnerability studies” covering all ecological regions in the country. In 1994-1995 a SEA of the Major Transport Routes in Slovenia was undertaken.
- The Polish Land Use Act, in force since January 1995, states that sustainable development is to be the basis for all land-use management decisions. The Act stipulates that a “forecast of environmental consequences” be performed for local land-use plans. A separate executive order of the minister of Environmental Protection, Natural Resources and Forestry states the content requirements for the forecast. Although the forecast may not be termed a full SEA, it certainly is a way of applying EIA principles and procedures to evaluate plans. An example of SEA in Poland is the 1996 Environmental assessment of Poland's transport policy.<sup>17</sup>

Table 5. Overview of EIA and SEA Legislative Provision in CEECs

Countries	EIA Law	EIA in Other Law	EIA of Programmes, Plans and Policies	EIA of Land Use Plans only	EIA Regulation, Decree or Ordinance
Slovakia	Yes		Yes		Not Yet
Croatia	No	Yes	No		No
Bulgaria	No	Yes	Yes		Yes
Latvia	No (Ecological Expertise Law)		No		No
Lithuania	Yes	Yes		Yes	No
Macedonia	No	Some	No		No
Slovenia	No	Yes	No	Yes	No
Montenegro	No	No	No		No
Czech Republic	Yes	Yes	Yes		Yes
Estonia	No	No	No		Yes
Hungary	No	Yes	No		Yes
Poland	No	Yes	No	Yes	Yes

Source: Overview of EIA and SEA Provisions in Laws in CEECs (In: Mikulic, N. Dusik, J. Sadler, B. and S. Casey-Lefkowitz: SEA in Transitional Countries: Emerging Practices, 1998).

- In Hungary the Environmental Protection Act of 1995 provides the basis for SEA. Article 43 notes that SEA is required for national socio-economic plans, decisions with regional impact, economic regulatory tools related to environmental protection and regulations, which could affect the environmental media, the quality of environment, and human health in relation to the environment. The act does not specify how SEA should be carried out. In 1993 a SEA of a motorway network was completed.
- SEA in Czech Republic is required under the Czechoslovak Federal Act of 1992 (No. 244/1992), in which it is stated that an EIA has to be undertaken during the preparation of development programmes, and the definition of proposals for new legislation. In 1998 a SEA of the Energy Policy of the Czech Republic was carried out.
- In Bulgaria the environmental assessment of programmes and plans was first required by an EIA Regulation of 1995. In the new EIA Regulation of 1998, environmental impact assessment is required for national and regional investment development programmes, regional and urban plans and their changes, construction decisions connected with change to agricultural land use and certain forest-related activities. Simple examples of SEA have been undertaken for urban plans in different parts of the country.
- The land-use planning process, as opposed to other sectoral policy-making or programme development seems to carry natural elements of environmental assessment in Central and Eastern Europe. For example, in Croatia, although the law does not explicitly require strategic environmental assessment, some elements of environmental assessment are implemented in the preparation of land use, general master, and physical plans.

## B. Country Experience Relating to Transport and SEA

Having reviewed SEA in a general context, this section reviews examples of SEA in the transport sector in various countries. Box 2 reviews a number of initiatives compiled on the basis of different SEA review studies published in the 1990s. A more detailed description of these cases can be found in two studies that were conducted by the Directorate-General for Transport (DG VII) of the European Commission: Methodology for Transport Impact Assessment (DG VII, 1995); and State of the Art on SEA for Transport Infrastructure (DG VII, 1995). More recently, DG VII has published a Manual on SEA of transport plans, which refers to a number of examples in order to explain some of the key SEA stages.<sup>18</sup>

## Box 2. Other examples of SEA at different levels of transport planning

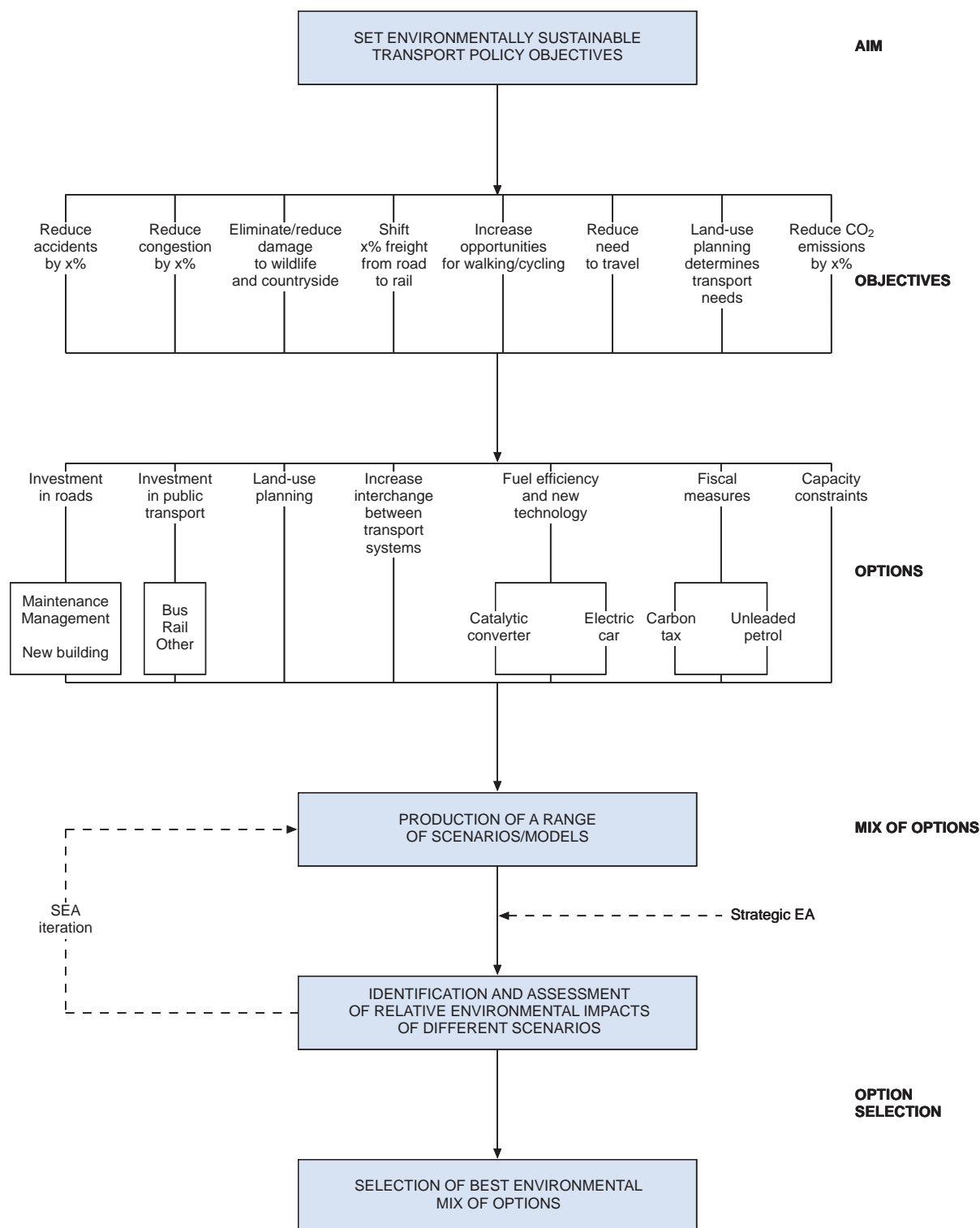
Belgium	<ul style="list-style-type: none"> <li>– Thematic study HSR project Paris/London-Brussels-Köln/Amsterdam</li> <li>– Iron Rhine Rail Cargo: multi-modal comparisons</li> <li>– Options for rail extension for the port of Antwerp towards the eastern regions</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>– Transport 2005</li> </ul>
Finland	<ul style="list-style-type: none"> <li>– Main road network development plan</li> </ul>
France	<ul style="list-style-type: none"> <li>– Northern corridor</li> </ul>
Germany	<ul style="list-style-type: none"> <li>– Federal traffic infrastructure plan</li> <li>– The Bundesverkehrswegeplan</li> </ul>
Ireland	<ul style="list-style-type: none"> <li>– Dublin Transportation Initiative</li> </ul>
Italy	<ul style="list-style-type: none"> <li>– HSR programme assessment</li> </ul>
Netherlands	<ul style="list-style-type: none"> <li>– HSR Rotterdam-Antwerp, Meten = Weten (“to measure is to know”)</li> <li>– Betuwelijn Cargo Rail line</li> <li>– Amsterdam to Utrecht corridor study</li> <li>– Feasibility of underground transportation infrastructure</li> </ul>
Norway	<ul style="list-style-type: none"> <li>– Road and traffic plan 1998-2008</li> </ul>
Slovenia	<ul style="list-style-type: none"> <li>– Environmental appraisal of Transport Policy</li> </ul>
Spain	<ul style="list-style-type: none"> <li>– Fifteen-year multi-modal National Transport Plan</li> </ul>
Sweden	<ul style="list-style-type: none"> <li>– National road management plan</li> <li>– Road planning in the Southern region of Sweden</li> <li>– The Stomnätsplan 1994-2003</li> <li>– Dennis package: investments in urban transport</li> </ul>
United Kingdom	<ul style="list-style-type: none"> <li>– Fiscal and financial measures in transport planning</li> <li>– Environmental capacity of West Sussex</li> <li>– Greater Hull Transportation study</li> </ul>

The aim of DGVII's studies was to provide a world-wide overview of current SEA practice in the transport sector. The studies, however mainly review European cases and only a limited number of examples from other countries (US, Canada, Japan) are included. Also, the reviews do not include examples of cases where SEA in the transport sector is an integrated part of a wider evaluation exercise (such as is the case of the SEAs of Regional Development Plans in the Structural Fund process).

The reviews show that a number of examples can be found in most countries. Most SEAs have been conducted on a voluntary basis, while some countries have legal requirements for SEA of transport policies, plans, and programmes. In Sweden for example, SEA has been mandatory since 1992 for both national and regional long term planning for road investments. In the US, the Environmental Policy Statement of the Federal Highway Administration requires that consideration of environmental protection is included in all of the Agency's programmes.

Although examples can be found at various planning levels (policies, plans and programmes) and for various modes, most of the practical applications are to be found for road programmes. This can be explained by the fact that road transport and infrastructure has a very dominant position in most transport systems. In addition, as countries progress in structuring the planning process for the transport sector, as well as linking it more closely to land-use plans (*e.g.* the United Kingdom), so the application of SEA should also increase.

Figure 2. A model for defining the contents and process of SEA in the transport sector



*Note:* The objectives and options indicated are suggestions only; there may be many more or fewer in any particular case.

*Source:* Sheate, W.R., Strategic environmental assessment in the transport sector, in Project Appraisal, Vol. 7, No. 3, September 1992.

Such a linkage between structured planning and SEA is also supported by the experience of SEA of development programmes funded by the EU or international funding institutes. These programmes tend to be strictly regulated; thus enabling the competent authority for development to identify specific moments where SEA can make a contribution during the planning process.

The approach to SEA varies considerably between countries. The differences mainly reflect choices regarding:

- separate SEAs or including the environmental assessment in cost-benefit or multi-criteria evaluations, which also cover social and economic impacts; multi-modal or uni-modal assessments: in most countries, multi-modal assessments are few, which reflects the fact that separate respective sectoral authorities produce plans. This demonstrates a lack of co-ordination and consistency across modes that persist in many countries.

## **B.1 Examples of SEA at Different Levels of Transport Planning**

### **Belgium/the Netherlands**

#### ***Comparative study of high-speed rail lines Antwerp – Rotterdam (major route alternatives)***

The first proposals for the location of the Belgian high-speed rail lines were made by the SNCB in 1990 and subsequently integrated in government regional plans. The route choice for the Antwerp-Rotterdam line then became the object of political discussions between the two countries. In 1994, both governments decided to conduct a transboundary corridor evaluation of the major routes, which includes an overall environmental assessment. A Bilateral Working Group was created, including officials and experts from both countries and various governmental authorities and the railway companies. The Group's main task consisted in conducting a comparative transboundary assessment (in terms of environment, spatial impact, traffic and construction costs) of the various alternatives. In Belgium, the public consultation was conducted in the framework of the procedure for revision of the sub-regional plans; in the Netherlands, consultation and public participation was conducted in 1994 within procedures of the "physical planning core decision" ("*Planologische kernbeslissing*"). A route was finally agreed in 1997. The case is especially interesting because of its transboundary character, and because it involves the combining of two different planning procedures.

### **Canada**

#### ***SEA of amendments to the Western Grain Transportation Act (WGTA)***

The WGTA increased contributions from the federal government and the grain shippers to provide the railways with adequate revenue for transporting grain. One of the Act's environmental effects has been to discourage the production of livestock and forage crops and crop rotation practices. In 1992 Agriculture Canada initiated a review of the WGTA. Environmental issues were incorporated in the policy review from the outset. Socio-economic modelling and analysis was used to identify the likely economic and social impacts of the policy options being considered. These models and analysis were then used as a basis for identifying and assessing potential environmental effects. This information was used to further develop and refine the policy options. The potential environmental effects were identified, both those related to transportation and those related to land use. Detailed environmental studies of both of these were conducted, using the information generated by the socio-economic analyses.

### **Czech Republic**

It was reported at the Sofia EIA Initiative<sup>19</sup> in May 1999 that the Czech Republic had completed or was working on the following SEAs:

- SEA of Strategy for Development of Transport Frameworks to 2010 (Czech Republic, completed);
- SEA of Development Strategy of Plzen Region (Czech Republic, completed);



- SEA of Development Strategy of Budejovice Region (Czech Republic, completed);
- SEA of Regional Development Plan of Czech Republic (Czech Republic, undergoing);
- SEA of National Strategy of Regional Development of Czech Republic (Czech Republic, undergoing);
- SEA of Regional Operational Programme for NUTS II South-East (Czech Republic, undergoing).

### **Estonia**

Relatively little work has been undertaken on the SEA of transportation, however, an Environmental Assessment of Naissaar Island Development Plan was completed in 1997.

### **Denmark<sup>20</sup>**

In Denmark development of SEAs for regional plans started in 1995, with a transport corridor SEA being undertaken for the Odense-Svendborg motorway in 1998. At the start of the EIA for the Odense-Svendborg motorway project a proposal was made to examine rail options. The Danish Road Administration then decided to undertake a corridor study that considered the effects of improving rail services or building a motorway or a combination of the two. As a result of the study it was decided that improvements to both modes should be made.

In the 1999 preparatory document for the Regional Plan Revision 2001, the Government proposes a SEA for all regional plans, noting that the environmental impacts, including the possibilities for sustainable development, should be presented and discussed in connection with the development alternatives.

### **Finland<sup>21</sup>**

The Finnish EIA Act came into force in 1994. The Act also contains a stipulation that when an authority prepares a plan, programme or policy whose implementation is likely to have significant impact on the environment, its impact must be investigated and assessed to the necessary extent. For urban planning, regional and master plans, corresponding obligations are included in the Building Act. The EIA Act empowers the Council of State to issue general guidelines for this purpose; these guidelines were adopted in 1998. Government guidelines for environmental assessment of Regional Development Plans were issued in 1999, based on pilot studies made from 1995. The Road Administration took up SEA for its 4-year Action and Finance Programme in 1996 and is applying SEA to its Long-Range Plan to 2015.

A task force was formed to assess the environmental impact of Nordic Triangle projects in Finland. Its study focussed on traffic growth, the development of alternatives and the environmental impacts of those alternatives. Four road and rail investment options were developed and evaluated according to the most important positive and negative impacts on: national economy; regional and urban structure; natural and cultural environment; groundwater protection; energy use; emissions; traffic safety.

The SEA examined the impact of three alternatives for the Helsinki Metropolitan Area Transport System Plan. The assessment was conducted for the year 2020. Indicators were selected for traffic and mobility; land use; and environmental and social impacts.

### **France**

#### ***Northern Corridor<sup>22</sup>***

A Multi-Modal corridors study was undertaken in France for the Northern Corridor focused towards Brussels. The study had two steps:

- Identification of route options for each mode;
- Comparison of new infrastructure scenarios.

Using GIS a series of weighted environmental criteria (see Table 6) was used to identify suitable routes for each mode, in which each pixel was superimposed to reflect the stake (or interest); sensitivity to disturbance and the residual effect after mitigation.



Table 6. Northern corridor route selection criteria

Topic	Indicator	Topic	Indicator
Surface Water	<ul style="list-style-type: none"> <li>• Hydrographic network &lt; 15 m</li> <li>• Hydrographic network &gt; 15 m</li> <li>• Surface water &lt; 50 ha</li> <li>• Surface water &gt; 50 ha</li> </ul>	Agriculture	<ul style="list-style-type: none"> <li>• Specialised crops &lt; 25 ha; &gt; 25 ha</li> <li>• Fragile soil</li> <li>• Field crops</li> <li>• Mixed farming</li> <li>• Pasture</li> </ul>
Underground water	<ul style="list-style-type: none"> <li>• Potable water supply catchment productivity &lt; 10 m<sup>3</sup>/h; 10-100 m<sup>3</sup>/h &gt; 100 m<sup>3</sup>/h;</li> </ul>	Heritage	<ul style="list-style-type: none"> <li>• Areas of protected urban and industrial heritage</li> <li>• Notable buildings: edifice; protection area; conservation area</li> </ul>
Natural Environment	<ul style="list-style-type: none"> <li>• Biotope conservation order</li> <li>• Nature reserve</li> <li>• Special protection zone</li> <li>• Bird Community interest zone</li> <li>• SSSI 1</li> <li>• SSSI 2</li> <li>• Protected natural site</li> <li>• Marsh &lt; 50 ha</li> <li>• Marsh &gt; 50 ha</li> <li>• Heath, Brush, etc</li> </ul>	Human and industrial activities	<ul style="list-style-type: none"> <li>• Existing urbanisation</li> <li>• Industrial and commercial zone &lt; 100 ha; &gt; 100 ha</li> <li>• Hazardous industrial installation</li> <li>• Contaminated site</li> <li>• Airport</li> <li>• Military land</li> <li>• Main electricity line</li> <li>• Landfill/quarry &lt; 100 ha; &gt; 100 ha</li> </ul>
Vegetation	<ul style="list-style-type: none"> <li>• Forested massif: &lt; 300 ha; 300-1 000 ha; &gt; 1 000 ha</li> </ul>	Landscape	<ul style="list-style-type: none"> <li>• Notable and exceptional landscape</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Quiet zone</li> </ul>		

The study encountered the following methodological issues:

- accounting for the effects of more than one transport mode in a corridor;
- variability in the number of transportation elements to each scenario;
- cumulative effects assessment;
- variable levels of data and project alignment detail;
- diversity of types of transportation elements *e.g.* new route versus an existing route;
- the twinning of certain infrastructure elements;
- implementation schedule such that new infrastructure is not delivered simultaneously.

This example from France was considered to have met its objectives in clarifying the issues for public debate, comparing the transportation options and indicating the use that could be made of a GIS. While the exercise was regarded as a success, it can be seen to display certain weaknesses that reflect the availability of different assessment techniques. For example, the GIS approach is well suited to handling environmental issues that are capable of being mapped, however, the analysis fails with regard to those aspects that cannot be so mapped. In this context, relationships with matters of policy and social/community or health dimensions are not considered. Nevertheless, within the field of the methodologies employed the study provides valuable experience that could be exploited in other countries.

The case study does point to an interesting approach to the issue of how to address mitigation measures at a strategic level. The study utilised expert judgement to determine the likely difficulty in placing new infrastructure that reflected the extent to which mitigation measures could be successfully deployed. This aspect is of particular important to SEA, since where mitigation is excluded from the assessment of different options, there is a risk that the least worst rather than the best option would be selected. Conversely, when mitigation is incorporated, there needs to be certainty that the mitigation measure will be delivered at the project level otherwise the project would perform outside the approved SEA framework and hence might then be open to legal challenge.

### ***Inter-modal proposal for the A7/A9 route***<sup>23</sup>

The Ministry of Public Works, Transport and Tourism commissioned this study. The aim was to identify the measures to alleviate predicted road traffic saturation on the A7 and A9 by the year 2010. The following types of measure were assessed: road construction, other development options (coach and rail transport, combined transport and railways) and traffic management measures. The SEA was conducted according to three scenarios: a comparison between motorway and high speed rail; new motorway links; and a comparison of road, rail and waterway options in terms of their effect on water protection, air pollution and safety.

## **Germany**

### ***The federal traffic infrastructure plan (FTIP)***

The FTIP, approved in 1992, is a long-term (1991-2012) development plan for transport infrastructure within the whole of the Federal Republic. It covers railways, trunk roads, waterways and air transport concepts that are a federal-level responsibility. The broad objectives of FTIP include the reconstruction and improvement of transport infrastructure in the new *Länder*, the establishment of a high-speed rail network, investment in road construction in the old *Länder*, elimination of bottlenecks in existing rail capacity and increasing air traffic capacities. The SEA procedure was managed by the Ministry of transport and provides a means of assessing the relative economic and environmental effects brought about by the different modes of transport.

## **Lithuania**

Lithuania has focused on developing EIA regulations. Relatively little activity has taken place on SEA, nevertheless an Environmental Assessment of Jurmala Town Development Plan was completed in 1998.

## **The Netherlands**

### ***Second Transport Structure Plan (STSP)***

The STSP is a Cabinet document, developed by the Ministry of Housing, Physical Planning and the Environment and the Ministry of Transport and Public Works. The purpose of the SEA and the plan is to organise transport in the Netherlands in a way that minimises energy consumption and land take, and impacts on air quality. The output of the SEA directly affects the contents of the STSP and therefore the nature and the scope of the Dutch programme for transport infrastructure and the framework in which decisions are made concerning transport provisions at a regional and municipal level.

## **Norway**<sup>24</sup>

The Norwegian legislation on EIA was adopted in 1990, as part of the Planning and Building Act. SEA legislation has not yet been introduced, but a Government directive stipulates environmental assessment of law proposals, official studies and other official documents.

