EUROPEAN COMMISSION

OPTIONS FOR A SUSTAINABLE EUROPE

Policy recommendations from the General Consultative Forum on the Environment

European Commission

Directorate-General for Environment, Nuclear Safety and Civil Protection

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Preface

Over the three years of the Forum's existence, the process and output of the 'Scenarios for a sustainable Europe in the year 2020' exercise culminated its biggest, and perhaps most influential, achievement. Why did the Forum choose to use scenarios? Given the immense complexity of environmental and social sustainability issues in Europe, scenarios offer useful tools to help model key considerations and assumptions, and to identify gaps, inconsistencies and dilemmas. A richer understanding may result, leading to a clearer understanding of what sort of action needs to be taken to move away from the status quo. The Forum dedicated its last plenary meeting in November 1996 to discussing the scenarios document and arrived at seven fundamental recommendations for the Commission. In a letter to the Commission, they stressed that these recommendations are 'of great importance for the Commission to consider as the European Union moves towards the 21st century ... (and) ... as it prepares its future policies and in preparation of any new sustainable development programmes'.

The Forum set five objectives for the scenarios project:

1. to test and provoke the Forum's thinking about sustainability;
2. to help the European Commission develop its own vision for a sustainable Europe in the year 2020;
3. to challenge policy-makers to develop a more future-oriented approach to environmental policy;
4. to contribute to the definition of the agenda of the next Forum;
5. to communicate to a wider audience the complexity and inter-dependencies involved in achieving a sustainable Europe, and provoke further thought on new ways of proceeding.

Publishing and distributing the scenarios goes towards fulfilling the fifth and perhaps the most ambitious of the above objectives.

Structure of the document

This volume consists of two texts. The first is the summary and recommendations agreed on by the Forum in November 1996 on how the Commission should

approach its policy-making in the light of the environment and sustainable development in the run-up to the year 2000. The second text, prepared by the International Institute for Environment and Development and by SustainAbility in the United Kingdom, is a much longer one describing a series of scenarios for a sustainable Europe in the year 2020. It has not been agreed by the Forum but served as a brainstorming tool, outlining the key issues and setting the scene for the Forum's discussions before it agreed on the summary and recommendations.

Those scenarios can be summarized as follows:

1. **Opening opportunities:** the driving concern is Europe's ability to compete in the global market and create jobs, and the leading response is a focus on liberalization and market driven technological innovation as a way to safeguard economic progress, and thereby afford environmental and social improvement;
2. **Guiding change:** the driving concern is growing social and economic security, and the leading response is new policies to provide the appropriate signals to economic actors and to deliver a balance of cohesive social, environmental and economic outcomes;
3. **Transforming communities:** the driving concern is the inability of current policies to get to the root of social and environmental decline, and the response is a reform of priorities to favour qualitative development over quantitative growth. The choice is for stronger communities, high goals of human development, and simple, less stressful lifestyles.

The seven recommendations are far-reaching in terms of content and time-frames as they look at the horizon of the 21st century. They stress the following:

1. the EU should set up a 'sustainability' task force to develop new and innovative solutions for environment, economic and social cohesion;
2. the EU should produce and publish widely a regular 'Sustainable development' report;
3. to ensure that the long term is taken account of in policy development, a think-tank or 'House of the future' should be set up to develop innovative proposals for transparency, access to information, long-term investments in sustainable development and proper science to underpin long-term policy development;
4. steps should be taken to raise awareness and improve communications on sustainability and more sustainable lifestyles in order to create more political support;
5. European research and technological development strategies should focus on how to move towards sustainable development;
6. in view of the global dimensions of sustainable development, the EU should prepare a strategy on its global and international role in sustainable development as part of its foreign policy considerations;
7. the EU should ensure that the role of local communities should be strengthened, as they are central to the transition of European society to sustainable development.