The Norwegian Road and Road Transport Plan of 1997 included a pilot SEA. The Plan was based on four strategies: mobility, environment, transport safety and regional policy. The key indicators for the environment strategy were: a reduction in noise exposure; a reduction in air pollution exposure, in particular to NO<sub>x</sub> and PM<sub>10</sub>; a reduction in km of trunk roads in significant conflict with landscape and the natural and cultural environments.

## **Poland**<sup>25</sup>

Poland plans the construction of a motorway system of about 2600 km supplemented by a network of expressways. As part of the 1996 revision to the motorway construction programme a SEA of four

Table 7. Selection of Key Indicators used in the Polish Motorway Network SEA

Issue	Indicator
1. Land take	<ul style="list-style-type: none"> <li>• Decrease in agricultural area</li> <li>• Decrease in number of farms</li> <li>• Decrease in agricultural employment</li> </ul>
2. Air Quality	<ul style="list-style-type: none"> <li>• Carbon monoxide emissions</li> <li>• Emissions of oxides of nitrogen</li> <li>• Emissions of hydrocarbons</li> <li>• Emissions of carbon dioxide</li> </ul>
3. Noise	<ul style="list-style-type: none"> <li>• Length of problematic sections of motorway</li> <li>• Area of deterioration</li> </ul>
4. Safety	<ul style="list-style-type: none"> <li>• Numbers of accidents (killed and injured)</li> <li>• Costs of accidents</li> </ul>
5. Protected areas	<ul style="list-style-type: none"> <li>• Lengths of network conflicting with protected areas</li> </ul>

development scenarios of the network of motorways and expressways was commissioned by the General Directorate of Public Roads. The scenarios considered were the following:

- “do nothing” alternative (with about 300 km of motorways) with 1996 traffic;
- “do nothing” alternative with forecast 2025 traffic;
- “governmental” alternative (1996 motorway network plan) with 2025 traffic;
- new alternative of the motorway network with 2025 traffic – WK25.

Multi-modal scenarios were not considered in the study at that stage.

The SEA was seen by the road administration as a complementary measure to improve the EIA system. In particular it was seen as an instrument for promoting sustainable development and for promoting some environmental advantages of the motorway programme. Essentially, the SEA sought to respond to three basic questions:

- What are the environmental impacts of the alternatives proposed (by the network study team), including the “do nothing” alternative at predicted traffic flows?
- With reference to the “do nothing” alternative, do the options reveal a majority of benefits or negative impacts on the environment?
- Does the overall balance of considerations provide a positive or negative outcome?

This analysis involved the use of a series of indicators as presented in Table 7.

The study revealed that there were considerable deficiencies in baseline data, particularly at the level of assigning the effects resulting from fragmentation.

The study was not linked directly to the decision-making process. This coupled with the data deficiencies probably qualifies it as a preliminary study ahead of a future SEA in the strict sense. Nevertheless, the work broke new ground in Poland in beginning the practice of SEA.

## Slovenia

### *Environmental appraisal of Transport Policy*<sup>26</sup>

In this project, the impact of an unchanged traffic policy scenario on the environment in the country as a whole was estimated by means of traffic models and environmental impact models, using GIS. The theoretical potential for a policy shift leading to less pressure on the environment was described, and its effects on mobility and the environment estimated. In the same project, the environmental impact of connection of Slovenia to Europe was roughly estimated, and the impact of a certain previously defined high-speed rail route was estimated and compared to other routes. This SEA is especially interesting because Slovenia has good arrangements for EIA, and at present the need for reconsideration of its traffic

policy is widely acknowledged. The SEA, which gives a quite rough analysis but has salient conclusions, may serve to promote the required public discussion. The preparation of this SEA was supported by the European Commission (PHARE programme).

## Spain

### *Cumulative impacts of high speed rail and motorway links*<sup>27</sup>

The Spanish Ministry of Transport commissioned the strategic assessment of cumulative impacts of multi-modal infrastructure plans on protected areas designated under the Habitats Directive (Natura 2000 sites). The study develops a method to address transport impacts on protected areas of international importance for biodiversity at a strategic level. It focuses particularly on defining compensation measures, as requested in the Directive's Article 6.

## Sweden<sup>28</sup>

The Swedish Road Administration developed its strategic planning and impact assessment in the mid-'80s, co-operating with the Rail Administration in regard of prediction methods, etc. In the early 1990s, the Road Administration was given the task of developing an environmentally adapted transport system for the Swedish part of the Öresund region.

A conclusion drawn in Sweden is that SEA should concentrate on the long range network plans and policies specifying, for instance, which kind of infrastructure or transport management action is proposed for a given region. As Sweden has a programme of ten year plans for investments in national road and railway infrastructure that are revised every fourth year at both a national and regional scale this aspect is being taken forward.

Current plans cover the period 1998-2007, but in 1996, the Swedish Environmental Protection Agency, the National Board of Housing, Building and Planning and the National Heritage Board, were requested by the Government to propose a method for undertaking a SEA of these infrastructure plans. Although late in the plan preparation process, the method was applied to the extent possible. Most of the regional plans noted the existence of environmental goals, but these did not affect the content of the plan. This experience highlighted a need for the following:

- a need not just for SEA methodologies, but also a requirement to re-shape the decision making process in general to accommodate SEA;
- greater emphasis to be given to environmental goals relative to other goals;
- methods to predict environmental effects where the location of new infrastructure is known only in very general terms;
- assistance in the identification of strategic choices as infrastructure projects with a long planning history tend to influence the thought processes and their need may not have been questioned.

The planning round for 2002-2011 has since been changed and the process commences with a review of the gap between current trends and the goals laid down in the national transport policy including an analysis on what is causing the gap. This then lead to a strategic analysis of alternative options needed to attain the goals. A SEA will now also be undertaken to ensure that the strategies are in-line with the environmental goals in the national transport policy.

Elsewhere, a pilot study was carried out of the Gothenburg-Jönköping transport corridor, commissioned by the EU. This formed part of the development of guidelines for the environmental assessment of the TEN. Eight alternatives were studied, covering some 45x90 km and a time horizon of 2020. The impacts were assessed according to how each of the alternatives would support environmental goals, the need for specific mitigation measures and the environmental conflicts that would remain.

An integrated assessment of economic, social, transport and the environment was included in the development and land-use plans for the City of Lund. The assessment made use of national, regional and local environmental goals and objectives.

## United Kingdom

### **M4 Motorway Common Appraisal Framework<sup>29</sup>**

The M4 Motorway Common Appraisal Framework prepared for the Welsh Office was the first UK study to examine inter-urban issues using a Common Appraisal Framework that brought transportation, economic and environmental considerations together in an integrated manner. Although not intentionally designed as a SEA, the environmental assessment considered baseline and future conditions through a series of indicators developed to reflect the interactions between the proposed transportation measures and sensitive environmental features. Cumulative effects were examined but although mitigation and enhancement measures were identified, they did not form part of the evaluation.

The study involved the evaluation of various transportation measures including traffic management, public transport scenarios, as well as the proposed M4 Relief Road. This relief motorway would traverse several Sites of Special Scientific Interest to the south of Newport, and had been promoted as a means to address anticipated congestion on the M4 which passed along the northern boundaries of Newport. This study marked the first of a new series of transport planning studies that became known as Multi-Modal Studies, later to be launched formally by the Government.

The M4 study differed from the EU sponsored Trans-Peninne Study in that it was of a sub-regional rather than trans-regional scale and it examined specific transportation measures rather than broad policy concepts. Nevertheless, the M4 CAF transport model addressed movements across a wide area extending from Swansea to Bristol, the Heads of the Welsh Valleys and Gloucester. Rail connections extended along the Great Western Railway towards London and also to Birmingham. Using estimates of the change in road or rail traffic that would be required to generate a significant environmental effect, the geographic study area was focussed upon the following four broad zones within which the environmental assessment was focused:

- North of Newport;
- the M4 corridor;
- Newport;
- Magor, Gwent Levels and Castleton.

To model transportation flows at this regional scale, inevitably meant that there was some reduction in the local accuracy of assignments away from the M4 motorway in the vicinity of Newport. Consequently, the ability of the transportation model to provide data sets for the urban area of Newport was restricted and it was necessary to identify specific transportation links that were of environmental interest, such as crossing Conservation Areas.

In developing indicators for the M4 study, the following aspects were taken into account:

- Reflect the five over-arching Government objectives set for transport, namely:
  - to protect and enhance the built and natural environment;
  - to improve safety for all travellers;
  - to contribute to an efficient economy, and to support sustainable economic growth in appropriate locations;
  - to promote accessibility to everyday facilities for all, especially those without a car; and
  - to promote the integration of all forms of transport and land use planning, leading to a better, more efficient transport system.
- Minimise double counting;
- Use established methods of appraising the relevant impacts; and
- Present a concise overall assessment.

In seeking comparability of assessment between transportation scenarios and different modes, it was necessary to develop indicators that address environmental effects, rather than those that reflect the

location of features of interest. The environmental objectives and indicators adopted in the M4 study are presented in Table 8. The results were then reported in an Environmental Summary Table to enable those indicators that had no bearing on the option selection process to be removed from further consideration.

The M4 CAF can certainly be regarded as a pioneering approach to the integration of transportation, economic and environmental considerations into the evaluation of different transportation scenarios. In particular, the manner in which environmental performance indicators were selected and forecast tackled the difficult task of providing quantified outputs rather than qualitative responses to strategic indicators. The methodology addressed direct, indirect and cumulative effects of transportation infrastructure upon the sensitive ecological areas in a manner that allowed quantification, but acknowledged the level of design uncertainty that exists in strategic studies.

Table 8. M4 CAF Objectives and Strategic Indicators

Issue	Objective	Strategic Indicator
<b>ENVIRONMENT</b>		
Noise and Vibration	Traffic noise levels in the vicinity of transportation infrastructure are minimised (EO1).	<ul style="list-style-type: none"> <li>• Length of main transportation network with a change in noise levels.</li> </ul>
Air Quality	Total greenhouse gas emissions from transport are minimised (EO2).	<ul style="list-style-type: none"> <li>• Change in CO<sub>2</sub> emissions in the regional transportation model area.</li> </ul>
	Any increase in the acidification loading due to transport is minimised (EO3).	<ul style="list-style-type: none"> <li>• Change in NO<sub>x</sub> emissions in the regional transportation model area.</li> </ul>
	Emissions from transport affecting local air quality are minimised (EO4).	<ul style="list-style-type: none"> <li>• Percentage change in total emissions of NO<sub>x</sub> within Newport.</li> </ul>
Landscape/Townscape	Minimise adverse change in designated or historic landscapes (EO5).	<ul style="list-style-type: none"> <li>• Area of transportation infrastructure affecting designated or historic landscapes.</li> </ul>
Biodiversity/Nature Conservation	Minimise any adverse effects on the integrity of designated sites of national importance (EO6).	<ul style="list-style-type: none"> <li>• Area of transportation infrastructure affecting designated sites.</li> </ul>
	Minimise adverse effects upon locally designated sites of irreplaceable value (EO7).	<ul style="list-style-type: none"> <li>• Extent of direct or indirect risk to designated sites.</li> <li>• Area of sites of local ecological value directly or indirectly affected.</li> </ul>
Cultural Heritage	Minimise adverse effects on the integrity of nationally designated sites of cultural heritage (EO8).	<ul style="list-style-type: none"> <li>• Number of Scheduled Ancient Monuments or conservation areas experiencing a change in their setting.</li> </ul>
Water Resources	Minimise any increase in the susceptibility of land use activities to flood risks (EO9).	<ul style="list-style-type: none"> <li>• Area of floodplain occupied by new transportation infrastructure.</li> </ul>
<b>ACCESSIBILITY</b>		
Community Severance	To reduce community severance or conflict between motorised and non-motorised travellers (EO11).	<ul style="list-style-type: none"> <li>• Length of transportation infrastructure with a change in severance.</li> </ul>
<b>INTEGRATION</b>		
Land Use, Plans and Policies	Minimise the need for property demolition or land take (EO12).	<ul style="list-style-type: none"> <li>• Potential for property to be demolished or relocated.</li> </ul>
	Maximise support to transportation, land use planning, environmental sustainability and health policies (EO13).	<ul style="list-style-type: none"> <li>• Extent to which plans and policies are assisted or hindered.</li> </ul>
Resource Use	Minimise the amount of energy consumed by the transportation network (EO14).	<ul style="list-style-type: none"> <li>• Change in the consumption of energy within the regional transportation network.</li> </ul>
Construction	To minimise risk of extensive construction disturbance to sensitive features (EO15).	<ul style="list-style-type: none"> <li>• Area of major construction works within 100 m of properties or designated sites.</li> </ul>

*Note:* Transportation infrastructure includes all transport related works having a discernable physical presence and applies to cycle routes, bus routes, pedestrian facilities and traffic management measures as well as roads and railways.

As noted above, the study had certain weaknesses that were inevitable given the pioneering nature of the exercise. For example, the calculation of total energy consumption was highly dependent upon assumed energy use in the rail sector where significant gaps in data exist. In other situations, the importance of the units used for the indicator output was seen to be critical in judging performance, for example, should the measure be X per passenger or tonne km or alternatively X per vehicle km?

The assessment process was essentially a desk-based exercise with no external consultations reflecting concerns about planning blight given that the study was dealing with scenarios rather than specific options that could be directly implemented. Consequently, the study needed to explicitly consider the decision-making processes into which the results would flow and the prevailing attitudes of its audience. As a result, it was necessary to adopt what might be regarded as purist modal solutions, such as enhanced public transport, road building and traffic management, etc. to reveal the extent to which such scenarios would address the transport problem. As such, the process inevitably involves two stages in which the preferred hybrid then needs to be investigated at a more detailed level once the decision-makers have accepted the overall scenario. This highlights the need for the SEA to operate with a full appreciation of the current position of decision-makers and their information needs, as well as an appreciation of their ability to absorb potentially complex environmental information. The National Assembly for Wales is currently considering the CAF report.

### ***Setting Forth – Strategic Assessment***

The Scottish Office commissioned the SEA in order to determine the performance of various transport strategies (road and rail) in relation to environmental and transport objectives. The objectives were to evaluate environmental changes associated with the various strategies within the context of sustainable development. The output of the SEA assisted in the development of the proposals, which are currently the subject of an EIAs.

### **United States of America<sup>30</sup>**

Strategic environmental impact assessment in the United States transportation sector must be viewed with an appreciation of how transportation systems in the United States are financed and developed. The Federal government is quite involved in financing many transportation improvements, but owns few of the highways and virtually none of the urban mass transit systems or freight railroads. State or local governments primarily own highways in the U.S. The U.S. Congress has organized Federal assistance for surface transportation in a way that allows State and local governments to select how to spend the Federal funds.

In deciding how to use Federal transportation funds, State and local governments must conduct a systematic planning process. The planning process must consider environmental factors in general. The Federal government does not direct how environmental factors are to be considered. Some planning processes involve a thorough environmental impact assessment at a strategic level, while others are much less structured. The one exception is consideration of air quality. In areas, which do not meet national air quality standards, Federal legislation requires that the transportation plan demonstrate how air quality standards will be met in the future. This involves quantitative modeling of air emissions from transportation sources. If the transportation plan cannot show that it will contribute to air quality levels that satisfy the standards, then Federal funds cannot be used for the projects on the transportation plan.

Strategic environmental impact assessments in the transportation sector in the United States are most often done in accordance with State environmental policy acts, such as in the examples outlined below. This is because the Federal government is typically not involved in making the strategic decisions concerning long range investment choices. These decisions are reserved under Federal law for the State and local governments. In those examples where strategic environmental impact assessment is done, the analysis is usually more qualitative than quantitative. Nevertheless, there is evidence that even the qualitative assessment is helpful to public officials in selecting among strategic alternatives, and that it influences the nature of comments from citizens.



In unusual cases, the Federal government will conduct strategic environmental impact studies, when needed to guide a series of related Federal decisions. The I-69 trade corridor is one such example. In this case, the U.S. Department of Transportation found it useful to provide a strategic framework for tying together the many project level environmental impact statements that will be needed to implement transportation improvements throughout the corridor.

The US Congress designated the I-69 corridor from Mexico to Canada, based on a feasibility study making a new inter-state highway in this corridor the largest addition to the inter-state highway system since the system was originally planned in the late 1950s. Project level EIA would not adequately address the need to make strategic decisions relating to the entire corridor. To address these strategic decisions, the US Department of Transportation along with the relevant state departments of transportation are working together on environmental studies, which will identify the purpose and need for the transportation improvements, evaluate the alternatives and provide estimates of environmental impacts along the entire corridor. These studies are underway and the impacts to be evaluated include air quality, noise, farmland, historical sites, wetlands, wildlife habitat, parkland and communities. Extensive public participation is envisaged and this will be particularly challenging because those affected live in very different parts of the country. The study also involves co-operation with environmental agencies at both Federal and State level.

At the State level, the Wisconsin Department of Transportation conducted a SEA to assist in the development of a multi-modal statewide transportation plan. The plan evaluated 5 alternatives for investment for inter-modal improvements in urban and rural transportation of passengers and freight. These alternatives included different levels of funding for the various modes of inter-city passenger and freight transportation and urban transportation. The environmental evaluation addressed traffic congestion, energy consumption, air quality, land use, community impacts, water resources and land resources. Public participation was an important aspect of the development of the transportation plan and over 10 000 citizens were involved.

At the city level, to help decide the types of transportation improvements to make in Seattle over the period 1996 to 2020, the Seattle Metropolitan Planning Organisation conducted a SEA. The study evaluated a number of alternatives including different combinations of highway construction, preferential lanes for car pools and buses, heavy and light rail, buses, bicycle and pedestrian facilities and transportation demand measures. Impacts were evaluated for each alternative according to both transport performance measures and environmental quality indicators. The environmental quality indicators included: air quality, noise, fish passage and water quality. Considerable public participation was included in the decision making process, and participants in the planning process believed the adopted plan represented the best balance between environmental and transportation benefits.

## C. SEA Developments in the European Commission

### C.1 An overview

The Commission has long recognised the need to integrate environmental considerations in decision-making processes using SEA. The Commission's interest in developing a SEA system and procedures has been stated in various policy documents. Reference to the need for some sort of environmental integration in the Community's decision-making process can be found as early as the 1970s. The Fifth Environmental Action Programme on the Environment (1992), which sets the target for SEA application at 1995 and beyond, states that:

*"Given the goal of achieving sustainable development, it seems only logical if not essential to apply an assessment of the environmental implications of all relevant policies, plans and programmes".*

Reference to the need for SEA can be found in a number of policy documents: the White Paper on Growth, Competitiveness and Employment, the Community's report to the UNCED, the 5 year review of EIA implementation and the White Paper on a Common Transport Policy. In terms of community legislation referring to the principle of environmental integration and to SEA, there are a number of crucial sources, which need to be taken into consideration. The most important of these is the Amsterdam Treaty



which gives particular prominence to two fundamental principles concerning sustainable development and the integration of environmental aspects in decision-making, ensuring that environmental issues will become a central consideration in all European legislation.<sup>31</sup> This change has triggered a number of initiatives by the Commission and the European Council of Ministers. Notably, the Communication from the Commission to the European Council in Cardiff, 1998: "Partnership for integration – a strategy for Integrating Environment into EU Policies" which calls for a SEA of "all key proposals where an important environmental effect is expected".

The Commission has also proposed a Directive on SEA since the early 1990s and it is hoped that a final draft will be approved early in 2000 (see below). Other important requirements for SEA can be found in the Regulations governing the use of grants for investments under the Structural Funds. Regulations concerning nature conservation and the protection of biodiversity have also led to the support of more strategic levels of environmental assessment in Community instruments. Amongst the most significant are the Habitats Directive (1992) and the Community Biodiversity Strategy (1998) which includes biodiversity objectives for the transport sector. Finally, several research initiatives on SEA have been launched in the different Directorate-Generals of the Commission (see Chapter 4) and DGXI is promoting the use of SEA within all Directorate Generals in response to the requirements of the Amsterdam Treaty and the conclusions of the Cardiff Council of Ministers, 1998.

The EU has been giving impetus towards international harmonisation of environmental and transport data following the setting up of the Transport and Environment Reporting Mechanism (TERM) following the Cardiff Summit in 1998. It involves a co-operation between the EEA and the Commission (DGs for Transport and Environment, and Eurostat) to monitor progress towards integration of transport/environment policies in the EU. At the core of TERM are 31 indicators on the basis of which EEA will regularly report. TERM is conceived as a multi-year process, through which transport and environmental data, indicators and assessment methods will be improved gradually.

The EEA recently finalised an "Inventory of European Policy Environment Targets and Sustainability Reference Values", the findings of which have been brought together in the STAR database. STAR covers the European countries in the EEA area, and is accessible via the Web (<http://star.eea.eu.int/>). For the purpose of TERM, the EEA has extended STAR with an in-depth review of targets related to the transport sector. This review showed that the setting of targets varies significantly between countries, and this may constitute a problem for the implementation of international SEA.

## **C.2. Draft proposal for a Directive for environmental assessment of plans and programmes**

The Commission reacted to calls for an extended scope of project EIA by presenting to the Council a draft proposal for a directive on SEA, in 1996. An amended proposal was presented in 1999. Since its early draft versions, the Proposal has been reduced in scope to only include plans and programmes (including SEA provisions for policies proved to be unacceptable for most countries).

The Draft Directive in its present form, draws heavily on Directive 85/337 on the EIA of projects, and sets out regulations for:<sup>32</sup>

- identification of the bodies who should be involved in the preparing and reviewing of the SEA;
- plans and programmes that would require an SEA;
- the content of the SEA;
- provision for consultation and public participation;
- consultations in case of transboundary effects;
- taking account of SEA and consultation findings in the decision making process.

During a 1998 workshop organised in Semmering (Austria) by the European Commission, experts from the Member States recognised that one of the main advantages of the proposed Directive is that it ensures that environmental aspects are taken into account during planning, thus increasing the quality of plans and programmes.<sup>33</sup> Another advantage according to some Member states is that SEA provides decision-makers with greater information.