Ritt Bjerregaard

Member of the Commission

Introduction

As part of the process of implementing the fifth action programme on the environment 'Towards sustainability', a General Consultative Forum was set up in 1993 to advise the Commission on key strategic issues relating to environmental policy and sustainable development. Its term of office was three years. The fundamental characteristic of the Forum that gave its contribution to Commission thinking such high added value was its composition. Consisting of 32 members appointed on a personal basis by the Commission it was made up of eminent personalities from European industry, the business world, regional and local authorities, professional associations, unions, and environment protection and consumer organizations. It thus embodied the principle of shared responsibility that lies at the heart of the fifth action programme. The Forum succeeded in generating and enhancing existing and new views of the way sustainable development can be achieved in the Union and fulfilled the Commission's hope that it would become a channel of communication whereby Forum members passed the views developed in the meetings to the sectors concerned. The Forum also played an important role in integrating the concept of sustainable development into the Commission's other policies, most notably in the fields of agriculture, transport, energy, and information and communication. In its own words, the Forum believes that it 'can provide the Commission with challenging and new ideas on developing and implementing sustainable development ...'.

The Forum met nine times throughout the 1993-96 period in full plenary sessions (uniting all 32 members) and many more times in smaller working groups (where most of the preparation of discussion papers took place). In 1996, the Forum reached agreement on 'Recommendations for moving towards a sustainable Europe in the year 2020', one of their papers which was sent to the Commission and has served as an important input into the Commission's policy thinking on all aspects relating to sustainable development.

This publication will be distributed widely and it is hoped to encourage a wide-ranging debate on, and further implementation of, sustainable development policies across Europe.

PART I

Summary and recommendations

1. INTRODUCTION

1.1. Introduction to the scenarios for a sustainable Europe

At its plenary session in November 1996 the Forum, a body set up to advise the European Commission, considered potential scenarios for a sustainable Europe in the year 2020 and agreed on a series of recommendations to the European Commission on how it should approach its policy-making in the light of the environment and sustainable development (SD) in the run-up to 2000. It set five objectives for its work:

- To test and provoke the Forum's thinking about sustainability, building on its work so far;
- To help the European Commission develop its own 2020 vision for a sustainable Europe;
- To challenge policy-makers and the various stakeholders in sustainable development to develop a more future-oriented approach to environmental policy;
- To contribute to the definition of the agenda for the next Forum (1997-99);
- To communicate to a wider audience the complexity and interdependencies involved in achieving a sustainable Europe, and provoke further thought on new ways of proceeding.

To identify its recommendations, the Forum considered three scenarios for a sustainable Europe specially prepared for it. The scenarios were supported by and based on a background analysis of environmental, social and economic trends in Europe and the world (this document is attached in the third part). The Forum emphasized, however, that this should not be taken to mean that there was consensus on the content of the background document.

Although the Scenarios for a sustainable Europe cover a broad range of environmental, economic and social issues at a broad level, it is clearly not possible for them to cover all possible issues in fine detail. This would not necessarily be desirable in any case, since the aim is for people to use the scenarios to explore implications and to try and answer such questions themselves, rather than for the scenarios to try to provide a complete set of answers. Similarly, the scenarios do not try to recommend which policies and actions are required to attain a given future, but instead they raise some of the key issues that policy-makers must face.

The Forum found these scenarios to be a useful tool to support their policy discussions, and recommends the use of the scenarios to other groups in government, business and society that are seeking to develop policies for sustainable development.

2. CONCERNS/VALUES

On the basis of the scenarios, the following were identified as the key values and concerns that should guide the shaping of sustainable development policies in Europe over the next 25 years:

- Employment and competitiveness;
- Environment and health;
- Social security, social cohesion and equity;
- Cultural diversity;
- Personal freedom and democracy.

3. ENVIRONMENT AND SUSTAINABLE DEVELOPMENT POLICY PRIORITIES

From the Forum's use of the scenarios, six issues emerged as the main areas of tension and balance in the area of environment and sustainable development (SD) to be addressed by policy-makers over the next 25 years. These are key issues in the sense that environmental progress and sustainability will only be attained if they are addressed. The issues were derived from an analysis of all three scenarios, and they are relevant to all three scenarios. In each case, the word 'environment' is not mentioned explicitly in the title, since it is understood that all issues refer to the environment.

3.1. A new economic approach

The Forum was concerned with the tension between attaining full employment, the need to ensure competitiveness, protecting the environment and improving quality of life taking into account the need for equity and the need to accommodate different lifestyles. It was also concerned about the impacts of the rich-poor divide and the possibility of developing new forms of employment and organization of

time (work-sharing, increased leisure, etc.). The Forum identified the following additional issues related to economic policy:

- What indicators are required to go beyond GNP and measure progress towards SD? (both supplementary to and integrated with more traditional economic indicators);
- What is the role of economic instruments? (taxes, incentives, etc.);
- What are the institutional issues (e.g. the role of the EU and its members, and their relationship);
- Can the EU go 'beyond GNP' on its own, or does it need a global approach? What are the harmonization issues?