The experts at the workshop and literature on this subject highlight the following main weakness in the draft proposal:

- The definition of the scope of the proposal is unclear; some experts found the scope too narrow and think that the Proposal should cover all plans, programmes, policies and EU Proposals. They considered the strong link to land-use plans and programmes to be a limitation. Other experts found the scope of the proposal too wide in relation to the local level as the scope of the SEA Proposal covers all plans and programmes fulfilling its requirements at the local level.
- The feasibility of a European Directive is doubted by a number of States because of the very different planning procedures and processes of the Member States.
- The difficulty of linking SEA findings to decision making in the strategic decision-making process, the exact point of decision taking is difficult to identify. An SEA procedure would have to be extremely flexible to accommodate the large variety of types of decision making and the inherent uncertainty of some decisions.
- SEA would require expertise that several national agencies currently do not have; it involves a large number of highly trained experts and considerable further development of environmental valuation techniques.
- It is unclear how the consultation and public participation should be conducted. Issues are 1) the identification of the agencies and actors that need to be consulted and 2) how to establish which is the "public concerned". Also, confidentiality constraints are often more severe at plan and programme level than at project level. Public participation would therefore require the development of adapted techniques.

### C.3 SEA provisions in the Structural Funds Regulations

The Structural Funds and the Cohesion Fund are the principal instruments of EU Cohesion Policy and contribute to the development of transport infrastructure, particularly in the peripheral regions of the Union (*e.g.* Portugal, Greece, Spain, Ireland, Italy, and parts of Germany). Notwithstanding the fact that the primary responsibility for implementing environmental and cohesion policy rests with the Member States, the Commission has for several years been receiving complaints concerning infringements of environmental legislation in the implementation of projects financed by the Community Funds. The revised Structural Funds Regulations, introduced in 1993 and subsequently amended in 1999, have provided a basis for integration of the environmental dimension within the Funds' programming process and resulted in better structured programmes with environmental objectives and targets.

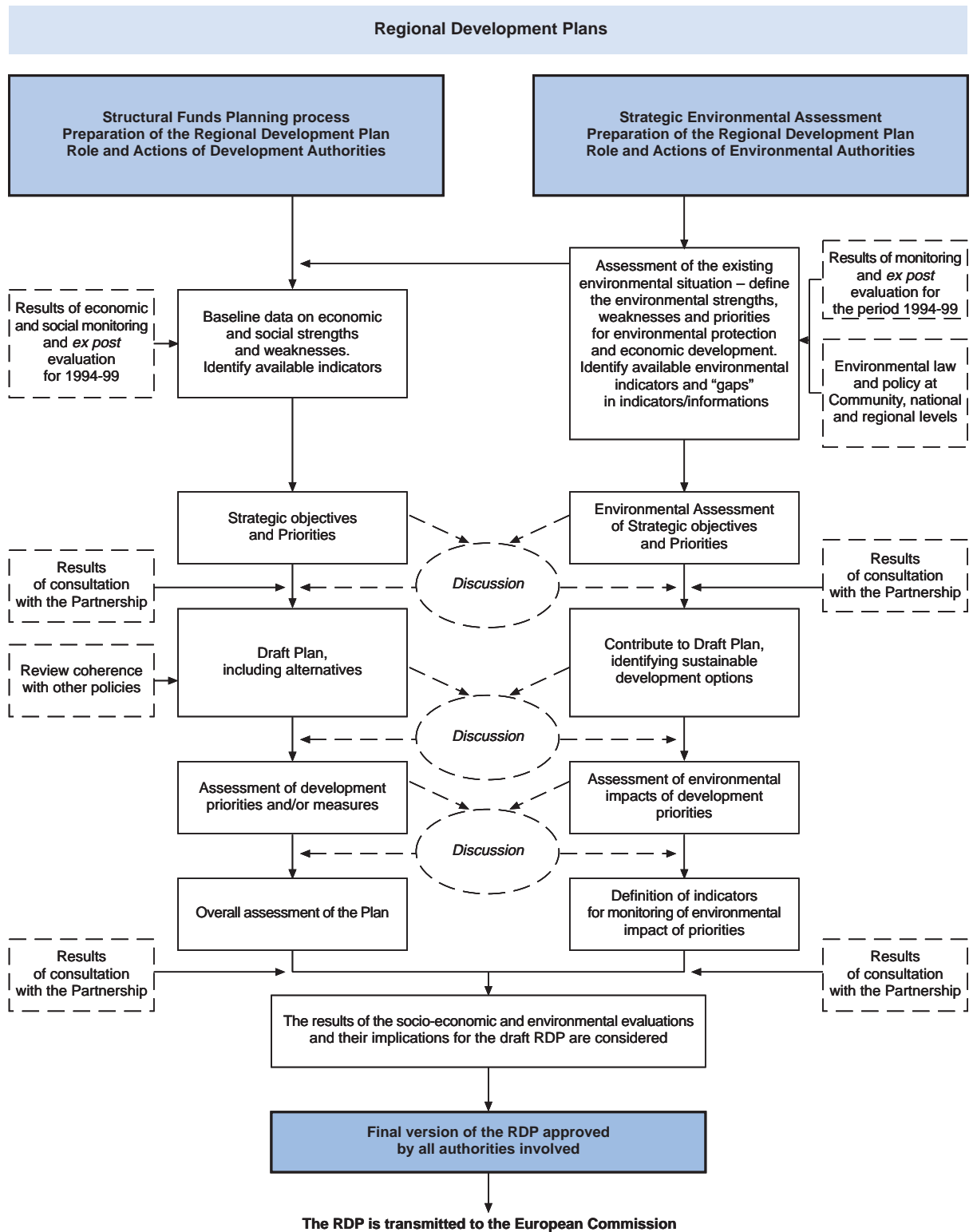
The Structural Funds account for approximately one third of the total European Union budget. The next round of Funds will cover the period 2000-2006. The objectives of the Structural Funds as outlined in the Maastricht Treaty are:

- to support economic and social cohesion within Europe;
- to reduce differences in the level of development between the Union's regions;
- to reduce the disadvantage of least developed regions;
- to promote sustainable non-inflationary growth respecting the environment.

The Structural Funds process has the following main stages of decision making:

- definition of broad objectives;
- development planning: the eligible Member States put forward a Regional Development Plan (RDP) stating the aims of the measures. This provides the basis for negotiation with the European Commission for an agreed contractual development plan, the Community Support Framework (CSF);
- implementation of individual projects or operations: the Member State puts forward detailed Operational Programmes (OP), which are agreed with the Commission;
- monitoring and evaluation (*ex ante* and *ex post*) of the impact of investments provides feedback and enables the assessment of the success of plans and projects at each level of decision making.

Figure 3. RDPs and the SEA Process



Article 41 of the proposed Council Regulation laying down the provisions on the Structural Funds describes the requirements for *ex ante* evaluation for the Regional Development Plans for the period 2000-2006 as:

*"The purpose of ex ante evaluation shall be to provide a basis for preparing the development plans... ex ante evaluation shall be the responsibility of the authorities responsible for preparing the plans..."*

The Regulation goes on to specify that such an assessment shall include: *"an ex ante evaluation of the environmental situation of the region concerned...; the arrangements to integrate the environmental dimension into the [Regional Development Plan]...; the arrangements for ensuring compliance with the Community rules on the environment. The ex-ante evaluation shall give a description, quantified as far as possible, of the existing environmental situation and an estimate of the expected impact of the strategy..."*<sup>34</sup>

SEA has been promoted to CEECs through the EU Accession process, particularly within pre-accession activities related to EU Structural Funds. Governing the preparation of Regional Development Plans (RDPs) within PHARE countries, is framework regulation No. 1260/1999 that provides the general provisions on the use of Structural Funds in 2000-2006. Article 41 of the regulation requests applicant countries provide, along with RDPs, their *ex-ante evaluation* that analyzes their likely environmental impacts. The general requirements for this assessment in the Article 41 of the regulation are further developed in:

- Vademecum "Plans and Programming Documents for Structural Funds 2000-2006" (DG XVI, 1999) which request countries to fully integrate outcomes of the environment assessment into RDPs (see Figure 3). In 1998 the Commission published a *Handbook on Environmental Assessment of Regional Plans and EU Structural Funds Programmes* to provide guidance on how to implement such requirements. The advice is directed at Member States' development and environmental authorities responsible for the planning and implementation of Structural Fund plans and programmes. The document stresses the nature of SEA as a process, and advocates a fully integrated approach which links each stage of the SEA to the complex procedures of Structural Fund programming, as defined in the legislation.
- The proposed EU regulation for operations of PHARE II in section 4.2.1 provides that: RDPs will also contain an assessment of the environmental situation and *will over time introduce the environmental impact assessment of the Structural Funds*.

During the previous period (1994-99) the application of SEA requirements varied widely among countries, with very few providing substantial evaluations. Some countries or regions failed to provide even the basic information requested by the Commission. One of the main reasons for this was the lack of knowledge regarding methodologies for SEA, insufficient training of administrators and insufficient involvement of environmental authorities. The Handbook is intended to address some of these obstacles.

#### **C.4 Towards SEA of Commission's policies and legislation**

The Commission has been seeking to develop appropriate internal assessment procedures as part of the process of achieving the integration required by the Treaty and the 5th EAP. In June 1993, the Commission adopted an internal communication recognising the need for policy EA as an important instrument for environmental integration and the communication included the following provisions:

- all future Commission actions must be screened and environmentally assessed if they are likely to have a significant effect on the environment;
- new legislative proposals that are likely to have a significant environmental impact must be accompanied by an environmental statement.

The procedure was rarely put in practice, again because of a lack of knowledge regarding methodologies of SEA and because of insufficient training for Commission staff. The Amsterdam Treaty, however, has led to greater political support to the concept of integration and has triggered a new initiative to promote SEA within all Commission services (see Box 3).

**Box 3. Towards new internal procedures for SEA of Community policies and legislation**

The European Commission is developing mechanisms and tools which will facilitate the process of environmental integration into policies and legislative proposals for its key policy areas. As part of this initiative, DGXI is developing a Tools Guide presenting tools and methods that can be used for carrying out SEA during the preparation and before the adoption of Commission policy proposals. Given the wide range of policies for which the Commission is competent, the description of these tools is necessarily kept general and it is recommended that every DG tailor them to its specific context. A first proposal, which has not yet been officially adopted within the Commission, includes the following key elements:

- How to apply SEA to policy-making
- Screening: Does the proposal represent opportunities for integration of environmental considerations? (Screening checklist)
- Scoping: Which issues should be considered?
- Impact evaluation and documentation: What are the possibilities for environmental improvement of the policy proposal and what are the environmental impacts?
- Monitoring

This Tools-Guide can be applied to all policy documents prepared and adopted by the Commission (legislative proposals, communications, white papers, green papers, agreements, etc.).

The guide shows how the key stages of SEA (screening, scoping, assessment, documentation and monitoring) can be integrated into key stages of policy-making within a DG (work programme preparation, draft principles of policy, draft policy proposal, inter-service consultation, adoption, implementation and monitoring).

*Source:* European Commission (1999). Draft Tools Guide for applying the Strategic Environmental Assessment (SEA) process to policy making within the Commission. Working Document to be approved by the Commission services.

**D. SEA of the Trans-European Transport Networks****D.1 The Trans-European transport Networks**

According to Title XII of the Treaty on the European Union, the trans-European transport networks (TENs) should help to achieve the objectives of completing the Single Market and ensuring economic and social cohesion, particularly with regard to outlying regions. The establishment of integrated high-quality transport networks throughout the Union and beyond its frontiers is therefore considered a priority task.

The European Commission plays a crucial role in the strategic definition of the TEN. In preparing the multi-modal network the Commission has, in close co-operation with the Member States, developed various master plans for the revision and extension of the different interregional networks. Between 1990 and 1994, separate documents were published on each of the plans, *i.e.* the road network, the rail network (conventional and high speed rail), the combined transport network, inland waterways and seaports, and the network of airports. The plan for the High-Speed Network was subject to a SEA in 1992 (see below).

In 1994, the Commission submitted a proposal for a Decision to the European Parliament and the Council on Community guidelines for the multi-modal TEN.<sup>35</sup> These guidelines constituted a first attempt to initiate a process of integrating all the guidelines specific to each mode of transport in a consolidated program, to reflect the Union's vision of what the multi-modal trans-European transport network should be by the year 2010. They cover the network schemes for the various modes, the objectives and broad lines of measures for the development process, and identify projects of common interest. Since their first publication, the European Parliament and the Council of Ministers have twice amended the guidelines under the co-decision procedure. They were finally adopted in 1996 as decision 1692/96/EC.

## D.2 SEA of the TEN

To improve future environmental performance of the transport sector, the Commission intends to apply SEA as an integral part of the decision-making process for transport infrastructure policies, and the TEN in particular. This intention has been stated in several Commission and Council papers, although mostly in very general terms (see Box 4).

Finally, with the approval of the Guidelines on the TEN in 1996, the Commission has undertaken to address SEA – together with socio-economic assessment – as part of the future network development. Article 8 of the Guidelines covers environmental protection and provides that the Commission will develop appropriate methods of analysis for strategically evaluating the environmental impact of the whole network and individual corridors.

### Box 4. Commission and Council policy statements regarding SEA for transport

#### Commission Green and White Papers Transport and the Environment (1992)

The Green paper on “The Impact of Transport on the Environment” was published following the Commission's commitment to sustainable development at the Dublin summit of 1990. The purpose of the Green paper is to “initiate a public debate on the issue of transport and the environment and the proposed strategy for “sustainable mobility”. It recommends taking greater account of costs, including external costs, in order to restore the balance amongst different modes of transport. The Green Paper was followed by a White Paper on **“The future development of the Common Transport Policy; A global approach to the construction of a Community framework for sustainable mobility”**. This argues that *“Strategic environmental impact assessment will be an integral part of the decision-making process for transport infrastructure policies, plans, and programmes” and investment decisions on individual projects. In order to provide a level playing field for investment decisions in transport infrastructure, the Community should recommend a standard methodology for their cost-benefit analysis, including externalities, even when the infrastructure in question does not form part of a Trans-European network*”.\*

#### **The Commission's action programme 1998-2004 “Sustainable Mobility: Perspectives for the Future”**

This action programme defines the major priorities for common transport policy up to 2004 and lists amongst the initiatives to be taken, a number of priorities for environment and transport:

- strengthening the environmental assessment of policy initiatives with important environmental effects
- active supports to the Council of Ministers in setting up a strategy to further reinforce the integration of environmental issues into transport systems.

#### **Report by the European Council of Ministers (Transport) (1998)**

The Council recognises the need to assess existing and future transport policy initiatives in order to ensure that environmental requirements are integrated into the sector – as requested by the Amsterdam Treaty. It calls for an integrated transport policy that covers all transport modes and is based on medium and long-term environmental objectives. Finally, it recognises the need to apply the integration principle to Transport and Enlargement from the earliest stages.

#### **Communication on Cohesion Policy and the Environment (1995)**

“To minimise the environmental damage from likely increases in road traffic, there is a need to address the issue of balance between different modes of transport. Investment in rail infrastructure and public transport is a central key to this problem. In addition, appropriate examination of alternatives and appropriate mitigation measures should be included in transport corridor assessments and/or individual transport schemes.”

\* Commission of the European Communities (1992a). The future development of the Common Transport Policy; A global approach to the construction of a Community framework for sustainable mobility, COM (92)494 final, Brussels.



In response to this requirement, a joint work programme between DGVII, DGXI, Eurostat and the European Environment Agency was launched. This consisted of the following elements:

- To produce a manual of SEA methodology for the transport sector

The manual was completed early in 1999 by consultants on behalf of DGVII. It provides guidance to public authorities and practitioners involved in SEA of transport plans and programmes. It describes: a) the principles of SEA for transport, b) the main SEA steps, and c) the basics of assessing global, regional and local impacts. The methods and practical suggestions are based on international good practice and research.<sup>36</sup>

- To carry out a pilot SEA of the overall TEN in three stages

Stage 1. To promote feasibility studies for a spatial and ecological assessment of the TEN roads and rail network – The Commission organised a Technical Workshop in April 1997 to explore the feasibility and existing good practice for the strategic assessment of spatial and ecological impacts of transport initiatives. The results of this workshop contributed to the assessment of the physical impacts of infrastructure, through the evaluation of land use, disturbance and fragmentation of, for example, nature areas. The assessment, published in 1998 also makes clear recommendations on what needs to be done to carry out a complete assessment (see below).

Stage 2. To support a research consortium on the assessment of the traffic related environmental impact of the TEN – DGVII has formed a consortium of projects under the 4<sup>th</sup> Framework Research Programme. These projects aim to develop and test methods and tools for predicting the effect of the TEN in terms of traffic-generated impacts such as emissions of greenhouse gases, acidifying gases and pollutants, and energy consumption, safety and -if possible- noise. The task requires the use of predictive traffic and environmental models for the whole EU.

Stage 3. To make a comparative evaluation of predicted impacts of TEN – The results of the previous two stages would be aggregated in order to make a comparative evaluation of predicted impacts in the light of the Community's environmental objectives and targets. This final stage has yet to be completed, partly due to difficulties in integrating the first two stages.

- To promote pilot corridor assessments by individual Member States

The Commission has provided financial contributions to five Member States (Austria, France, Italy, Sweden and the United Kingdom) to develop and test methods for SEAs of transport corridors involving, where possible, multi-modal options.

### D.3 Pilot Case Studies

The five studies looked at the following corridors:

- Gothenburg-Jönköping Transport Corridor (Sweden);
- SEA of the Trans-Pennine Corridor (United Kingdom);
- SEA of the Austrian section of the Danube Corridor (Austria);
- Road Corridor between port of Ravenna and Venice (Italy);
- Corridor Nord – between Paris and Brussels (France/Belgium).

The objectives of the SEA pilot studies, agreed between the European Commission and the Member States involved:

- a) optimising existing methods and techniques and demonstrating their feasibility;
- b) raising awareness by enhancing the exchange of information and communication between the key actors involved in the decision-making process; and
- c) providing a better insight into the manner in which SEA can be integrated with TEN planning processes.

The studies, which were due for completion by the end of 1999, have all made extensive use of Geographical Information Systems, although the models and approaches adopted for each corridor have

varied significantly. For example, the British case has developed a strong spatial planning approach and considers non-infrastructure alternatives, while the French method focuses on how to compare infrastructure options against the sensitivity of the areas affected.

The studies have also helped by highlighting some crucial difficulties that will require urgent attention. These include:

- The transport planning system is not always structured in a clear and hierarchical manner. This can make it difficult to identify the exact stage (and often *stages*) at which SEA should be applied. For example, the concept of a transport corridor often does not coincide with a “corridor” plan or decision. There may be no clear institutional and planning step between a national or regional plan and the individual project. This makes it difficult to apply SEA and, most importantly, can reduce its effective impact on final decisions;
- The practical, institutional and cultural obstacles to public participation during SEA.
- The availability of adequate, reliable and comparable data in transboundary conditions can be a serious obstacle. The work of the EEA and the European Commission in this domain must be strengthened.

The TEN studies have also highlighted that although pilot studies and practical applications of SEA in a variety of sectors exist, it remains difficult to find examples of SEA where they had a clear influence on the final decision. The shortage of information on practical examples remains an important limitation to the effective development of SEA practice. Thus, for a better understanding of the procedural and practical application of SEA, the improvement of documentation and information exchange should be considered a priority.

The programme and its results are a testimony to the significant effort of the Commission and other interested parties, in advancing towards a SEA of the TEN. However, to date it remains unclear whether a full assessment will be carried out, and the manner by which the results will be taken into account in a future review of the TEN Guidelines. It is expected that an answer to this could be included in the forthcoming “White Paper on TEN” by DG VII (due by the end of 1999).

The following paragraphs discuss in greater detail the results of:

- D.4 – The SEA of the High Speed Rail network (which was carried out before the TEN Guidelines were adopted, in 1996, and before the joint work programme was started);
- D.5 – The SEA of the whole network, looking at spatial and ecological impacts.

Finally, the Commission has also played an important role in promoting research on SEA and related issues. Chapter 4 gives an overview of such initiatives.

#### **D.4 The SEA of the High Speed Rail network (1992)**

The first outline plan of the High Speed Rail (HSR) network was published by the Commission in December 1990.<sup>37</sup> The plan has been drawn up with a view to the year 2010, and comprises the (at the time) 12 Member States plus Austria and Switzerland. In all, the network consists of  $\pm 9\,800$  km new lines and  $\pm 14\,400$  km upgraded existing lines. The Council Resolution of 17 December 1990 requested the Commission, together with the representatives of the governments of the Member States, the railway companies and the railway industry, to look in greater detail at:

- the socio-economic impact of the network on the integrated transport market and the development of the Community;
- the impact of the network on the environment in the broadest sense, and how it compares with other modes of transport in this regard;
- economic studies, including, amongst other things, the commercial aspects of the key links and other crucial points in the network and the problem of financing them.

Following the Resolution, several studies on the network were commissioned by the Commission's Directorate-General for Transport (DG VII).



The SEA of the network was conducted in 1992;<sup>38</sup> It is the first multi-modal network SEA to have been conducted on a European level. The study was closely followed by a Steering Group consisting of representatives of the Directorate-General for Transport (DG VII) and of the Directorate-General of Environment (DG XI). At several stages presentations of the study progress were made for the High level Group on the development of a European high-speed train network. This Group was created by the Commission to assist in creating the outline plan and identifying priority projects, and consisted of representatives of the national administrations of the Member States, the Community of European Railways, the major manufacturers of railway equipment, Eurotunnel, and a Round table of Industrialists.

The objective of the SEA was to make a comparative assessment of the environmental effects of the HSR network and of the other modes that are used for the long distance transport of passengers (*i.e.* conventional rail, motorways, and aviation). The evaluation of the impact of the HSR network was performed by comparing the scenarios “with” and “without” the HSR network. The following impacts were assessed:

- spatial impact: land take, barrier effects, impact on landscape and sensitive sites, effects on the spatial organisation of activities and on the urban environment;
- congestion;
- primary energy consumption;
- emissions of CO<sub>2</sub>;
- air pollution – emissions of CO, NO<sub>x</sub>, SO<sub>2</sub>, VOCs, and particulate matter;
- noise pollution;
- traffic safety.

The significance of impact estimates was evaluated taking into account the environmental objectives and targets of the 5th EAP.

## Conclusions

Except for demonstrating that HSR is – for most aspects – a more environmentally-friendly mode, the SEA has had no significant influence on the decision-making process on the HSR network. Since 1990, the network has been modified, but it is difficult to establish to what extent environmental considerations were at the basis for this. One of the major problems in assessing the role of the SEA in the decision-making process is that at no point a trade-off analysis was made between the environmental effects, the socio-economic effects and the investment implications.

The main merit of the SEA on the HSR network is that it demonstrates that SEA can be successfully applied from a very early stage in the decision-making process. Also – more importantly – existing methods and tools could be successfully applied to a SEA of the TEN, given that efforts are made to develop the necessary databases. Still, to optimise the future SEA of the multi-modal TEN, there needs to be a better understanding of the principal elements of the SEA process itself. The main methodological and procedural issues that should be clarified are listed in Box 5.

### D.5 The SEA of the whole TEN – looking at spatial and ecological impacts

The study “*Spatial and Ecological Assessment of the TEN: Demonstration of Indicators and GIS Methods*” was produced by the Working Group on the SEA of the TEN-DGX1, DGXVII, Eurostat and the European Environment Agency (EEA). The aim was to develop and test a number of indicators, to consider the availability of data and to identify issues for further research. It considered quantitative evaluation methods, using Geographical Information System (GIS) as an analysis tool.

The approach focused on sensitivity analysis, looking at the environmental characteristics of the land and relying on expert judgement and scientific knowledge. It involved selecting indicator categories, impact estimation, and ratings or assigning priorities.

The purpose of the assessment was to establish the extent to which TEN and strategic alternatives can contribute to the realisation of certain environmental objectives and targets. A framework of such objectives was essential for the identification of proper indicators and for the evaluation of impact

### Box 5. The High Speed Rail study: key issues and recommendations for the future SEA process of the TEN

Key issues	Recommendations
<p><b>Degree of abstraction:</b> the 1990 master plan still involved a high degree of abstraction: the exact location of certain new links was not yet known and decisions regarding the choice between new lines or upgraded ones had not all been taken. Therefore, local aspects (noise nuisance, visual impact and impact on nature) were difficult to assess in quantitative terms.</p> <p><b>Scope:</b> a limited number of aspects were considered; indirect effects (from <i>e.g.</i> secondary developments) or cumulative effects were not considered.</p> <p><b>Data availability:</b> because of the incompleteness (or lack) of harmonised European databases the most time-consuming task was the collection and harmonisation of data from 14 countries. Another problem was the difference in data availability between the modes: the environmental impact of road traffic is much better documented than the impact of air and rail traffic.</p> <p>The databases on land cover and biotopes that were developed within the CORINE programme were far from complete, which rendered a quantitative analysis of the network's impact on natural habitats impossible.</p> <p><b>Method:</b> the multi-modal approach implied the development of a specific methodology. For certain aspects (<i>e.g.</i> noise) this needs to be optimised.</p> <p>Aggregation of impacts (<i>i.e.</i> trade-off between various environmental aspects) was limited.</p> <p><b>Models:</b> the traffic model used was developed in another study, and did not meet all the specific output requirements for the environmental assessment.</p> <p><b>Uncertainties:</b> uncertainties were mainly dealt with by a scenario analysis.</p> <p><b>GIS:</b> the use of GIS was limited because of lack of data.</p> <p><b>Alternatives:</b> the study is restricted to infrastructure alternatives: the results show that the construction of the HSR infrastructure and the implementation of technical measures and standard setting will not suffice to realise the European Union's environmental targets, such as the reduction of energy consumption and CO<sub>2</sub> emissions.</p> <p><b>Consultation and public participation:</b> the study was reviewed by DG VII and DG XI and by the High level group on HSR (which includes representatives of the Member States and industry). No NGOs were involved in the official procedure, nor was a formal public consultation process conducted.</p> <p><b>Influence in the decision:</b> except for demonstrating that HSR is – for most aspects – a more environmentally-friendly mode, the SEA has had no significant influence in the decision-making process on the network. Since 1990, the network has been modified, but it is not clear to what extent environmental considerations were at the basis of this.</p> <p>A major problem in assessing the role of the SEA in the decision-making process is that no trade-off analysis was made between the environmental effects, the socio-economic effects and the investment implications</p>	<p>Continue the SEA as an iterative system: assessments can become more detailed as the network becomes more concrete. SEAs on a corridor level, which should be the logical next step in the SEA process, should allow a better assessment of noise pollution and impact on landscapes and habitats.</p> <p>Conduct scoping phase (<i>i.e.</i> identification of impacts to be assessed and indicators used) for subsequent SEA phases.</p> <p>Development of a set of indicators that can be applied for multi-modal assessments.</p> <p>Development of integrated and harmonised databases, covering all modes.</p> <p>Identify and classify valuable landscapes and sensitive sites. As a minimum requirement, planning of the network should take account of the existing protected areas; such as regulated by the Habitats Directive (EEC 92/43) that came into force in 1995.</p> <p>Development of additional methods that can be used for multi-modal assessments.</p> <p>Development of aggregation criteria and methods.</p> <p>Development of an assessment model that combines traffic and impact modelling.</p> <p>Development of methods for sensitivity analysis.</p> <p>Development of integrated and harmonised GIS databases.</p> <p>Additional policy options should be envisaged in the network planning and assessment. Alternative scenarios should include <i>e.g.</i> measures on traffic management, demand management, telematics, fiscal measures, pricing,...</p> <p>Clarify procedural issues and investigate how consultation can be combined with the confidentiality issues that are inherent to strategic actions (<i>e.g.</i> by reviewing various country procedures).</p> <p>Clarify procedural issues in the TEN guidelines: stages of the decision process where SEA should be inserted, how findings of SEA should be used in decision making.</p> <p>Develop indicators and methods for integrated assessment, covering environmental effects, the socio-economic effects and the investment implications.</p>

predictions. Table 9 summarises such framework, defining the themes, environmental objectives, targets and potential indicators. The indicators were finally selected on the basis of their relevance to Community objectives, their applicability at the EU scale and their feasibility with regard to available data.

Three impact categories were identified:

- Ecological impacts of infrastructure – impacts that are directly related to ecosystems, habitats and species, as well as the degree of bio-diversity;
- Functional impacts – like those derived from barriers, as a division of functional land units and the reduction of the viability of land units;
- Impacts with a spatial dimension – like noise, which can be evaluated by estimating for instance the number of people living in the vicinity of the infrastructure or by defining noise sensitive zones.

The study found a number of difficulties and identified areas requiring further research. Amongst its conclusions, it highlighted that data shortage and inconsistencies, as well as the assumptions used to overcome them would limit the usefulness of the chosen indicators, particularly in terms of measurability and soundness. However, the project achieved a number of important results:

- it demonstrated the technical feasibility, but also the limitations, of a Europe-wide SEA of the TEN;
- it provided a comprehensive compilation of Union-wide spatially referenced database, holding information on the TEN and on a number of environmental aspects; and confirmed the usefulness of multidisciplinary data collection at European scale;
- it initiated the development, testing and application of a series of impact assessment methodologies such as proximity analysis, impact prediction models, and sensitivity mapping.

Following the definition of TENs for the EU Member States, the European Council of Ministers has launched a new initiative for the definition of the future TEN in an enlarged Europe. Box 6 gives details of this process and discusses the potential role of SEA.

Table 9. Relevant selected spatial and ecological issues for a SEA of the TEN

Theme	Environmental Objectives	Environmental Targets	Potential Indicator
Biodiversity and nature conservation	<ul style="list-style-type: none"> <li>• Safeguard of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation of designated areas and the wider environment</li> </ul>	<ul style="list-style-type: none"> <li>• Vicinity of sites to the infrastructure</li> <li>• Density of sites within buffers around the infrastructure</li> <li>• Consumption of natural habitats</li> </ul>
Water resources	<ul style="list-style-type: none"> <li>• Sustainable use of water resources</li> <li>• Maintenance and improvement of groundwater quality</li> <li>• Maintenance of the ecological quality of surface freshwater</li> <li>• Education of discharges into marine water</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction of pollution, protection of watersheds, prevention of environmental damage from shipping activities</li> </ul>	<ul style="list-style-type: none"> <li>• Number of crossings of waterways</li> <li>• Number of water and groundwater protection zones touched</li> </ul>
Coastal zones	<ul style="list-style-type: none"> <li>• Sustainable development of coastal zones and their resources</li> </ul>	<ul style="list-style-type: none"> <li>• Improve the balance of land use and conservation and the use of natural resources</li> <li>• Perform integrated planning and management</li> <li>• Improve co-ordination between relevant EC policies and between EC, national and regional policies</li> </ul>	<ul style="list-style-type: none"> <li>• Number of coastal zones touched</li> <li>• Size of coastal zone stretches taken by links</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Avoid exposure to dangerous noise levels for health and quality of life</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction of noise exposure (especially night-time exposure)</li> </ul>	<ul style="list-style-type: none"> <li>• Area under influence along the links</li> <li>• Number of tranquil zones touched</li> </ul>
Land resources	<ul style="list-style-type: none"> <li>• Sustainable maintenance of economic activities</li> <li>• Improve land-use planning</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid disrupting functional units</li> </ul>	<ul style="list-style-type: none"> <li>• Land take (agricultural land, forestry)</li> </ul>

Source: EEA (1998) "Spatial and Ecological Assessment of the TEN: Demonstration of Indicators and GIS Methods".

### Box 6. **Transport Infrastructure needs Assessment in Central Europe (TINA) – Extending the Union's Trans-European Transport Network**

The 1996 Guidelines on TEN referred to the network on the European territory. In recognition of the role of transport as a key element of the Union's pre-accession strategy (described in Agenda 2000) the Council of Ministers decided to initiate a process for the definition of the future TEN in an enlarged Europe. A strategy in five steps for the development of a pan-European transport network was set out by the Commission (COM(97) 172 final):

- consolidation of the Pan-European Transport Corridors and the development of the concept of Pan-European Transport Areas;
- the extension of the TEN-T to the candidate countries through the Transport Infrastructure Needs Assessment (TINA) process;
- a common approach to transport technology, aimed at ensuring inter-operability;
- the promotion of the use of intelligent transport technologies;
- co-operation on research and development.

Since 1996, the TINA process has been under way, chaired by the Commission and involving senior officials from the EU Member States and from eleven candidate countries. Its aim is:

- to define the TEN-Transport for the enlarged Union on the basis of the concept and criteria set out in the TEN Guidelines (Council Decision 1692/96/EC; and
- to define a method for the assessment of the network, including the environmental dimension.

The TINA Senior officials group endorsed its final report in June 1999 at Potsdam, which will be published in early autumn 1999. Based on the agreement reached in Vienna in June 1998, and confirmed in Potsdam with some minor corrections, the final report will contain an outline network for the enlarged Union and detailed information on possible investment measures on this network for a total value of ca 85 billion Euro. This will constitute a basis for a Commission's proposal, at the appropriate time, to extend the TEN-T guidelines.

Project identification will be particularly important for the implementation of the new Instrument for Structural Pre-Accession Aid (ISPA). This will provide EU support, from 2000 onwards, for projects aimed at addressing the problems of the transport infrastructure network in the candidate countries and environmental issues, which were highlighted in Agenda 2000. A total financial volume of 7 billion Euro has been decided for the period until 2006, half of this for the transport sector. The results of the TINA process will serve as the starting point for project identification.

In terms of carrying out a SEA of the proposed network, the experience and work to date by the TINA Senior Officials Group has confirmed that such an assessment would be necessary. However, to date no action has been taken carry out such assessment, while there has been some effort towards estimating the financial cost of the network and its projects.

One of the outcomes of the TINA process is meant to be a prioritisation of projects that should be funded in order to develop the network. It will, therefore, be essential that the environmental implications of selecting and prioritising segments of the network be taken into consideration at the earliest possible stage. It is expected that once the Commission has finalised its development of SEA methods, as required by Article 8 of the 1996 Guidelines, these will be applied to the proposed network on the territory of the acceding countries.

*Source:* "TEN – 1998 Report on the implementation of the Guidelines and priorities for the future", European Commission.

## **E. SEA Practice in International Organisations**

### **E.1 International funding institutions and SEA**

International financial institutions, particularly if their mission is to represent the public interest, have a special responsibility in the investment process as regards the incorporation of environmental consideration at the earliest possible stages in an investment process and in a consistent a way as possible. Financial institutions need to be satisfied that basic environmental criteria are met. Included in

these criteria, in addition to direct environmental effects, are the indirect effects arising from the possible sub-optimal allocation of resources. Financial institutions must also be satisfied that the legislation in the region and country in which the project is situated is respected as well as the requirements of European Union legislation, where applicable.

These assessments, however, go beyond the formal aspects, since their purpose is also to establish whether a project is indeed viable in a practical sense. Not only must the financial and business plan be realistic, as must technical aspects relating to the investment, but an analysis of externalities should be included where possible.

While financial institutions cannot be a substitute for the roles of the promoter and regulator, they frequently have a role throughout the project cycle monitoring the project during disbursement of the funds and the life of the loan. Consequently the unique contribution that financial institutions can make in the process is a result of their relative independence in exercising their judgement on whether a venture satisfies sustainability criteria. To this end several international organisations have recognised the need for SEA and are either setting up procedures or guidelines or are investigating the possibilities of doing so. By looking at some of the leading international funding institutions it is possible to view the progress being made with SEA. Box 7 gives a brief overview of relevant initiatives.

The World Bank produced guidance on what it calls regional and sectoral environmental assessments in 1993 and 1996. As a result of the Bank's increasing focus on assessing investment programmes – as well as individual projects –, it has carried out a growing number of sectoral and regional EAs since the early 1990s.<sup>39</sup> In a recent review of the evolution of Environmental Assessment at the World Bank, Goodland and Mercier have highlighted the potentially important role of sectoral and regional EAs in promoting better and more effective analysis of alternatives: *“Most EAs still are applied at the project level. The project EA starts when a project has already been decided upon... Project-level EA fails to help in project selection. While there is much flexibility in design and much scope for mitigation of impacts, project-level EA is useless in the selection of the project in the first place”*.<sup>40</sup> This is seen as a strong argument for the promotion of SEAs that enable the analysis of alternatives to become part of sector work, eventually leading to project identification.

In Europe, the European Bank for Reconstruction and Development (EBRD) has Environmental Procedures which state that, in addition to EIA on specific operations, the Bank may also carry out SEA of plans or programmes related to an economic sector such as transport, or to a geographical region, “as the need for them arises”.<sup>41</sup> Whilst recognising the benefits of such a strategic approach (e.g. assessment of cumulative impacts, broader types of alternatives), to date the Bank has undertaken one SEA – the Slovenian East West Highway Project in 1994. The project consisted of three main components:

- i) Motorway construction over 9.4 km between Pesnica and Sentilj (Maribor-Austrian border);
- ii) Reconstruction/upgrading of two routes leading to the Hungarian border between Pocehova and Lendava (23.7 km) and between Slovenska Bistrica and Ptuj (9.1 km); and
- iii) Road widening between Cnuce and Domzale near Ljubljana (4.2 km).

Several EIAs and environmental analyses were carried out on this project in conformity with both Slovenian environmental requirements and EBRD's Environmental Procedures. As a result of the environmental due diligence procedure, a number of environmental impacts were identified including noise, air/water quality, wildlife, natural and cultural heritage together with the temporary environmental impacts associated with road construction. Although environmental mitigation plans were developed, the Slovenian Minister of Environment recognised that the impacts of the overall motorway development programme had not been assessed.

To meet this concern, the Bank helped to develop Terms of Reference for a Strategic Environmental Assessment of Slovenia's transport system and to provide technical assistance for carrying out the SEA as part of the Bank's loan on the East-West Highway Project. Those subsequent TOR contained the following four objectives:

- To carry out a baseline study of existing environmental conditions in the North-South and East-West transport corridors of Slovenia;
- To identify alternative development scenarios for these corridors (modal and corridor);

## Box 7. SEA provisions or initiatives in international organisations

### EUROPEAN COMMISSION

- Amsterdam Treaty: Article 6: “Environmental protection requirements must be integrated into the definition and implementation of Community policies... in particular with a view to promoting sustainable development”.
- SEA included in the 5th Environmental Action Programme and various other policy papers
- Draft proposal for SEA Directive
- Habitats Directive
- SEA provisions in the Structural Funds Regulations
- Internal communication on Commission procedures: environmental assessment of Commission actions and legislative proposals
- Research programme on EIA and SEA (DG XI)
- Practice:
  - SEA of the trans-European transport networks (TEN), (DG VII, DGXI and the EEA); Manual on SEA of transport plans (DGVII);
  - Impact of the 5th Environment Action Plan;
  - A Handbook on Environmental Assessment of Regional Development plans and EU structural funds programmes (DGXI)
  - Case studies on SEA and the promotion of five pilot studies of SEA of TEN transport corridors (DGXI and DGVII).

### EUROPEAN ENVIRONMENT AGENCY (EEA)

- A Programme of Integrated Environmental Assessment (IEA) is underway, defined as “*the interdisciplinary process of identification, analysis & appraisal of all relevant natural & human processes & their interactions which determine both the current & future state of environmental quality & resources on appropriate spatial & temporal scales, thus facilitating the framing & implementation of policies & strategies*”. The programme focuses on the following issues: domains on which to apply IEA; analysis of driving forces, pressures and state of the environment; impacts on the environment of policy measures; costs of environmental policy measures.
- Contribution towards the SEA of the TEN (spatial and ecological components).
- Practice: review of 5th EU Environmental Action Programme.

### UN-ECE

- Task force to consider the extent to which EIA can be applied to PPPs. The work included an overview of case studies in various countries (1990).
- Convention on environmental impact assessment in a trans-boundary context (1991): “the parties shall endeavour to apply the principles of EIA to policies, plans and programmes”.

### OECD

- A report on environmental impact assessment of roads includes a chapter on SEA with recommendations for a possible structure of SEA for the road transport sector.
- A methodology for environment policy reviews has been developed.

### EBRD

- Guidelines on EIA (1992) address the need for SEA for developments plans, sector-wide programmes, multiple projects.
- In the EBRD's Environmental Policy (revised 1996) environmental appraisal is stated as a focus of the EBRD's approach. Strategic Environmental Assessment is defined as a form of environmental appraisal for plans and programmes related to an economic sector such as transport, energy, forestry, fisheries, etc., or related to a geographical area or region.



Box 7. **SEA provisions or initiatives in international organisations** (*cont.*)**WORLD BANK**

- The World Bank's Environmental Assessment Sourcebook discusses the need for SEA and distinguishes between regional and sectoral assessments;
- Preparation of a number of Sectoral and Regional EAs, including for the transport sector.

**INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA)**

- International study of the effectiveness of environmental assessment;
- preparing basic principles for the definition of SEA (draft proposed at Glasgow, June 1999).

**NATO**

- Pilot study: methodology, focalisation, evaluation and scope of environmental impact assessment.

- To identify and assess the environmental impacts associated with the alternative development scenarios in the Slovenian transport corridors; and
- To make recommendations to the Slovenian Ministries of Transport, Environmental Protection and Regional Planning on medium and long-term actions needed for selecting least cost transport alternatives while meeting environmental goals.

Following Board approval of the East-West Highway Project, the Technical co-operation component was transferred to the PHARE programme and the EBRD was no longer involved in the development of the SEA.

Subsequent to the signing of the EBRD loan, motorway corridors were determined on the sole basis of their inclusion in an overall "Spatial Plan" for Slovenia and a "Motorway Construction Programme", concerning an implementation schedule, was discussed in Parliament. As a result of these events, the ministries concerned agreed that the SEA could not "examine the environmental impacts associated with the alternative development scenarios for Slovenian transport corridors" as had been stipulated in the original TOR. Consequently, the consultants engaged by PHARE to carry out the SEA agreed upon revised TOR with the ministries concerned that had as its objectives:

- To assess the possibilities to achieve a sustainable transport development by means of an active policy towards the reduction of traffic on motorways; and
- To assess environmental management in the transport sector in Slovenia, and make recommendations for improvement.

The report, published in May, 1996, concluded that, although "...there are no legal requirements for strategic environmental assessment (at a level higher than corridors) for new infrastructure and certainly not for transport policy in general, it would be recommendable (sic) to consider the introduction of a more general environmental assessment of Policies, Plans and Programs in the transport sector and other sectors." (DHV Consultants BV, 1996a, p. 57.)

As part of EBRD's policy for enhancing its environmental operations, it is currently examining needs for SEAs in its countries of operation and the extent to which the Bank might play a role in meeting those needs. This is anticipated to lead to further work on SEA, particularly in terms of identifying the sectors and PPPs which might be subject to SEA and in which EBRD could become directly involved. However, as a project financier, the Bank's focus on environmental investigations will, by definition, continue to be at the project level. Nevertheless, the Bank would like the comfort of knowing that any individual project proposed by a public or private sector sponsor is part of a larger, environmentally-sustainable policy or programme which has been subjected to a SEA.



The European Investment Bank's (EIB) "Environmental Guidelines" describe the tools that the Bank uses during project work: sector studies, cost effectiveness, cost-benefit analysis, and environmental impact studies. Of these, the sector studies are certainly the most interesting in terms of strategic-level assessment as opposed to project-level studies. The sector studies insist on a broader analysis of environmentally sensitive sectors (such as transport) with the aim of describing the context, evaluating the issues and identifying the scale, scope and nature of potential Bank opportunities. Such work generally incorporates environmental considerations and could therefore be seen as a contribution towards a SEA-type approach. However, to date sector studies are carried out selectively (for example in a period of structural change) and are therefore not sufficiently common to provide a strategic overview to most EIB transport projects.<sup>42</sup> In terms of full SEAs, the EIB has not yet carried out similar assessments, although it is currently drafting Policies and Procedures Notes on "Strategic Environmental Impact Assessment".