Additional issues include job-sharing; promoting new kinds of economic activity and employment (beyond the discussion within the Delors White Paper); accelerating the exploitation of R&D in job creation; the move from production to services; the role of micro-enterprise; the implications of IT and teleworking; and the special concerns of rural areas, especially in southern Europe.

3.2. Governance and democracy

The Forum was concerned with a dual agenda of where decisions should be best taken (subsidiarity at global, regional, national and local levels) and how they should be taken to increase participation (to fill the democratic deficit). It also includes the balance between rights and responsibilities for all stakeholders. In considering the issues associated with different levels of decision-making, it is also necessary to differentiate between different regions, both within Europe and in the rest of the world.

3.3. Long-term policy and flexibility

The Forum was concerned with the areas in which there is a need for long-term policy, and how to inspire the long-term thinking needed for SD while developing the necessary flexibility to respond to accelerating change and the possibility of surprise. This issue has both economic and political aspects:

- A more appropriate balance must be struck between long-term and short-term interests and interest groups in the policy process. This will require institutional structures to explicitly consider the long-term implications of policy;
- There are political problems associated with taking action in the short term to support or work towards long-term goals. There is a need for raising public awareness and support, which may also be a new role for NGOs (non-governmental organizations).

3.4. Education, information and awareness-raising

The Forum was concerned with tackling the apparent gap between increasing amounts of technical information on SD and the everyday decision-making requirements of consumers and business. It is also concerned with raising awareness and changing attitudes regarding SD. This will involve a re-thinking of policies for information, awareness, education and culture. Other aspects of this issue include:

- Disparity between the scale of the SD challenge compared to the small sums being spent on public education and awareness-raising;
- Appropriate balance between disseminating information and promoting 'learning by doing';
- Development of appropriate incentives (people will not act unless there are incentives);
- Role of the local community as 'enabler' and catalyst in sharing and promoting best practice;
- Developing a sense of 'European space' that transcends perceptions limited by national boundaries;
- The short-term focus of mainstream media;
- The need to integrate environmental messages into communication and advertising.

3.5. The international role of the EU

The Forum addressed the international role of the European Union in SD, which involves identifying Europe's SD interests and how it can project its SD values on the world stage. It involves issues of equity, trade, aid, technology transfer and investment, and identifying a strategic SD agenda with countries and regions such as Africa, China, India, Russia, the Mediterranean and Latin America.

3.6. R&D, innovation and technology

The Forum was concerned with the tension between the need to innovate for greater eco-efficiency and the risks to humans and environment posed by technologies such as biotechnology and toxic chemicals. It also includes the integration and awareness of the role of information technology as a lever for SD in such areas as resource management and new sustainable lifestyles. Other aspects of this issue include:

- How to accelerate the development, testing and adoption of eco-efficient technologies. Money is an important part of it, but not the only consideration;
- Social aspects of innovation and new technologies;
- Developing new mechanisms to understand and communicate risks (e.g. chemical risks);
- Creating the right investment climate in the EU and areas receiving EU support;
- Use of information technology as lever/amplifier to promote sustainable technological change;
- Improving the balance between basic, applied and theoretical research;
- Ensuring that the research community plays a more active role as a stakeholder in the SD debate;
- Fostering truly pan-European R&D;
- R&D aiming at optimum eco-efficiency improvements (e.g. new vehicles, solar energy);
- Ensuring that life-cycle analysis (LCA)-style thinking is the basis for all R&D.

4. RECOMMENDATIONS

Recommendation No 1: Sustainability task force

The European Commission should set up a task force for new and innovative solutions for environment, economic and social cohesion, which should focus on:

- developing a vision for sustainable development in Europe;
- more analysis and holistic linkages between different policy areas;
- more sophisticated and precise policy options;
- R&D policy to focus on accelerated use and exploitation of R&D (i.e. for faster job creation);
- establishing the main SD indicators;
- mechanisms to include non-monetary indicators in decision-making;
- development of new employment possibilities through SD and the environment.

This would give the EU the possibility to lead global developments by example.