The Banks and similar financial institutions are thus essentially dependent on SEA carried out externally by the project promoters. What they can and do is to verify the assumptions and consistency of the objectives underlying a proposed project investment, to ensure that they meet basic criteria related to SEA. They cannot, however, make up for deficiencies in the SEA or the EIA, or resolve basic policy contradictions.

The EIB has been involved in financing the following major projects for which SEAs or very comprehensive environmental assessments have been undertaken:

- Öresund Crossing between Denmark and Sweden;
- Swedish railway investment company Banverket 10-15 year scenario analysis.

The Helsinki Commission (HELCOM) Programme Implementation Task Force (HELCOM PITF) has recently published the results of its review of the existing infrastructure decision-making processes of International Financial Institutions (IFIs). The work compared procedures by the EIB, EBRD, and the World Bank amongst others, thus providing an important contribution to a greater understanding of these processes and the strengths and weaknesses of different approaches.

Below is a summary of some of its key findings relevant to SEA and transport:<sup>43</sup>

- *"While all of the IFIs require an EIA, these EIAs rarely include projected emissions effects from generated traffic, and none of them require an SEA";*
- in terms of analysing alternatives, a key aspect of SEA, only the World Bank *"has on occasion... required an alternatives analysis"*, in addition, HELCOM found that *"none of the IFIs require an alternative analysis which considers comparable economic rate of return or financial rate of return for other modal or demand management options for reaching the same mobility and access objectives"*;
- with regard to the scope for greater involvement in policy-level decisions, the study argues that *"...with the capacity to demand or require policy or institutional changes through loans conditions, the prerogative of EIB staff to make up their own policy is considerable"*.

## **E.2 Towards joint initiatives which would promote greater use of SEA-type instruments**

Apart from greater distribution of guidelines, methodologies and examples of good practice – all of which should lead to an increasing use of SEA by IFIs, consideration should also be given to the opportunities of greater collaboration in the very influential area of investment in the transport sector.

A number of joint initiatives by the IFIs have already been promoted in the "environmental" sector:<sup>44</sup>

- the Baltic Sea Joint Comprehensive Programme involved the World Bank, EIB, EBRD, EU, and the Nordic Investment Bank – NIB. The idea was to provide (and finance) a common framework for studies which would examine the environmental problems of the Baltic Sea, and in particular the "hot spots" facing the region, including point sources and agricultural run-off for liquid effluent, air pollutant emission sources, land use issues, etc.;
- the Danube Environmental Action Programme was a joint initiative of the World Bank, EIB, EBRD, and EU). This was another attempt to assess the environmental issues as a whole for a given natural resource. The programme led to the setting up of a permanent secretariat located in Vienna, funded by the European Commission, which follows up the results and recommendations of the initiative.

Although these examples are not focused on transport, they provide some important lessons and suggestions for a way forward in the future. The framework for co-operation was quite successful and could serve as a model for a series of strategic assessments of the transport sector in different regions that are being targeted for investment by different IFIs. The advantage of these joint initiatives was the fact that all institutions felt they had ownership of the process and its results. The result of such assessments could be some guidelines or prioritisation mechanisms that might influence the individual institutions' loan programme in favour of environmentally, socially and economically sustainable solutions. This joint approach would have several beneficial results, including a better and more cost-effective use of existing information on environmental issues related to the transport sector in certain regions or countries.

## F. Some Key Issues

This chapter has shown that there is a wide diversity of SEA initiatives. Structured SEA procedures (screening, scoping, public consultation, etc.) and common methodologies have just begun to appear, partly as a result of initiatives by the European Commission. The responsibilities of the different authorities are still unclear, there is a lack of well-defined sectoral policy statements on sustainability (at Union, national or regional level), the feedback between SEA and project EIA is far from optimal, and monitoring systems need to be developed.

The shortage of information on existing practical examples remains a limitation for the effective development of SEA practice. For a better understanding of the procedural and practical application of SEA, the improvement of documentation and information exchange is crucial. An important task is making inventories and comparative analyses of existing case studies. This was the major recommendation of the workshop on SEA in the Hague<sup>45</sup> and of the DG XI study on SEA legislation and procedures in the Community.<sup>46</sup> Although some progress has been made and an example of useful documents can be found in Annex 2, much still needs to be done. An overview is required of examples of SEAs that have actually proved successful in terms of influencing decision-making processes and improving the sustainable character of the final outputs. It would also be useful to know more about the difficulties and obstacles that Member States have had to face in applying SEA and in what ways they have tried to address these difficulties.

Partly in response to the need of an overall EIA/SEA research strategy, covering the Union as a whole, the Commission and the Joint Research Centre prepared "A Study to Develop and Implement an Overall Strategy for EIA/SEA Research in the EU" in 1997. This aims to achieve a fully effective implementation of the EIA Directive and to provide a satisfactory basis for the implementation of SEA within the Union. The seventeen research areas which were identified, relate to deficiencies and research needs common to a number of Member States.

A summary of some of the key issues and deficiencies associated with SEA that need to be addressed are presented in Box 8.

Public participation has been recognised as a key area of difficulty within SEA. Many of the examples of SEA to date have failed to secure in any significant way the participation of the public (both in terms of the individuals or organised groups such as NGOs). Reasons given include:

- arguments that involving the public at large (*e.g.* at national level) is difficult, costly, and/or time consuming;
- arguments that involving large sections of the public at an *early* stage of strategic planning (*e.g.* a national plan) can be difficult because issues and alternatives have not yet been reasonably defined to allow a debate;
- lack of adequate tools and mechanisms;
- lack of experience and good examples;
- a perception that it undermines the role of those elected by the public to make such decisions.

### Box 8. Key issues and deficiencies of SEA

#### Political/institutional

- Policy, plans, and programmes decision-making processes and procedures vary considerably between different countries and cultures. For this reason, different procedural and methodological approaches may be needed for environmental integration even though the underlying SEA principles remain the same.
- There are weak linkages between the SEA and EIA phases in the assessment process.
- There is a need to make existing knowledge of the different procedural and methodological approaches, and of practical experience in their use, more widely available to practitioners to assist them in developing SEA methods appropriate to their own needs.
- Political support for SEA may depend on retaining some measure of political discretion in decision-making and avoiding any major shift in decision-making powers.

#### Technical/methodological

- Difficulties can arise in selecting and defining relevant and feasible alternatives to be assessed within SEA.
- Similarly, difficulties can arise in selecting and defining appropriate criteria for assessing the significance of strategic-level impacts.
- There is insufficiently widespread knowledge of the practical methods available for predicting impacts at the policy, plan, and programme level (in particular, there is concern over the possible over-use of complex methods in circumstances where simpler methods may be more appropriate).
- There are specific weaknesses in the practice of evaluating socio-economic impacts and impacts on natural resources.
- There is great uncertainty in SEA predictions (particularly of long-term indirect impacts) and current understanding of how to handle this uncertainty is rather limited.

#### Consultation/public participation

- A number of policy, plan, and programme-making processes are often “closed” processes (*i.e.* internal to the policy-making body) and, therefore, confidential. The challenge in these cases is to establish how more broadly based expert opinions and public concerns can be identified and taken into account within the different stages of the SEA process.
- Additionally, where the geographic scope of a policy, plan, and programme are very large, there is difficulty in deciding who should represent the “general public” and what other “stake holders” should be involved in the process (and by what methods this should be achieved).
- Further, there is the challenge of how the information contained within the SEA studies (which, by their nature are more strategic in content) can be made sufficiently understandable and accessible to the general public.

Source: European Commission (1995), EIA Methodology and Research.

A review of six cases by the World Bank<sup>47</sup> shows that public participation can indeed be done, at least for large scale programmes involving a wide range of sub-projects, and that it can provide important benefits which include:

- Helping to identify the issues and concerns which were at the basis of the EA;
- Clarification of the level of support for the project by the local populations or other stakeholders;
- Identification of the concerns of local populations;
- Reducing resistance to negative impacts during project implementation;
- Production of design recommendations;
- Helping to select potential alternatives at the sectoral level;
- Helping to weigh impact parameters (*e.g.* during fine ranking process).

## 4. RESEARCH ON SEA

### A. Research Priorities – European Commission, Environment Directorate General

The SEA research priorities that are listed in Box 9 were identified during an international workshop on EIA/SEA methods and research in Delft in 1994. To address these research needs and to support the development of the SEA Directive, the Commission has launched a series of research projects that cover the various procedural and methodological aspects of EIA and SEA (see Box 10).

#### Box 9. SEA research priorities

1. How environmental information is used in decision-making for policies, plans, and programmes.
2. Attitudes of decision-makers to the use of SEA and how their concerns can be reduced.
3. The applicability of existing EIA and Policy/Plan Analysis methods for use in SEA.
4. Linkages between SEA and EIA.
5. The practicalities of tiered decision-making.
6. Integrated environmental-economic-social evaluation at strategic level.
7. Criteria for determining the significance of strategic-level impacts.
8. Screening and scoping of alternatives within the SEA process.
9. Scoping of the indirect and cumulative impacts within the SEA process.
10. The practicalities of public participation within the SEA process.

Source: European Commission (1995), EIA Methodology and Research.

To gain insight in SEA methods by practical experience, DG XI is co-financing certain SEA pilot studies in different countries. An interesting initiative is also the organisation by DG XI of a number of EIA/SEA training seminars for Commission staff of different Directorate-Generals.

The next sections provide a summary of the key studies produced by the Commission on SEA and related topics, both in general (examples a to d) and specifically on transport (examples e and f). Specific research on methodologies and practice for the SEA of the entire trans-European networks (TEN), as well as for SEAs of selected TEN corridors, was presented in Chapter 3.

Annex 2 provides a full reference and web sites, where available.

#### a) EIA a study on costs and benefits (1996)

One aspect of this research study investigated the costs and benefits associated with the application of SEA requirements to certain policies, plans and programmes. 20 case studies were investigated of

Box 10. **SEA research in the Directorate-General for Environment (DG XI)**

1. Reviews of existing systems and methods:
  - existing SEA methodology;
  - SEA legislation and procedures in the European Community;
  - Development of an EIA and SEA research strategy for the EU;
  - Study on costs and benefits of EIA and SEA;
  - Preparation of case studies on SEA.
2. Pilot SEAs:
  - SEA trial run in Erlangen (SEA of the master plan);
  - SEA trial run in Denmark (environmental assessment of Parliament Bills).
3. Training:
  - Training seminars for Commission personnel on EIA and SEA.

which five were transport related. Others included regional and land use plans. The main findings of the study are reproduced below.

*Costs*

- The main costs included internal staff, consultancy, expert advice and publicity and publications.
- Internal staff and consultancy time made up 90% of all SEA costs.
- If plan preparation is truly integrated with agenda 21 initiatives and responsibilities and the EC directives on the environment, then most public officers can contribute to SEA in the course of normal duties.
- An SEA adds around 5-10% to the cost to a regional land use plan some good SEAs cost less than 5%.
- Costs depend upon the prior existence of baseline data and the extent to which the policy plan or programme is pursuing environmental goals.

*Time Inputs*

- Internal inputs to SEA varied from a few days to six person years.
- As familiarisation with the SEA process increases less time will be required at the outset and more on implementation monitoring.
- If time is allowed for at the outset, SEA will not require additional time above that allocated to other policy, planning and programming activities.

*Benefits*

- Enhance understanding of the effects of the policy.
- Enhance the transparency of the policies, plans, and programmes process.

*Conclusions*

- The use of SEA is already widespread throughout the Community.
- Costs are generally borne by the public sector.
- SEA is a logical extension to the existing policies, plans, and programmes process.
- SEA costs are marginal compared to the overall scale of the investment.

#### **b) Case Studies on SEA (1997)**

The main aim of this research project was to exchange information regarding the implementation of different systems of SEA within EU Member States, with a view to strengthening their respective national systems. The study identified, analysed and compared 18 SEA case studies from Member States. The key findings included:

- the lack of standardised terminology regarding SEA and policies plans and programmes, often confuses discussion on the issue;
- SEA practice differs greatly among countries and sectors;
- SEA practice is usually applied at the plan and programme levels;
- flexibility and adaptability remain the core characteristics of any SEA;
- SEA should be conducted as soon as possible;
- SEA should be participatory;
- SEA should provide the basis for sustainability assessment;
- scoping should include alternatives and involve the public;
- uncertainty in predicting impacts should be acknowledged;
- SEA reports should be available to the public and include a non-technical summary;
- the public should be encouraged to participate meaningfully in the SEA process rather than merely be informed;
- monitoring and review are the major weaknesses in the present systems of SEA, and
- SEA can help save time and money by preventing or ameliorating environmental damage and poor decisions being imposed on the population.

#### **c) Strategic environmental assessment of policies in Denmark (1996)**

The study aimed to test the feasibility of applying SEA to parliamentary bills by testing the fundamental principles of SEA on two Danish Bills. The five principles of SEA include:

- documentation of the process and results;
- a clear and comprehensive procedure;
- analysis of alternatives;
- inclusion of public participation, and
- evaluation of the significance.

Key findings included:

- it was possible to implement the 5 SEA principles within an SEA of a parliamentary Bill;
- public interest organisations are an effective proxy for the General Public;
- the decision making process associated with the development and passage of a Bill through Parliament is comprised of many stages allowing numerous opportunities for revision and amendment, and
- the analysis of impacts should concentrate on the direction rather than their quantification or exact geographical location.

#### **d) SEA existing methodology (1994)**

This study provided an overview of SEA methodologies by focusing on the technological methodology for incorporating environmental information in the formulation of strategic actions, either mandatory or voluntary. The report consists of two parts:

- an inventory and analysis of 11 examples of SEA in various countries and sectors. The analysis focuses on methods and tools, and on the appreciation by decision makers;
- an overview of successful methodologies specific to the strategic level.

Findings included:

- For all SEAs studied, suitable tools were available, thus availability of SEA methodologies is not an obstacle for the performance of SEA.
- SEA methods depend on the type of strategic action: the elaboration of general guidelines is difficult.
- In most SEAs, various alternative options are assessed.
- SEA is an iterative process, and a continuous communication between environmental experts and sectoral experts.
- The influence of the SEA the decision is difficult to assess. In some cases, the SEA has had a demonstrable effect on the finally selected option. In other cases the SEA probably caused changes in the Environmental awareness of the authority.
- Uncertainties in SEA are often considerable. Techniques to deal with this are available.
- Most SEA examples need a period of more than 6 months.

Recommendations

- Evaluate the importance of indicators and environmental objectives.
- Clearly define the strategic action and its alternative options.
- Develop methods to deal with uncertainties in decision-making.
- Reduction of the time needed for an SEA can be achieved by making less detailed assessments for high level strategic actions, as well as enhancing the quality of environmental policies, improving the availability of baseline data, and concentrating on main environmental issues.

**e) Study on induced traffic (1995)**

The report gives an overview and evaluation of methodologies that are used for the forecasting of induced traffic on new transport infrastructure. The focus is on an operational definition of induced traffic, a classification and comparison of model forms for the estimate of induced traffic and a description of issues that need to be considered when determining appropriate techniques when forecasting travel demand on individual Trans-European Network (TEN) projects. A unifying framework is proposed, based on a distinction between generative and distributive model components. Recommendations are made for methods that can be used to quantify the Community-wide effects of the TEN.

**f) The development of alternative options**

***Integrated visions for a sustainable Europe – (VISIONS) Assessment of the effect in EC Member States of the implementation of policy measures for CO<sub>2</sub> reduction in the transport sector***

The development of public policies for the management or “planning” of urban and regional areas has, up to now, operated for the short and medium term allocation of resources within the assumption of quantifiable data inputs and relatively well defined goals. The new problems of planning for sustainable development -which is now firmly on the agenda at all levels of policy making- include issues that are far more complex than those that originally defined scientifically-based policy tools. In addition to their inherent value-conflicts, scientific models and legislative systems suffer from scarcity of data of the required quality for realistic modelling and strategic assessment, and there is no practical prospect of a single over-arching model through which the necessary integration of the many sectors can be achieved.

If the planning process is to retain its credibility and effectiveness in the new context of sustainable development, new approaches and new tools will need to be developed and applied. The main objectives are:

- development of a computer model capable of estimating the emissions of greenhouse gases from the sector road traffic covering the period of 1985 to 2010;



- to run a number of scenarios in order to evaluate the effects of the considered measures on future greenhouse gas emissions;
- to contribute to the internal discussions within the Commission on the identification and design of appropriate emission reduction measures.

## Conclusions

- CO<sub>2</sub> emissions will continue to increase under business as usual conditions.
- Community wide measures addressing fuel efficiency of vehicles, combined with fuel tax increases have the potential to break this upward trend.
- Depending on measures taken, stabilisation of CO<sub>2</sub> emissions in the sector of road traffic could be achieved somewhere between 2005 and 2010, but not for the year 2000.
- Additional national measures on traffic infrastructure could accelerate CO<sub>2</sub> reduction.

## B. Methodological Research for SEA of Transport

### B.1 Introduction

The 1990s witnessed a major increase in awareness of the environmental impacts caused by the transport sector. OECD and ECMT launched studies on global impacts such as those linked to carbon dioxide emissions, and looked at the environmental implications of complex issues like urban transport, access and mobility. The European Commission also launched a series of research initiatives, partly linked to the preparation of the future SEA of the TEN (or some of its corridors). DGXI has undertaken general research (reviewed in chapter 3) on the development of SEA theory and best practice with some studies focusing on transport issues. DG VII has concentrated on studies which review existing SEA practice and methodologies in and outside of the EU, whilst other work focuses on specific issues such as the development of alternative scenarios.

The research projects that are conducted on the specific topic of SEA for the Common Transport Policy (CTP) and the TEN network cover a range of issues. Nevertheless they have a focus on the modelling of a restricted set of physical impacts such as traffic and transportation flows, CO<sub>2</sub> emissions, air pollution, noise emissions, energy consumption. Other impacts which are also of great relevance to the TEN, such as visual impact, impact on biotopes and habitats, are only considered in a marginal manner, even though appropriate methods and modelling techniques (*e.g.* GIS) exist or can be developed. Also, the modelling approach seems to be very dominant in the programme's actions. There is a danger that the tools developed will be too sophisticated, especially for the application to high level decision making (which requires less detailed and more flexible assessment methods and tools).

Key research programmes from the "Fourth Framework" and the "European co-operation in the field of Scientific and Technical Research" Programme (COST) are reviewed below. Most of the studies are only indirectly related to SEA and transport, however, they provide useful techniques and tools that could be used within a SEA. The studies have been categorised into five areas according to their potential use within a SEA of the CTP or TEN Programme.

1. SEA methods
2. SEA and policy assessment frameworks
3. SEA and the production of alternative scenarios
4. SEA tools
5. SEA and the assessment of new technology.

Each of these five themes is examined below (sections B2-B7). Further information on these and other Fourth Framework Strategic Transport Research Projects, including contact details for the project co-ordinator and the Commission, can be obtained from the following web site: <http://www.cordis.lu/transport/src/>. Information regarding COST projects can be obtained by emailing [COST-Transport@dg7.cec.be](mailto:COST-Transport@dg7.cec.be). In addition, where available, web and/or document references to the research projects are specified in Annex 2.

A pilot SEA of the TEN has been undertaken using the research projects, COMMUTE, MEET, SCENARIOS and STREAMS. All 4 projects are from the fourth framework programme and are outlined below. There are other programmes that have produced research related to SEA and transport. Box 11 outlines the aims and objectives of three of the Commissions' Framework Programmes of which the Fourth Framework is one.

#### Box 11. European Framework Research Programmes

**Second Framework Programme (1987-1991):** the EURET programme (Concerted action 1.1) on the cost-benefit and multi criteria analysis for new road construction and infrastructure investment in the field of railways, inland waterways, nodal centres for goods and passengers

The main objective of the Concerted Action 1.1 was to establish a co-ordinated method for the evaluation of infrastructure projects, taking into account the specific characteristics of peripheral regions of the Community and the transit countries. The research was conducted in 4 phases:

1. review of existing methods (*e.g.* cost-benefit and multi-criteria);
2. review of measurement methods for the existing criteria;
3. study of criteria to be employed in the European approach;
4. study of measurement methods to be employed in the European approach.

Although the EURET research focuses on project assessment, the reports give a comprehensive overview of existing evaluation systems in the EU, which can provide valuable input into the development of an EU-wide SEA methodology or guidelines.

#### **Fourth Framework Programme: strategic transport research (1994-1998)**

In the Fourth Framework Programme, strategic research has been conducted into, amongst other things, the area of transport policy assessment. The research provides a socio-economic and integrated approach to the understanding, general efficiency, functioning and impact of the TEN. It supports the development of the CTP, by defining the criteria for developing sustainable mobility under the best possible environmental, social and energy consumption conditions. The development of appropriate modelling and methodologies has been a key topic of research.\*

The programme covers various research actions that are related to assessment (environmental, spatial and socio-economic) on the strategic level:

- Economics of transport systems.
- Understanding mobility.
- Integration of new technologies.
- Policy Assessment.

#### **The Commission's Fifth Programme 1998-2004 includes "Competitive and Sustainable Growth"**

In terms of transport, the programme concentrates on "sustainable mobility and inter-modality". The aim of this key action is to promote a long-term balance between the growing demand for mobility on the one hand and the necessity to respect environmental, safety social and economic constraints on the other. Three research objectives are proposed:

- a regulatory and accountable framework reflecting socio-economic objectives;
- an interoperable infrastructure which allows the operation of attractive, environmentally-friendly and efficient transport means;
- modal and inter-modal systems for managing operations and providing services.

\* European Commission (1994), Transport Work Programme.

## B.2 SEA methods

It is imperative that a strong SEA method and procedure is developed within which the different assessment tools can be adopted. SEA should help develop, assess, amend and deliver the most sustainable option.

*Methodology for transport impact assessment* (DG VII, APAS, 1995)

This study has reviewed the current “state of the art” of methodologies applicable to the assessment of strategic transport initiatives. A proposed integrated approach to assessment has also been outlined in which strategic environmental effects, spatial impacts and the more traditionally measured direct transport impacts are incorporated into a consistent framework (see Figure 4). The report is divided in the following parts:

- transport and regional development;
- the measurement of socio-economic impacts;
- environmental impacts and the sustainability of transport policies;
- frameworks for assessing transport policy initiatives;
- an integrated approach to assessing the impacts of TEN policies.

*State of the art on SEA for transport infrastructure* (DG VII, 1995)

The report consists of an analysis of existing methodologies and experience of SEA in and outside the EU. The main aspects of SEA are covered, *i.e.* indicators, methods, models, GIS, data requirements and availability. In the final report general recommendations should be made regarding the methodological approach of the SEA of the TEN. The report found that there was currently only limited experience of transport SEA. It went on to conclude that Cost Benefit Assessment and Project Level EIA were inadequate to assess the impact of the TENs.

Recommendations included: multistage, tiered SEA procedure be adopted with each stage accompanied by a formal SEA statement; the objectives of the CTP and the TEN-T should be appraised; an SEA of the TEN scenarios should be undertaken; an SEA of the corridor alternatives should be undertaken.

The Report was published in 1995 and discussed tools such as geographical information systems (GIS), transport models, strategic models and other environmental modelling techniques that could be used within an SEA. The Report made the following conclusions:

- In theory GIS is a key methodology within a SEA. In reality there is a shortage of easily useable data.
- Similarly transport models would be useful but they need developing.
- The methodology for a rail corridor-based noise model is widely accepted.
- Other models regarding land use and air and noise are either inappropriate or are insufficiently developed.

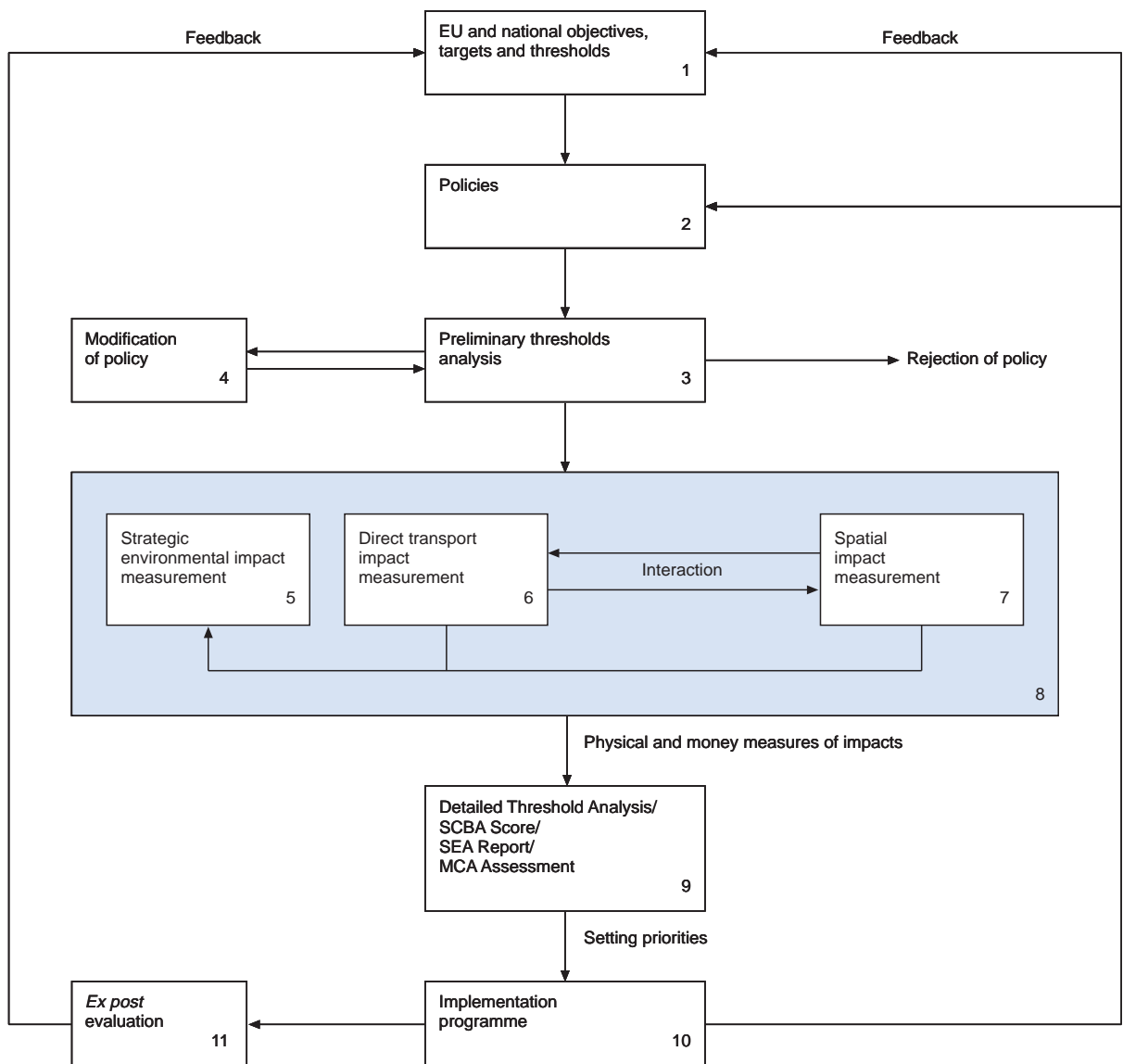
*Motorway working group, action AIRE* (DG VII, 1994)

The Motorway Working Group of the Transport Infrastructure Committee of DG VII has made a proposal of how SEA should be included in the planning process. It states that the “multi-modal approach will be the framework within which scenarios for the trans-European road network should be analysed”. The report proposes a scenario approach representing a limited number of infrastructure alternatives.

## B.3 SEA and policy assessment frameworks

SEA can be used to inform an assessment/analysis of policy at the highest level.

Figure 4. Proposal for a comprehensive assessment framework for transport SEA



Source: CEC, Methodologies for transport impact assessment, European Commission, DG VII, 1995.

#### SAMI (Strategic assessment methodology for the interaction of the CTP instrument)

The main aim of the SAMI project is to define a comprehensive assessment methodology for the CTP. SAMI uses multi criteria analysis techniques as the basis for developing decision support models for policy assessment. The key objectives include: to identify CTP targets and quantifiable indicators and assess possible conflicts and synergies between them; to define and develop an assessment methodology based on computer software; to clarify conditions for the implementation of the CTP at the European level and the implications in the CEEC/CIS, and to prepare a short manual/guide for strategic policy assessment at the European level.

**TENASSESS** (*Policy assessment of trans-European networks and CTP*)

This research aims to develop a methodology for transport policy assessment that could be used in the assessment of alternatives; for example, different transport infrastructure investments and service evaluations, typical of strategic assessment. A comprehensive policy assessment of the CTP will be provided with a view to advancing recommendations that may assist its further development and implementation. Six case studies have been selected to test the methodology.

**CODE-TEN** (*Strategic Assessment of Corridor Developments, TEN Improvements and Extensions to the CEEC/CIS*)

CODE TEN extends the methodology developed in TENASSESS to the incorporation of CEEC/CIS countries. The assessment methodology to be developed by this project will focus on the corridor concept. A comprehensive policy assessment of the CTP will be provided with a view to advancing recommendations that may assist its further development and implementation. Six case studies have been selected to test the methodology.

The project tries to re-establish the inter-relationships between four research disciplines: macroeconomics, regional economics and land use, transport and environment. Partial models of these four disciplines are integrated into one System Dynamics model. The purpose of this model is to carry out a strategic analysis of the Common Transport Policy (CTP) in terms of the construction of Trans European Networks (TEN). TEN corridor developments involve large projects with impacts, which clearly meet the requirements of SEA. National and EU level environmental and safety legislation, as well as national and common transport policies, provide the reference points for the assessment process.

The report consists of an analysis of existing methodologies and experiences on SEA in and outside the EU. The main aspects of SEA are covered, *i.e.* indicators, methods, models, GIS, data requirements and availability. In the final report general recommendations should be made regarding the methodological approach of the SEA of the TEN.

**ASTRA** (*Assessment of Transport Strategies*)

The ASTRA project tries to re-establish the interrelationships between four research disciplines: macroeconomics, regional economics and land use, transport and environment. It integrates the traditional modelling approaches associated with these four areas and combines them in one modelling platform/systems dynamic model. The purpose of the ASTRA tool will be to undertake strategic analysis of the long-term effect of the EU Common Transport Policy including the construction of the TENs. The ASTRA incorporates modules for policy assessment and modelling indicators for sustainable development.

**B.4 SEA and the production of alternative scenarios**

In order to help deal with the uncertainty associated with the quantitative prediction of impacts at the strategic level it is essential that a number of alternatives are looked at and evaluated. This allows, through a comparison of the impacts from the different options, the selection of the most sustainable option.

**STREAMS** (*Strategic policy research for European Member States, 1999*)

This project aims to develop a methodology and then to implement and test it in an operational model to present base scenarios on European transport developments. It endeavours to bring state of the art research on strategic transport modelling issues into practical use so that a reliable method to support European transport policy decisions can be created. A model will be developed and calibrated for all of Europe to forecast patterns of mobility and of freight and passenger flows.

**SCENARIOS** (*Scenarios for Trans European Network, 1998*)

This project aims to develop TEN scenarios for the whole of Europe including CEEC/CIS States. The project will entail making explicit the key influencing factors acting on the transport system: development

of population, spatial patterns, transport system costs, mobility patterns, development of technologies and transport policy. A key objective of the Scenarios project will be to construct a comprehensive scenario model with a view to developing a reference scenario that could then be used by different research teams.

#### POSSUM (*Policy scenarios for sustainable mobility*)

Research in the context of scenario development and in which criteria will be set for sustainable mobility. The project will develop a set of alternative policy scenarios to assist in decision making on the CTP and the TEN. The assessment will cover EU countries, the CEEC and CIS countries. Transport policy scenarios will be designed to present a range of future situations. Paths leading from the current situation to the attainment of the various scenarios will then be developed including a range of actions that may be taken and points for key decisions.

### **B.5 SEA tools**

There are a growing number of tools for the evaluation of impacts available to SEA. However, It is important that these tools are placed within a strong SEA procedure so that the significance of the results from various models and technical methodologies can be fully assessed.

#### COMMUTE (*Common technology for multi-modal transport environmental impact assessment*)

The project objective is the development of an innovative, comprehensive and reproducible methodology for assessing the impact of transport system activities and system changes on the environment, including general safety and risk aspects. The emphasis of the methodological development is on the multi-modal and inter-modal aspects of the impact assessment in relation to the extension and improvement of Trans-European Transport Networks.

The COMMUTE tool is based on relatively large-scale spatial resolutions. It could be used for assessing environmental impacts on European, National and local level. The tool uses traffic data as an input. On the other hand traffic data input comes from transport models in the form of traffic flows and other related parameters. The COMMUTE tool enables assessment of road, rail, and air transport emission and energy consumption, as well as assessment of safety and noise impacts.

#### MEET (*Methodologies for estimating air pollutant emissions from transport*)

The objective of this project is to develop a database for emission factors for all transport modes and to provide models to estimate air pollutant emissions from transport activities. The results of this project serve as an input to the COMMUTE project.

MEET provided basic input for the update of the emissions calculation module (called COPERT = Computer Programme to Calculate Emissions from Road Transport).<sup>48</sup> This was used in the Auto-Oil Programme 2 (AOP2), an EU regulatory initiative aimed at improving air quality by addressing emissions from passenger cars and vans, as well as the quality of petrol and diesel fuel. In particular, MEET input was used to update cold start extra emissions, inspection and maintenance effects on emissions, to predict the effects of future legislation on emissions etc. The basic emission factors are only partially based on MEET (there is a set of further improved emission factors which however were not used in AOP2).<sup>49</sup>

#### ECOPAC

In this project a new methodology will be developed for the assessment of socio-economic and spatial impact of the CTP and the TEN networks.

#### COST 341 (*Habitat Fragmentation due to Transportation Infrastructure*)

The linear nature of transport infrastructure results in the bisection and possible isolation of habitats and wildlife communities. The aim of the research is twofold to conserve biodiversity and reduce vehicular accidents and resulting fauna casualties. This project aims to compile best practice regarding

methodologies, indicators, technical design and procedures for avoidance, mitigation and compensation of adverse effects on nature conservation from transport infrastructure. This information will be compiled into a handbook for the European community/government/policy makers, the scientific/technical community, NGOs and the public.

#### *COST 328 action (Methods for assessing trans-European networks)*

This action aims at finding the best methods of socio-economic assessment of transport networks in Europe with the accent on interoperability and interconnectivity of networks and at explaining the role of transport operators. This method tries to overpass the traditional CBA and MCA methodologies by setting network performance indicators. The key outputs of the study include:

- Identification of an assessment/evaluation framework expected to be suitable for European transport policy.
- Formulation of policy guidelines resulted from the findings of the case studies.
- Proposals for a good policy practice in assessing/evaluation of European network development.

#### *COST 319 (Estimation of pollutant emissions from transport)*

This research action is complementary to MEET and should provide tools to estimate transport emissions at urban level.

#### *COST 317 (Socio-economic effects of the Channel Tunnel)*

The action aims to specify the relationship which may exist between the introduction of major transport infrastructure projects (the Channel Tunnel) and consequences in terms of the socio-economic changes to the surrounding area. It aims to propose where possible a method for detecting and evaluating these changes.

### **B.6 SEA and the assessment of new technology**

Within the development of alternative policy plan or programme scenarios the use of new technologies will provide important alternatives, possibly reducing the need to build new infrastructure. Consequently they must be assessed.

#### *EMARC (MARPOL rules and ship generated waste)*

This research will assess the current situation with regard to the production of waste in all its forms on board ships and to investigate present and future systems for the management of ship waste both afloat and ashore. The role played by MARPOL regulations and influencing these activities in both locations will be assessed. The results of the database analysis will be used to devise a model for environmental changes resulting from improved technologies and the widening of the application of MARPOL rules.

#### *FANTASIE (Assessment of new technologies and environmental issues)*

The project identifies new technologies and lines of technological development that are expected to have major impact on transport systems in the EU and the attainment of the CTP aims. This includes world-wide technology forecasting. Consideration of the whole transport area with all its modes and technologies is included.

This study has reviewed the current “state of the art” of methodologies applicable to the assessment of strategic transport initiatives. A proposed integrated approach to assessment has also been outlined in which strategic environmental effects, spatial impacts and the more traditionally measured direct transport impacts can be incorporated into a consistent framework. The report is devised in the following parts:

- transport and regional development;



- the measurement of socio-economic impacts;
- environmental impacts and the sustainability of transport policies;
- frameworks for assessing transport policy initiatives;
- an integrated approach to assessing the impacts of TEN policies.

### C. OECD Road Transport Research

In 1994, the OECD published a report on “Environmental Impact Assessment of Roads”. The report includes a chapter on SEA in which practice and procedures in various countries are reviewed and recommendations are made for a possible structure of impact assessment for policies, plans, and programmes within the road / transport sector. The report concludes that:

*“It is still unclear how the application of environmental assessment at policy, plan and programme levels will affect the outcome of projects and other measures/actions. In several countries, the general attention given to environmental issues has resulted in more bypass projects, more traffic calming and more environmental protection measures within the road sector. In countries where the overall resources for rail investments have increased, this was probably not a result of formal SEA. However, SEA is a concept with potential for efficiency and for increased environmental consideration in general policies and in the choice of actions. A continued implementation of SEA can be expected within the OECD countries.”*

Box 12 outlines the possible content of SEIA document for strategic road/transport plan.

#### Box 12. SEIA Document

##### Possible content:

- purpose and need;
- description of proposed actions, including do-nothing and other alternatives;
- description of existing environment of relevance to system planning;
- description of risk for significant effects of the proposed plan (relevant to system planning) including information on how environmental effects have been considered for alternatives (achievement of environmental goals);
- recommended mitigation principles;
- information on evaluation methods used;
- information on “scoping” or preceding policy formulation;
- information on gaps in knowledge and important uncertainties.

Source: OECD, 1994.

## 5. CONCLUSIONS AND RECOMMENDATIONS

SEA is an iterative process, and should ideally be based on continuous communication between all actors that are involved in the planning process, *i.e.* sector and environmental officials and experts and the public.

### A. Dissemination of Information and Training

Experience shows that, even though SEA still has a limited influence on decision making, one of its main merits is that it initiates communication on environmental issues between the various actors that are involved in the planning process.

An effective communication and learning process depends in the first instance on the availability of practical information and documentation. A second prerequisite is the provision of adequate training for all parties involved in the SEA process. The following kinds of actions will be important in these areas:

1. **Establishment of international forums, or the organisation of seminars**, in which various concerned parties can meet and discuss SEA developments in the transport sector. The European Commission is already playing an important role in terms of organising workshops.
2. **Training workshops** in an international or national/regional context, which should address officials, (from all related ministries and agencies), experts, NGOs and non-experts. The development of training material and guideline manuals in which a range of SEA processes and methods are illustrated is essential.
3. **Improvement of the co-ordination of SEA research and initiatives**: this and other reviews show that SEA in the transport sector is subject of a varied range of research initiatives, in various organisations and on various levels (regional/national/international). Duplication is frequent because of the lack in exchange of information on these initiatives. A better co-ordinated research programme and exchange of information (with *e.g.* the development of an easily accessible database with relevant initiatives) would greatly improve the performance of methodological research and would accelerate the actual putting into practice of SEA.

### B. Addressing Institutional Barriers

4. Institutional and political barriers hinder the implementation of transport SEAs. These problems become more significant for multi-modal SEAs, which require co-operation between road, rail, aviation and other administrations, and for multi-country approaches. Better awareness of the main purposes of SEA should be raised within all involved administrations and inter-institutional co-operation (on national and international level) enhanced.

### C. Environmental Assessment of Transport Policies

Currently the practice of SEA in the transport sector (as in most other sectors) is limited to plan and programme levels. However, to make the principles of sustainability fully operational, SEA should be introduced as early as the policy-making level. Policy assessment needs a specific approach and appropriate methodologies, and a number of examples can be found, for example in the Netherlands, Denmark, the United Kingdom (about to be published)<sup>50</sup> and Finland. Even though the introduction of

international or national regulations in this regard seems at present inappropriate, the following initiatives in this area should be envisaged.

5. **Reviewing existing systems and practice of SEA of transport (and other) policies**, including both mandatory and voluntary systems and cases, with special focus on issues such as public participation, monitoring and how to use SEA findings in high level decision making.
6. **Pilot initiatives** for SEAs at the policy level in transport ministries or national/international transport agencies. A first task in developing such initiatives would be to investigate how and where SEA can be optimally introduced in the agency (taking into account its organisational and procedural structure). A next step could be to develop an appropriate SEA procedure/methodology, to monitor and report the performance of the system. These pilot actions could be complementary to the research on policy assessment of the CTP that is being conducted by the European Commission. The setting up of pilot projects is an approach that is also being taken by the European Commission, which co-financed amongst others the Danish initiative to develop a SEA system for Parliament Bills.
7. **Pilot methods for SEA of policies and training workshops** are being organised by the European Commission for the Directorate Generals responsible for key policy areas such as transport. This is in response to the requirements in the Amsterdam Treaty and should encourage similar initiatives at national and regional levels.

#### **D. Improvement of Sustainability Targets and Indicators**

8. A first step to make the concept of sustainability operational in the SEA process is the **setting of clear objectives and targets and selection corresponding sustainability indicators**. Different sets of indicators are needed, reflecting assessment requirements on different levels of planning (policy, plan and programme). Ideally, each set of key-indicators should include economic, traffic, social and environmental indicators. Several checklists have already been developed or may readily be incorporated in SEA. Care must be taken to harmonise efforts with those currently underway at the international level, especially considering the need to support Agenda 21 approaches.<sup>51</sup> SEA can benefit from the Agenda 21 process by adopting the pressure and state indicators defined for monitoring sustainable development (Gühnemann, 1999). Various national and international initiatives aim to define indicators of sustainable development. Important progress in this area has been made through research initiatives by the EU, the OECD, the World Bank, SCOPE, UNSTAT, EUROSTAT and WWF. However, the setting of targets varies considerably between countries and this may constitute a barrier to international SEA (Dom, 1999). Consensus is currently being built in the EU over the TERM set of indicators for use in the transport sector (see Annex 3). Similar consensus should be built at the wider international level for example amongst all OECD countries and main IFIs in order to establish a set of indicators and targets to be used in the assessment of funding packages.

#### **E. Enhance SEA as a Process for Strategic Sustainability Analysis (SSA)**

9. To guarantee that environmental considerations are fully integrated in the decision-making process, the findings of a SEA need to be considered on the same level as financial considerations and socio-economic evaluations. There is consensus in the international discussion that in the long term the integration of economic, social and environmental instruments within one process seems the most effective. Options are to either broaden the scope of SEA to include socio-economic impacts, or to develop separate assessment processes which are optimally inter-linked. This requires the development of methods and models for SEA that would allow trade-offs between environmental impacts, socio-economic effects and investment considerations to be analysed and tested against sustainability targets. If these links are not established, the risk exists that SEA would remain very much a pro-forma exercise in the future. An integrative assessment of all the effects of a proposed action – whether conducted as part of or parallel to a SEA – is crucial for the quality of the planning process.

## F. Methodological Research

The review of ongoing research above shows that the methodological aspects of SEA in the transport sector are being extensively researched, in the European Commission amongst other institutions. However, certain issues need to be further investigated.