Recommendation No 2: Regular EU SD report

In the light of Recommendation No 1, the EU should produce and publish widely a regular SD report, to include:

- both 'performance' and 'balance sheet' information;
- integrated environmental/economic/social issues and aspects based on all the concerns/values and priorities identified by the Forum in the scenarios' work, and including employment and questions of regional distribution;
- how trade-offs were reached between economic/social/environmental issues, equity issues and assessment of long-term perspective and flexibility of policies;
- policy evaluation of current policies (e.g. their cost-effectiveness) and also report on new policies in the pipeline;
- SD assessment of EU public spending (and also aid and technology transfer);
- progress on EU's global obligations (environment, trade, etc.);
- international impact of the EU — i.e. how activities within the EU have economic, environmental and social impacts beyond the EU.

In preparing the report, it will be necessary to attend to institutional and organizational aspects. For example, each DG should contribute to the report (which would require greater cooperation within the Commission). It may be appropriate for the European Environment Agency to be involved in the preparation of the report.

The report should be transparent and should also emphasize communications and participation. The report should also not be seen as the 'end' of a process, but rather as the input to a new cycle of policy development, and thus as an essential stage in the policy life cycle.

Recommendation No 3: Think-tank on 'House of the future'

To ensure that the long term is taken account of in policy, a think-tank should be set up to develop innovative proposals for:

- A political institution called for example the 'House of the future' which would seek explicitly to take into consideration the concerns and priorities of the longer term and the future in the development of policies;
- SD constitutions at the EU and national level;
- Transparency, access to information and appropriate communications;
- Long-term investments for SD (which may not appear cost-effective over the shorter term);
- Proper science to underpin long-term policy development (which could include independent funding for scientific research);
- Integrating SD and long-term perspectives into international institutions (notably the World Trade Organization (WTO), but also the United Nations).

Recommendation No 4: Awareness, communications and lifestyles

Steps should be taken to raise awareness and improve communications on sustainability and more sustainable lifestyles, with citizens and businesses. Mechanisms that should be employed include:

- Raise awareness of best practice on SD: There should be greater knowledge, awareness and communications of best practice on SD within the EU (similar to the way in which the PCSD in the US has collected best practice examples from across the US). Such information could be posted on a WWW site.
- Communications on SD: The Commission should develop a communications strategy, starting by 'speaking with one voice' within the Commission, and then spreading the message externally using mass media. The EU should also make use of public relations and advertising skills that are available in stakeholder groups to develop more effective communications strategies. Communications should take advantage not only of existing networks, but also new ones like the World-Wide Web (WWW) and Internet.
- Competitions on SD should be set up. Competitions are a good way of communicating best practice, innovations, etc. The competitions could be based on existing 'twinning' of cities in different EU countries and on exchanges of young people across EU. Adequate budgets are essential, since existing competitions are poorly funded, so they have a limited reach across the EU.
- In order to create political support for SD policies, a policy advisory group should be created of those groups and individuals that would be potential 'winners' as a result of SD policies, since they are typically dispersed or unaware of this.

Recommendation No 5: Research and technology

Steps should be taken to develop a European R&D strategy to move towards SD. This should include:

- Developing more responsive university programmes to get away from the strong disciplinary tradition, facilitate problem-oriented research and interdisciplinary cooperation, and to encourage researchers to spend more time in the 'real' world away from their research environment;
- Develop an R&D strategy for an eco-efficient Europe by 2020, complete with vision, deadlines and budget (similar in scale and ambition to the US plan to put a man on the moon in the 1960s);
- In order to promote the development, dissemination and use of new technologies, SD needs a market pull, for example through sustainable lifestyles and purchasing policies. Mechanisms should be put in place to provide such incentives;
- In order to foster greater participation by citizens and stakeholders in R&D there should be provisions to go beyond simply informing them, and to include them more closely in decisions about knowledge-creation.

Recommendation No 6: Global and international role of the EU

Sustainable development is a global issue, and cannot be attained solely within the EU or by the EU acting alone. The EU should therefore prepare a strategy on its global and international role in SD, including:

- Develop a policy paper on EU foreign policy and SD issues, evaluating how the EU could demonstrate global leadership on SD;
- Develop regional specific policies. For example, in relation to the OECD countries the EU could compete on high environmental standards; with emerging economies the focus could be on lifestyles as well as technological exchange; and, with the poorest countries, there should be a focus on urgent environmental issues (e.g. water quality rather than climate change). There should also be SD screening of private and public financial flows to these countries;
- Attention should be paid to the potential role of private and public financial flows to facilitate the process of SD.