10. Development and documenting of a wide range of methodologies: the choice of SEA methods and tools should depend on the context of the country or region, the existing planning processes, the availability of data, the objective of the strategic action and the policy level of the action. The development of standard methodologies therefore seems not feasible and not desirable. A more realistic approach is optimisation of various methods and tools and a wide dissemination of information on them. Flexibility and adaptability should remain the core characteristics of SEA systems.
11. Specific SEA aspects on which research is recently emerging and which require additional investigation are:
  - cumulative impact assessment – especially the USA and Canada have conducted research in this area;
  - assessment of secondary development related to transport infrastructure;
  - life cycle analysis (LCA): in the Netherlands and some other countries LCA is being developed as a SEA tool. For transport actions, the application of LCA in SEA could provide interesting solutions for *e.g.* inter-modal comparisons;
  - gather more examples on SEA processes and how they connect and interact with planning procedures;
  - review of the effectiveness of SEAs carried out (not necessarily limited to the transport sector) in terms of: *a)* integrating sustainable objectives and targets in policies, plans or programmes, and *b)* promoting greater collaboration between environment and development authorities, and greater levels of participation by stakeholders;
  - develop harmonised data and techniques to enable SEA of international policies. The practice of international SEA may indeed drive data optimisation (Dom, 1999).
12. Urgent attention should be given to the role of public participation and consultation at strategic planning and at how to meet the requirements of the UN Espoo and Aarhus declarations in the context of large transport schemes.<sup>52</sup>

## G. Put SEA in Practice

13. Methods will always remain to a large extent case-dependent, since they rely largely on existing planning systems and on the availability of data but experience shows that SEA methods are not only validated by practical application, but are also developed with practice. **The conducting of pilot studies should therefore be complementary to methodological research.** The reasoning that SEA is still a technique at an early stage of development should cease to be seen as an obstacle to the putting in practice of SEA. All the more so since most reviews show that a wide range of methods and tools for the assessment of transport policies, plans, and programmes already exist and have been applied.
14. Political support is needed from Governments to both bring about a SEA at an appropriate time in the planning cycle and to ensure that an appropriate role is given to its findings when making a final decision over the policy, plan or programme.
15. Governments should ensure that suitable technical and financial support is provided to generate suitably trained and experienced staff to support the SEA needs of the competent authorities.
16. Greater effort should be devoted to ensure that economic, technical and environmental assessments are at least **co-ordinated**, so that those involved are fully aware of the types of alternatives being discussed in the different studies. The aim should be to provide a complete overview to decision-makers.

Governments should devote increased efforts to the application of SEA to policies and legislative levels, as well as to plans and programmes. Governments should ensure that SEAs are undertaken in parallel to the planning of the strategy and that the SEA should be performed by a multi-disciplinary and multi-stakeholder team of experts providing an objective review of the performance of the strategy.

## H. A SEA Strategy for the TEN and TINA

17. **Development of an iterative and flexible SEA strategy for the TEN, including network and corridor assessments:** at present, it is not clear whether the Commission still intends to assess the multi-modal TEN as a whole, or whether it will opt for a corridor approach. A network analysis should be the first step of an iterative SEA process, which should gradually be extended to national, regional and corridor levels. Although the preparation of the master plans is already very advanced there are still important reasons for advocating a network SEA:
  - The network SEA could constitute the screening/scoping phase for the next tiers of planning: it should allow the identification of the main pressure points and contribute information that allows the selection of regions or corridors (or sets of corridors) that are to be assessed by priority.
  - The SEA of the TEN will facilitate the provision of environmental information in all next tiers of planning, *i.e.* national, regional SEA and corridor SEAs.
  - A network SEA would contribute significantly to the improvement of existing methodologies and models. In particular, the experience gained in the SEA of the TEN would provide valuable information and assessment tools for the assessment of the pan-European networks and other trans-national policies.
18. **Creation of an SEA task force for the TEN:** SEA is not limited to the mere application of technical assessment techniques and models, but also involves the organisation of effective channels for communication between the various actors that are involved in the process. In a complex SEA process such as the TEN would require, the creation of a task force to guarantee a continuous consultation between officials and experts is essential. The group could consist of representatives of the various relevant DGs, the European Environment Agency and national experts. The task force should have an active and steering role in all SEA stages, *i.e.*:
  - identification of objectives;
  - screening and scoping (of impacts and alternative options);
  - co-ordination with relevant ongoing research (*e.g.* the 4th Framework Programme) and with other forms of assessment (*e.g.* socio-economic assessment);
  - reviewing of SEA results;
  - exchange of information and dissemination of results;
  - organisation and assistance of consultation and public participation;
  - monitoring.
19. **Clear identification of objectives, targets and indicators at each planning level:** objectives and indicators form the essential framework of each SEA system. A core set of (environmental, traffic and socio-economic) objectives and targets and relevant indicators should be identified and agreed upon for each planning level. Particular attention should focus upon the development of regional and local goals and the mechanisms by which the public can participate in their derivation. Goals and targets for landscape change and transport is an area requiring specific research to develop strategic level tools.
20. **Development of integrated databases:** one of the main requirements for the effective application of SEA on the TEN is the development of European, harmonised databases (including traffic, environmental, economic and demographic data). The European Environment Agency has played a significant role in this, creating a first new database with data on TEN infrastructure and ecological and spatial characteristics of the land affected. This database will reduce the time needed for SEA, thus making SEA a flexible and effective decision tool. In addition, the database could provide valuable (and time-saving) input into the development of national or regional SEA processes.

21. **Formulation and assessment of alternative policy options:** It is advisable to assess the TEN in the wider framework of all proposed CTP measures and priority actions aimed at promoting the use of environmentally-friendly transport modes and of collective transport. The future SEA of the TEN should therefore include various policy scenarios, in which not only the effects of alternative transport networks and corridors, but also of traffic demand management, pricing and regulatory measures can be assessed and subjected to sensitivity analysis.
22. **Development of modelling tools:** development of an assessment model that combines traffic and environmental impact modelling, and is possibly linked to a GIS system.
23. **Develop procedures and ensure the link with decision making:** So far, it is very unclear to what extent the results of a network-level SEA can be binding for Member States, and what would be the SEA's link to national-level SEAs and EIA at the project level. Also, the fact that the results of SEAs conducted on Community level are at present not considered to be a condition for EC funding severely limits the effectiveness of SEA. This legal and procedural situation regarding SEA should be clarified when reviewing the Guidelines for the TEN.
24. **Consultation and public participation** remains another important issue. The White Paper on the CTP recognised that improvement of the environmental performance of the Community's transport systems requires the participation of all actors. So far, however, the political discussion on the TEN has mostly been conducted between the Community's institutions, the national and regional authorities, industry and the transport operators. A strategy should be developed to also address the concerns that are increasingly being expressed by transport users, environmental protection groups and local authorities.<sup>53</sup> Ideally, consultation should already be conducted at the outset of the SEA, *i.e.* in the phase of objective identification and scoping. Of course this means that a proper balance needs to be struck between confidentiality requirements, which can be very stringent at the strategic levels of decision making, and public consultation needs.
25. TINA could be a useful test bed for the development of practical methodologies to integrate SEA outputs with other appraisal criteria to provide practical advice to decision-makers. Future work could focus on carrying out a SEA of corridors in the TINA network to provide inputs to the Appraisal Framework.

## I. Initiate the SEA Process for the Pan-European Networks

26. **SEA to promote a multi-modal approach and prioritise funding:** As a result of the TINA process, a number of corridors and related infrastructure projects are being proposed in order to develop the network connecting the EU to CEECs. SEA can be a tool to guarantee a multi-modal approach in developing the pan-European transport networks, and to help prioritise funding for those projects which contribute most to environmental and sustainability goals. It is essential that the environmental implications of selecting and prioritising segments of the network be taken into consideration at the earliest possible stage.
27. The SEA of the pan-European network should, amongst other things, be made operational by an **intensification of exchange of information** between CEEC and EU initiatives and experts and by training initiatives such as those outlined above.

## J. SEA as Part of Funding Mechanisms

28. **Inclusion of SEA in certain funding conditions:** the international financing agencies play a crucial role in the future development of national and international transport systems. Environmental considerations only account for a small part of funding approval at project level (with *e.g.* mandatory requirements for project EIA). Often, projects effectively form part of a wider programme of funding, with significant overall impact. Making SEA a condition for the financing of such programmes/plans, and as a preparatory phase for the approval of project financing, seems therefore essential. Most funding agencies have recognised the need for SEA and some (like the World Bank) have already carried out a number of assessments in various sectors, including transport, however, in general there is still a lack of practical experience.

29. **Promoting joint initiatives:** IFIs should consider the benefits and opportunities of greater collaboration in the very influential area of investment in the transport sector. A series of strategic assessments of the transport sector in the different regions which are being targeted for investment by different IFIs could lead to some guidelines or prioritisation mechanisms which might influence the individual institutions' loan programme in favour of environmentally, socially and economically sustainable solutions. This joint approach would have several beneficial results, including a better and more cost-effective use of existing information on environmental issues related to the transport sector in certain regions or countries.
30. SEA of **funding mechanisms** should be given urgent priority, particularly with regard to transboundary corridors. The results of SEA should be linked to the decision to grant financial support. IFIs and the European Commission should seek ways to join forces on SEA of the transport sector in CEECs.



## NOTES

1. Including national legislation for Finland, the Netherlands, and Denmark, and regional legislation such as that of Tuscany – Italy, and Castilla y León – Spain.
2. The Commission adopted in 1996 a Proposal for a Directive on Environmental Assessment of plans and programmes (Strategic Environmental Assessment or SEA [COM (96) 511 final]). In October 1998, the European Parliament finalised the First Reading of the SEA Proposal. The Commission amended the SEA-Proposal in February 1999 and the negotiations at the Council level are expected to come to an end by end of 1999 or the beginning of 2000.
3. See for example: Article 6 of the Amsterdam Treaty; the July 1998 Communication by the Commission to the European Council outlining its strategy for integrating the environment into EU policies; the Commission's 1993 provisions for the environmental evaluation of plans, programmes and legislative proposals (SEC (93) 785 final).
4. Council Regulation (EC) No 1260/1999 of 21 June 1999 laying down general provisions on the Structural Funds.
5. European Environment Agency (1999) Towards a transport and environment reporting mechanism (TERM) for the EU – Part 1 and 2. EEA Technical Reports.
6. In this context the policies referred to are those drawn up by government administrations, and not electoral commitments made by political parties.
7. For example the UK DETR Guidance Manual for Multi-Modal Studies to be published shortly and the Highways Agency Guidance manual on SEA for Multi-Modal Studies to be published in September 2000.
8. In this context the policies referred to are those drawn up by government administrations, and not electoral commitments made by political parties.
9. Therivel R. *et al.* (1992), Strategic environmental assessment.
10. Lee, N. and Walsh, F. (1992), Strategic Environmental Assessment: an Overview, in Project Appraisal, volume 7, No. 3, September 1992.
11. Adapted from: European Commission (1999), *Manual on SEA of Transport Infrastructure Plans*. Report prepared by DHV for DGVII.
12. Adapted from University of Manchester (1995), EIA Leaflet series, Strategic environmental assessment.
13. Transport corridors are defined as in the Manual as “the area between two urban areas, airports, ports or other fixed poles of traffic attraction, between which traffic flows”.
14. The UK has recently embarked upon a programme of Multi-Modal Studies for parts of the trunk road network in which a study of the environmental consequences is to be made.
15. European Environment Agency (1999), Monitoring Progress Towards Integration – a contribution to the Global Assessment of the Fifth EAP, Interim Report (31 March 1999). Report to the EEA by Environmental Resources Management.
16. European Bank for Reconstruction and Development (1993), Environmental Impact Assessment Legislation.
17. See paper by Rewinskii, *et al.*, 1999: Major Environmental Problems of the Motorway Construction Programme: How EIA Can Help, Presented at OECD-ECMT Conference on Strategic Environmental Assessment for Transport, 14-15 October, 1999; and Tracz: 1999: Strategic Environmental Assessment of the Planned Network of Motorways and Expressways in Poland, Presented at OECD-ECMT Conference on Strategic Environmental Assessment for Transport, 14-15 October, 1999.
18. See also Annex 2.
19. 4th Regional EIA Workshop of the Sofia EIA Initiative, Bratislava, May 19-21, 1999.
20. Source: *Transport SEA: A Nordic Perspective*, A. Jansson (1999), Finnish National Road Administration, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
21. Source: *Transport SEA: A Nordic Perspective*, A. Jansson (1999).

22. Source: *SEA applied to Multimodal Corridors. Methodology developed by France: The Case of the North Corridor*, P. Scriabine (1999), SETRA, France, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
23. Reference: Ministère de l'Équipement, du Logement et des Transports (1992), *L'axe A7-A9 à l'horizon 2010 – propositions intermodales*.
24. Source: *Transport SEA: A Nordic Perspective*, A. Jansson (1999), Finnish National Road Administration, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
25. Source: *SEA of the Planned Network of Motorways and Expressways in Poland*, M. Tracz (1999), Cracow University of Technology, Poland, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
26. Reference: DHV Group (1996), *Environmental Impact of Transport Policy In Slovenia*.
27. Reference: Secretaría de Infraestructuras y Transportes del Ministerio de Fomento. (1999) *Estudio del impacto acumulado de la línea de alta velocidad Madrid-Zaragoza-Barcelona-Frontera Frances, y las Autopistas R-3, M-45 y M-50 sobre la zona de especial protección para las aves No.142*. Report by SEO/BirdLife.
28. Source: *Transport SEA: A Nordic Perspective*, A. Jansson (1999), Finnish National Road Administration, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
29. Source: *SEA Guidance for Transport in the UK*, P. Tomlinson (1999), TRL, UK, presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
30. Source: *SEIA in the Transportation Sector: The US Experience*, F. Skaer (1999), presented at OECD/ECMT Conference on SEA for Transport, Warsaw, October 1999, available on website: [www.oecd.org/cem/topics/env/SEA99.htm](http://www.oecd.org/cem/topics/env/SEA99.htm).
31. Bar S, Kraemer A, Smith (1998) *Amsterdam and the Environment – an analysis of the Treaty of Amsterdam and its effects on the environmental policy of the European Union and its Member States*. Report to the European Commission.
32. CEC (1995), *Proposal for a Council Directive on the assessment of the effects of certain plans and programmes on the environment (draft version)*. Appeared as a draft SEA Directive [COM(99)73]] in March 1999. The Council of Ministers reached unanimous political agreement on a common position on the draft at their December 1999 meeting. Once formally adopted at a forthcoming Council meeting, the common position will be transmitted to the European Parliament for a second reading in accordance with the co-decision procedure.
33. See the European Commission web site for more information: <http://www.europa.eu.int/comm/dg11/eia/sea-support.htm>.
34. Quote taken from the proposed text for a Council Regulation, (No. 6959/99) 6 April 1999.
35. Commission of the European Communities (1994) *Proposal for a European Parliament and Council Decision on Community guidelines for the development of the Trans-European Network*, COM(94) 106 final, Brussels.
36. DGVII (1999) *Manual on Strategic Environmental Assessment of Transport Infrastructure Plans*. Prepared by DHV Consultants for the European Commission, February 1999.
37. Commission of the European Communities (1990) *The European High Speed Train Network*, Brussels.
38. M+R (1993), *The European High Speed Train Network: Environmental Impact Assessment*. Study commissioned by the Commission of the EC – Directorate-General Transport.
39. World Bank (1999) *Case Studies on Regional and Sectoral EA: An analysis of lessons learned*. A Report prepared by Environmental Resources Management for The World Bank.
40. Goodland R and Mercier J-R (1999) *The Evolution of Environmental Assessment in the World Bank: from "Approval" to Results*. The World Bank, Environment Departments Papers, Paper No. 67.
41. EBRD (1996) *Environmental Procedures*.
42. EIB (1997) *Environmental Guidelines*.
43. HELCOM PITF (1999) *TASK 1: Review of the Existing Infrastructure Decision-Making Process at the IFIs in the Baltic Sea Region*. Fourteenth Meeting, Helsinki 18-19 May 1999.
44. EIB (1996) *The European Investment Bank and the Environment*.
45. Vrom (1995), *International Workshop on Environmental Assessment of Policies*, the Hague, December 1994.
46. Lee N. and Hughes J. (1995), *Strategic Environmental Assessment Legislation and procedures in the Community*.
47. World Bank, 1999: *Case Studies on Regional and Sectoral EA: An Analysis of Lessons Learned: A Report prepared by Environmental Resources Management for The World Bank*.
48. For COPERT II you can find information from the EEA's web page:  
<http://www.eea.eu.int/Document/Techrep/tech05.pdf>  
<http://www.eea.eu.int/Document/Techrep/tech06.pdf>  
 You can download the programme from:  
<http://vergina.eng.auth.gr/mech/lat/copert/copert.htm>.

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49. European Commission, (1999) MEET Methodology for calculating transport emissions and energy consumption, Final summary MEET Report, ISBN 92-828-6785-4, p. 362, Luxembourg".  
All MEET technical reports can be downloaded from: <http://www.inrets.fr/infos/cost319/index.html>.
  50. GOMMMS and the SEA Guidance Manual.
  51. UN (1993), Agenda 21, the UN Programme of Action from Rio.
  52. The European Commission (DGXI) is currently funding a study on this subject. See DGXI's web site for more information.
  53. T&E, European Federation for Transport and Environment (1995). Ten questions on TENs, Brussels.

## Annex I

### SEA PROVISIONS IN EUROPE

Country	Provisions for assessing likely environmental impacts at the Policies, Plans, and Programmes level	Sectors to which some assessment provisions currently apply
Austria	At present policies, plans, and programmes are not systematically subject to an explicit environmental evaluation, but there are a number of planning instruments that allow environmental considerations to be taken into account in various sectors (see opposite). The new EIA Act (1994) only relates to assessment at the project level.	Energy, transport, tourism, water resources, waste management, land-use planning, forestry.
Belgium	The consideration of environmental impacts occurs to some extent, at the regional government level for various sectors (see opposite). These apply mainly at the plan and programme level. The current EIA legislation in Belgium relates predominantly to the project level (the main partial exception to this is in the Brussels region). In the Flanders region a new decree has been prepared, which incorporates a section relating to the environmental impact assessment of policies, plans, and programmes.	Agriculture, gravel extraction (Flanders). Energy, transport (Brussels). Water resources, waste management, land-use planning (Brussels & Flanders)
Bulgaria	EIA is required for national and regional investment development programmes, regional and urban plans and their changes, and plans leading to land use change for specific activities.	National and regional investment programmes, urban plans, and land use change plans.
Czech Republic	SEA is required in preparation of development programmes and proposals for legal acts by the Czechoslovak Federal Act of 1992.	Programmes and proposals for legal acts
Denmark	The response is confined to the Prime Minister's Office Circular (1993) which specifies that an SEA is required for all government proposals which have major environmental effects (also see Elling 1994). The existing legislation is largely confined to the project level. However, there are long-standing provisions to take environmental effects into account in the preparation of land use plans and, possibly, in certain other policies, plans, and programmes as well.	Effectively, the 1993 procedure is applicable to all sectors.
Finland	Under an existing Government regulation and Council of State decision, an abridged estimate of environmental impacts has to be prepared for policies, plans, and programmes at the national level for all sectors. Also environmental considerations have to be taken into account for regional plans and programmes, that may have significant environmental impacts. More specific requirements also exist in other up-dated sectoral legislation relating to land-use planning and waste management. Additionally, the EIA Act (1994) requires the environmental assessment of plans and programmes that may give rise to significant environmental impacts.	All sectors at national level. Specific requirements for regional development land-use planning and waste management.
France	Current EIA legislation is mainly confined to projects, the principal exception, until recently, has been certain local land use plans. However, since 1990, according to a decision of the French Parliament, it should be demonstrated that proposed laws are environmentally sound and sustainable. Also, a recent decree of 1993 requires, under certain circumstances, the preparation of environmental statements for whole programmes. Less formalised environmental evaluation provisions are applied to a wider range of policies, plans, and programmes. Studies relating to the possible future extension of more formal SEA procedures have been undertaken (Ministère de l'Environnement, 1994, Falque, 1995 forthcoming).	Formal EIA procedures applied to certain land use plans. Less formalised provisions applied in a wider range of sectors.
Germany	Existing federal legislation is mainly confined to the project level. However, a requirement to take environmental considerations into account is incorporated into legislation relating to each of the sectors opposite. Additionally, the Cabinet EIA Procedure of 1975 was not confined to projects and has, therefore, had some limited application to certain policies, plans, and programmes. Some environmental assessment of policies, plans, and programmes occurs in particular cases, at the <i>länder</i> and municipality level.	Agriculture, industry, transport, water resources, waste management, land-use planning, nature protection.

Country	Provisions for assessing likely environmental impacts at the Policies, Plans, and Programmes level	Sectors to which some assessment provisions currently apply
Greece	Existing legislation is confined to projects. Environmental evaluation at the policy, plan, and programme level in most sectors is not well developed. Information on the use of environmental evaluation in EU-funded plans and programmes was not supplied.	No details
Hungary	The Environmental protection Act of 1995 provides the basis for SEA. It notes that SEA is required for national socio-economic plans, decisions with regional impact, economic regulatory tools related to environmental protection and regulations which could affect the environmental media, the quality of environment, and human health in relation to the environment.	Socio-economic plans, economic tools related to environmental protection and regulations.
Ireland	Procedures exist, according to a Government decision of 1978, for taking into account environmental considerations when developing policies, plans, and programmes – details on their practical application have not been obtained. Local authorities are required to take into account environmental issues when preparing development and certain other plans.	In principle, all sectors at the national level. Also, land-use planning; waste management and water quality at the local level.
Italy	No statutory form of SEA exists at the national level; existing EIA legislation is confined to certain project categories. In principle, Article 2 of Act 349/86 enables the Minister of the Environment to undertake an environmental assessment of certain national plans but this is not operationally effective. Some form of environmental evaluation is incorporated into the planning process in a number of different sectors but in some sectors ( <i>e.g.</i> certain land use and energy plans) it is not well developed. A small number of regions have incorporated some provisions for the environmental assessment of certain policies, plans, and programmes within their regional EIA and land-use planning laws ( <i>e.g.</i> Tuscany L.R. 18 January 1995 n. 5). There are two project laws under consideration, one designed for the national level and the other addressed to the regions, which propose formally extending environmental assessment to plans and programmes in the sectors covered by Directive 85/337/EEC.	Details not available but most of the sectors for which policies, plans, and programmes exist contain some (often limited) provisions for environmental evaluation.
Luxembourg	Current legislation mainly relates to project-level EIA.	
Netherlands	Under the requirements of the Environmental Protection Act and the EIA Decree, certain types of plans falling within the sectors listed opposite are subject to the EIA procedure. Additionally, existing land-use procedures also take environmental considerations into account. Further, an environmental test is proposed which, when approved, would require the systematic consideration of environmental impacts in decision-making at national policy level (also, see Verheem, 1992).	Agriculture, industry, energy, transport, infrastructure, tourism, water resources, waste management and land-use planning.
Norway	No statutory form of SEA exists at present: existing legislation is confined to projects. There is statutory provision for a form of policy, plan, and programme -level environmental assessment for areas of new oil extraction and production and for water resource management plans, under separate legislation. Also, there are ministerial procedures for an environmental assessment of annual budgetary proposals. Studies of SEA have been undertaken within the framework of the Nordic Council and interest in this continues.	Water resources, oil extraction/production and, less formally, in other sectors as well.
Poland	No statutory form of SEA exists at the national level. The new Land Use Act (January 1995) states that sustainable development is to be the basis for all land-use management decisions. The Act stipulates that a "forecast of environmental consequences (a simplified form of SEA) be performed for local land-use plans. A separate executive order of the Minister of Environmental Protection, Natural Resources and Forestry states the content requirements for the forecast.	Local land-use plans.
Portugal	No statutory form of SEA exists at present; existing legislation is confined to projects. Elements of environmental evaluation are incorporated into regional and local land use planning, the preparation of a national energy plan and a national system for industrial waste management. Also some limited elements are incorporated into the investment programmes submitted to the EU for Structural Funds support (also, see Pinho, 1990). No legal or administrative provisions for SEA are envisaged in the near future.	Energy, land-use planning, waste management and EU funded national development programmes.
Slovak Republic	The legal status of SEA is ensured by the fourth part of the Slovak Parliament Law N° 127/1994 on EIA, where development policies and territorial planning documentation are subjects of the assessment of their likely impact. In 1996-97 draft SEA Regulation was prepared and is expected to be completed in 1999.	Energy supply, mining, tourism, transport, agriculture, forestry, water management, waste management, land-use planning.

Country	Provisions for assessing likely environmental impacts at the Policies, Plans, and Programmes level	Sectors to which some assessment provisions currently apply
Slovenia	No statutory form of SEA exists at the national level; existing EIA legislation is confined to projects. The new Environmental Protection Act 1993, however, requires former regional plans to be replaced by "environmental vulnerability studies" covering all ecological regions in the country.	Regional development planning.
Spain	No statutory form of SEA exists at the national level: EIA legislation is confined to projects. Any environmental evaluation of policies, plans, and programmes at the national level is limited, except in certain cases where there is a strong spatial dimension or in those cases that directly relate to the environmental sector. However, seven of the seventeen autonomous regions have made statutory provisions for the environmental assessment of certain policies, plans, and programmes, typically (with one exception) as part of their EIA legislation (see opposite for sector categories). It is envisaged to introduce, in the future, environmental assessment of plans and programmes, at the appropriate level of government, in the following sectors: agriculture, forestry, energy, water resources, industry, transport, tourism, land-use planning, coastal development.	Land-use planning (5 regions). Waste management (3 regions). Agriculture (2 regions). Transport, industry, energy. Tourism (1 region). Also forestry, nature conservation, mineral resource management and infrastructure.
Sweden	Under the provisions of the National Resources Management Act, and related other legislation and regulations, some environmental assessment requirements apply to the following situations: certain Forestry Board measures, local municipality energy plans, national and regional road plans, certain local land-use plans.	Energy, transport, land-use planning and forestry.
Switzerland	The decree of 19/10/1988 on assessment of environmental impact governs the evaluation of projects. Motorways and new rail lines are subject to impact studies at several stages: the stage I EIA begins as soon as the decision in principle to approve the project is taken in Parliament. This stage of EIA contains elements relevant to SEA. Environmental impacts are also considered in the elaboration of strategic and sectoral land use plans.	Land use planning and transport projects.
United Kingdom	No statutory form of SEA exists at the national level; existing EIA legislation is confined to projects. Various non-statutory measures have been adopted, at national government level, to integrate environmental considerations into the policy and decision-making process ( <i>e.g.</i> all departments must ensure that papers submitted to Cabinet and Ministerial Committees cover, where appropriate, the significant costs and benefits to the environment of the proposed action). Also each Department has a "Green Minister" who should ensure that environmental considerations are integrated into the strategy and policies of the Department. Additionally, there are various broad statutory provisions elaborated in certain cases through official circulars and guidance, which require the incorporation of environmental considerations into policies, plans, and programmes decision-making, at either central or local government level, in parts of the sectors listed opposite. A number of initiatives to strengthen environmental assessment practice at the policy, plan, and programme level have been undertaken and others are envisaged (see, Department of the Environment, 1993 and 1994 for additional information).	In principle, but mainly on a non-statutory basis, all sectors are covered at the national policy level. Additionally some assessment provisions apply, on a statutory basis, at different government levels, in parts of the transport, water resources, waste management, agriculture and land-use planning sectors.  The department of transport issued a draft policy paper "Transport – The way forward" in April 1996 which proposes new trunk road planning procedures based on a system of Regional Planning Guidance which would go a long way to integrating road planning with regional land-use planning.  The transport Research Laboratory will report on the feasibility of SEA in transport planning in 1997.  A SEA of the trunk road programme is underway.

Source: University of Manchester, SEA Legislation and procedures in the Community, 1995, DGXI, *inter alia*.

## Annex 2

## SEA GUIDANCE, LEGISLATION, CASE STUDIES, RESEARCH, AND GENERAL LITERATURE

Author/Agency	Title and/ or Web Site	Key Words	Transport Related
General Research			
European Commission DGXI (1995)	SEA legislation and procedures in the European Community. Report by EIA Centre Manchester University	Policies, plans and programmes, SEA, Adaptability, Integration, Laws, Statutory instruments, Cabinet/ministerial decisions, Circulars Public consultation, Structural funds	Some
European Commission DGVII (1996)	State of the Art on Strategic Environmental Assessment for Transport Infrastructure. Report prepared by Steer Davies Gleeve	SEA, Infrastructure, Technological methodologies, Uncertainty, Objectives, Indicators, Alternatives, Iterative, Tiered	Yes
European Commission (1997)	A Study to develop and implement an overall strategy for EIA and SEA	EIA, EIA/SEA methodologies, Inventory, Research Strategy	No
European Commission DGXI (1996)	Preparation of Case studies on SEA. Report prepared by Mens En Ruimte	Case Studies, Review criteria, Training	Some
European Commission, DGXI (1997)	Environmental Assessment of Policies. Report prepared by Centre for Environmental Assessment at Roskilde University	Parliamentary Bills, SEA Alternatives	No
European Commission DGXI (1996)	EIA a study of costs and benefits. Report prepared by Land Use Consultants <a href="http://www.europa.eu.int/comm/dg11/">http://www.europa.eu.int/comm/dg11/</a>	Costs & Benefits, Case study, Strategic planning, Staff costs, Time scale	No
European Commission DGVII (1998)	Common Methodology for Multi-modal Transport Environmental Impact Assessment (COMMUTE). Report prepared by TÜV Rhein land Sicherheit und Umweltschutz GMBH <a href="http://dbs.cordis.lu/cordis-cgi/">http://dbs.cordis.lu/cordis-cgi/</a>	Computer software, Review methodologies, Data structure, Data availability, MEET	Yes
European Commission, DGVII (ongoing)	Habitat Fragmentation due to Transportation Infrastructure (COST 341)	Biodiversity, Habitat Fragmentation, Safety, Sustainable, Indicators, Mitigation, On line data base	Yes
European Environment Agency (1999)	Evaluation of the Transport Sector Targets in the STAR Database. Report by Environmental Resources Management for the EEA, Copenhagen	Transport, legislation, targets, objectives, standards	Yes
The Interdisciplinary centre for comparative research in the social sciences (ongoing)	Strategic Assessment of Corridor Developments, TEN. Improvements and Extensions to the CEE/CIS <a href="http://dbs.cordis.lu/cordis-cgi/">http://dbs.cordis.lu/cordis-cgi/</a>	SEA methodology, Corridor assessment, Scenarios, Assumptions, Policy instruments, Policy assistance tools	Yes
Guidance on SEA and related issues			
Council on Environmental Quality, US Federal Executive Branch (1997)	Considering Cumulative Effects Under the Environmental Policy Act <a href="http://www.cullman.com/government/federal/executive/office/coeq.html">http://www.cullman.com/government/federal/executive/office/coeq.html</a>	Cumulative Effects Analysis, Methodologies, Scoping, Techniques	No



Author/Agency	Title and/ or Web Site	Key Words	Transport Related
Department of Environment United Kingdom Government (1993)	Environmental Appraisal of Development Plans: A Good Practice Guide (HMSO London)	Environmental appraisal, Impact matrix, Land use planning, Policy Appraisal	No
Department of the Environment, Transport and the Regions United Kingdom Government (1998)	A New Approach to Appraisal Guidance on the New Deal for Transport	Roads, Methodologies, Objectives, Integrated, Environmental Capital	Yes
Department of the Environment United Kingdom Government (1991)	Policy Appraisal and the Environment	Cost Benefit Analysis, Government departments	No
Department of the Environment and Department of Transport United Kingdom Government (1992- new version under review)	Policy Planning Guide Note 13 Transport a Guide to Better Practice <a href="http://www.DETR.gov.uk">http://www.DETR.gov.uk</a>	Transport, land use	Yes
European Bank of Reconstruction and Development (1996)	<a href="http://www.ebrd.com">http://www.ebrd.com</a> (EBRD environmental procedures including guidelines for environmental assessment)	EIA/SEA procedures	Some
European Commission, DG VII (1999)	Manual on SEA of Transport infrastructure Plans	SEA, Methodologies, Corridors,, Process, Tiering, Reviews, Alternatives, Monitoring	Yes
European Commission, DGXI (1998)	A Handbook on Environmental Assessment of regional Development Plans and EU Structure funds	SEA, regional development plans	No
Ministry of Environment and Energy, Denmark (1995)	Guidance on Procedures for Environmental Assessments of Bills and Other Government Proposals	SEA	No
Ministry of the Environment Finland (1997)	The Environmental Assessment of Plans Programmes, and Policies in Finland	Alternatives, Participatory planning, Monitoring	Some
OECD (1994)	Road transport research environmental impact assessment of roads	SEIA, Roads	Yes
The Federal Environmental Assessment Review Office, Canada	The Environmental Assessment Process for Policy and Programme Proposals <a href="http://www.ceaa.gc.ca/act/policy_program_e.htm">http://www.ceaa.gc.ca/act/policy_program_e.htm</a>	Strategic Environmental Assessment, legislation	No
World Bank	<a href="http://www.worldbank.org">http:// www.worldbank.org</a> (guidelines and procedures for environmental assessment and a manual for public participation)	EIA procedures	Some
Legislation on SEA and related issues			
European Commission, DGXI (1999)	Amended Proposal for a Council Directive on the assessment of the effects of certain plans and programmes on the environment, COM/96/0511 FINAL – SYN 96/034. COM (99)73. ( <a href="http://europa.eu.int/comm.dg11.docum/9973_en.htm">http://europa.eu.int/comm.dg11.docum/9973_en.htm</a> )	Procedure, SEA, Land Use Plans and Programmes, Cumulative Impacts, Synergistic Impacts	No
European Commission (1992)	Habitats Directive ( <a href="http://www.ecnc.nl/doc/europe/legislat/habitdire.html">http://www.ecnc.nl/doc/europe/legislat/habitdire.html</a> )	Article 6 (3), significant, appropriate assessment, combined effects	No
European Commission, DG VII (1996)	Community guidelines for the development of the trans-European transport network (under revision)	Transport networks, corridors, SEA, methodologies	Yes
United Nations Commission on Environment and Development (1992)	Biodiversity convention ( <a href="http://www.ecouncil.ac.ar/ftp/riodoc.htm">http://www.ecouncil.ac.ar/ftp/riodoc.htm</a> )	Article 14 (a, b) Policies, Programmes, Environmental consequences	No
United Nations Commission on Environment and Development (1992)	Agenda 21 ( <a href="http://www.ecouncil.ac.ar/ftp/riodoc.htm">http://www.ecouncil.ac.ar/ftp/riodoc.htm</a> )	Extend EIA beyond the project to policies plans and programmes	No

Author/Agency	Title and/ or Web Site	Key Words	Transport Related
United Nations (1998)	Espoo Convention on Environmental Impact in a Transboundary Context	Article 2 Section 7 Extend principles of EIA to Policies, Plans and programmes	No
General Text on SEA and related issues			
Department of Environment Transport and the Regions United Kingdom Government (1998)	Strategic Environmental Appraisal: Report of the International Seminar, Lincoln 27-29 May	Strategic Environmental Appraisal, Strategic Environmental Assessment, Best practice principles	No
European Environment Agency (1999)	Environment in the European Union at the turn of the century. Environmental assessment report No.2	Health, land use footprints, economic development, societal developments, environmental issues	No
European Environment Agency (1999)	A Feasibility Study for an Annual Indicator Report on Transport and the Environment in the EU. Report by Environmental Resources Management for the EEA, Copenhagen	SEA, EIA, legislation	No
Economic Commission for Europe (1992)	Application of Environmental Impact Assessment Principles to policies plans and Programmes	EIA, Case Studies, Policy Assessment, Legal/administrative provisions	No
NATO/CCMS (1996)	Methodology, Focalisation, Evaluation and Scope of Environmental Assessment. Fourth Report. Strategic Environmental Assessment: Theory Versus Practice	SEA, Sustainability Assessment, Public participation, Strengthening EIA	
Partidario, M. (1996)	SEA: Key Issues Emerging from Recent Practice	SEA, Best practice Policy assessment, Integrated policy development and Assessment	No
Sheate (1996)	Environmental Impact Assessment: Law and Policy Making an Impact II (Cameron May London)	EIA, SEA, Transport, Legislation, Case studies	Some
Sadler, B & Verheem, R. (1996)	SEA: Status Challenges and Future Directions	SEA Best Practice, Case Studies	Some
Therivel, R. Partidario, M. (1996)	The Practice of Strategic Environmental Assessment	Policies, Plans and Programmes, Sustainability, Integrated Policy Making	No
World Bank (1999)	Case Studies on Regional and Sectoral EA: An analysis of lessons learned. A Report prepared by Environmental Resources Management for The World Bank	SEA, Sectoral and Regional EA, lessons learned, Case studies	Some
Selected Case Studies			
European Commission, DG VII (1992)	High Speed Rail Study	Spatial impact, Energy consumption, CO <sub>2</sub> emissions, Noise, Air Pollution, scoping, indicators	Yes
European Commission (DGVII, DGXII Eurostat & EEA) (1998)	Spatial and Ecological Assessment of the TEN: Demonstration of Indicators and GIS Methods	GIS, Alternatives, , Indicators, Quantitative	Yes
Direction de Routes/SETRA, European Commission (1998)	Le Corridor Nord. Report by INGEROP	Corridor, TEN, SEA	Yes
Swedish National Road Administration, European Commission (1998)	Gothenburg – Jönköping Transport Corridor	Corridor, TEN, SEA	Yes
Regione Emilia Romagna, Regione Veneto, European Commission (1998)	Progetto Romea Sudio Pilota di Strategic Environmental Assessment (1998)	Corridor, TEN, SEA	Yes
Ministry of Transport and Communications Finland (1996)	Environmental Impact Assessment of the Nordic Triangle	Scenarios, Biodiversity	Yes

## Annex 3

**TRANSPORT AND ENVIRONMENT REPORTING MECHANISM FOR THE EU (TERM)**

The Amsterdam Treaty identifies integration of environmental and sectoral policies as the way forward to sustainable development. The European Council, at its Summit in Cardiff in 1998, requested the Commission and the transport ministers to focus their efforts on developing integrated transport and environment strategies. At the same time, and following initial work by the European Environment Agency (EEA) on transport and environment indicators, the joint Transport and Environment Council invited the Commission and the EEA to set up an indicator based Transport and Environment Reporting Mechanism (TERM).

TERM has been designed to help EU and Member States to monitor progress with their transport integration strategies, and to identify changes in the key leverage points for policy intervention (such as environmental regulations, investments, economic instruments, spatial planning and infrastructure supply). Seven questions are addressed which policy-makers in the EU regard as key to understanding whether current policy measures and instruments are influencing transport/environment interactions in a sustainable direction:

1. Is the environmental performance of the transport sector improving?
2. Are we getting better at managing transport demand and at improving the modal split?
3. Are spatial and transport planning becoming better coordinated so as to match transport demand to the needs of access?
4. Are we improving the use of transport infrastructure capacity and moving towards a better-balanced inter-modal transport system?
5. Are we moving towards a fairer and more efficient pricing system, which ensures that external costs are minimised and recovered?
6. How rapidly are improved technologies being implemented and how efficiently are vehicles being used?
7. How effectively are environmental management and monitoring tools being used to support policy and decision-making?

To answer these questions, a selection of 31 indicators was made, dealing with the various aspects of the transport and environment system. The indicators cover all the most important aspects of the transport and environment system (Driving forces, Pressures, State of the environment, Impacts, and societal Responses – the so-called DPSIR framework) and include eco-efficiency indicators.

The EEA's first indicator-based report ("TERM-zero") was finalised end 1999, and served as an input to the Helsinki Summit and the Transport Council (December 1999). The report will be published and launched around mid-April, and will also be available on the EEA's home page (<http://themes.eea.eu.int/theme.php/activities/transport>). In parallel, Eurostat is publishing a Statistical Compendium for TERM, which contains most of the data that underpin the indicators.

Table 1. **Envisaged TERM indicator list** (key indicators in blue)

Group	Indicators	Position in DPSIR	When feasible	Data Quality
Transport and environment performance				
Environmental consequences of transport	1. Transport final energy consumption and primary energy consumption, and share in total (fossil, nuclear, renewable) by mode	D	++	+
	2. <b>Transport emissions and share in total emissions for CO<sub>2</sub>, NO<sub>x</sub>, NMVOCs, PM<sub>10</sub>, SO<sub>x</sub>, by mode</b>	P	++	+
	3. Exceedances of air-quality objectives	S	++	+
	4. Exposure to and annoyance by traffic noise	S and I	--	--
	5. Infrastructure influence on ecosystems and habitats ("fragmentation") and proximity of transport infrastructure to designated areas	P and S	-	-
	6. Land take by transport infrastructure	P	+	+
	7. Number of transport accidents, fatalities, injured, polluting accidents (land, air and maritime)	I	++	-
Transport demand and intensity	8. <b>Passenger transport (by mode and purpose):</b> • total passengers • total passenger-km • passenger-km per capita • passenger-km per GDP	D	++	-
	9. <b>Freight transport (by mode and group of goods):</b> • total tonnes • total tonne-km • tonne-km per capita • tonne-km per GDP	D	++	+
Determinants of the transport/environment system				
Spatial planning and Accessibility	10. <b>Average passenger journey time and length per mode, purpose (commuting, shopping, leisure) and location (urban/rural)</b>	D	-	-
	11. Access to transport services, <i>e.g.</i> : • number of motor vehicles per household • % of persons in a location having access to a public transport node within 500 metres	D	-	-
Transport supply	12. Capacity of transport infrastructure networks, by mode and by type of infrastructure (motorway, national road, municipal road, etc.)	D	-	-
	13. <b>Investments in transport infrastructure/capita and by mode</b>	D and R	++	+
Price signals	14. <b>Real change in passenger transport price by mode</b>	R	-	-
	15. Fuel prices and taxes	D	++	+
	16. Transport taxes and charges	R	-	-
	17. Subsidies	R	-	-
	18. Expenditure on personal mobility per person by income group	D	+	-
	19. Proportion of infrastructure and environmental costs (including congestion costs) covered by price	R	-	-
Technology and utilisation efficiency	20. <b>Overall energy efficiency for passenger and freight transport (per passenger-km and per tonne-km and by mode)</b>	P/D	-	-
	21. Emissions per passenger-km and emissions per tonne-km for CO <sub>2</sub> , NO <sub>x</sub> , NMVOCs, PM <sub>10</sub> , SO <sub>x</sub> by mode	P/D	-	-
	22. Occupancy rates of passenger vehicles	D	-	-
	23. Load factors for road freight transport (LDV, HDV)	D	+	-
	24. Uptake of cleaner fuels (unleaded petrol, electric, alternative fuels) and numbers of alternative-fuelled vehicles	D	++	+
	25. Vehicle fleet size and average age	D	-	+
	26. Proportion of vehicle fleet meeting certain air and noise emission standards (by mode)	D	-	--

Table 1. **Envisaged TERM indicator list** (key indicators in blue) (*cont.*)

Group	Indicators	Position in DPSIR	When feasible	Data Quality
Management integration	27. Number of Member States that implement an integrated transport strategy	R	+	-
	28. Number of Member States with national transport and environment monitoring system	R	+	+
	29. Uptake of strategic environmental assessment in the transport sector	R	+	+
	30. Uptake of environmental management systems by transport companies	R	-	-
	31. Public awareness and behaviour	R	-	-

D = Driver, P = Pressure (environmental), S = State of the environment, I = Impact, R = Response

When: ++ now; + soon, some work needed; - major work needed; - - situation unclear

Quality: ++ complete, reliable, harmonised; + incomplete; - unreliable/unharmonised; - - serious problems

Source: EEA, 2000: *Are we moving in the right direction?* Indicators on transport and environment integration in the EU. Term 2000. Environmental issues series No. 12.

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