Recommendation No 7: Strengthening the role of local communities

Local communities can play an important role in the transition towards sustainability, and their role should be strengthened through:

- Supporting stakeholder involvement in decision-making: There should be technical and logistical support for greater access of local stakeholders, consumers, SMEs (small and medium-sized enterprises) in European and global decision-making;
- Setting up local hearings for SD, perhaps similar to those used by the Brundtland Commission.

PART II

Working document

CONTENTS

1. INTRODUCTION AND OBJECTIVES

At the beginning of 1996, the EU's General Consultative Forum on the Environment embarked on its most ambitious project — to develop three scenarios for a sustainable Europe in the year 2020 — which it presented to the Commission at its last plenary session in November 1996. The scenarios for a sustainable Europe present three different perspectives on environmental problems and economic trends; on the meaning of sustainable development; and on the policies and actions that are needed to attain it. They paint a contrasting picture of life in Europe in 2020, and outline the implications for the five selected target sectors of the fifth action programme.

The Forum set five objectives for the scenarios project:

1. To test and provoke the Forum's thinking about sustainability, building on its work so far;
2. To help the European Commission develop its own 2020 vision for a sustainable Europe;
3. To challenge policy-makers and the various stakeholders in sustainable development to develop a more future-oriented approach to environmental policy;
4. To contribute to the definition of the agenda for the next Forum (1997-99);
5. To communicate to a wider audience the complexity and interdependencies involved in achieving a sustainable Europe, and provoke further thought on new ways of proceeding.

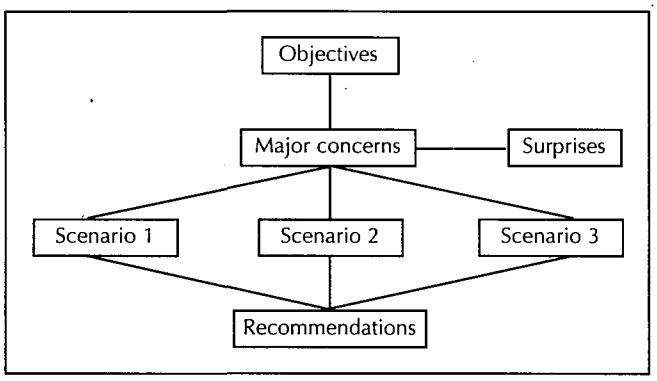

Figure 1: **A model of the structure of the document**

2. SCENARIOS

2.1. Working with scenarios

In the decade since the Brundtland Commission defined it as that which 'meets the needs of the present without compromising the ability of future generations to meet their own needs', there have been at least 100 definitions of sustainable development, each emphasizing different values, priorities and ways forward. Sustainability, therefore, remains both a contested and a complex concept. In any discussion it is important to clarify what is being sustained over what and for how long, measured by what criteria, for whose benefit and at whose cost.

One can only ever see a part of a system as complex as environmental and social sustainability in Europe. In the words of the Economics Nobel Prize-winner Herbert Simon, 'the number of considerations that are potentially relevant to the effectiveness of any strategy or organizational design is so large that only a few of the more salient of these lie within the circle of awareness at any given time'.

One of the ways to make sense of complexity is to construct models of reality in the form of scenarios or stories. Limited and limiting by definition, scenarios can be useful tools to help us model our key considerations and assumptions, and to identify gaps, inconsistencies, dilemmas and what we simply don't know. They can thereby help us expand our thinking, take on and explore possibilities that are new, or challenge the basis of some assumptions. A richer understanding may result. This can help us to incorporate resilience and the capacity to cope with turbulence and uncertainty in policy design.

Why three scenarios and why these three scenarios?

One can construct a virtually infinite number of scenarios. But it is usually difficult to keep in mind more than three which are of sufficient complexity to be useful aids to thinking.

These scenarios are three possible responses to the unfolding trends, challenges and opportunities identified in Section 2.2 (Major concerns about Europe's sustainability), and all three imply taking action to move away from the status quo. All three scenarios deal with the same set of issues, but respond to them in different ways.

Section 2.3 presents in a matrix of 'headlines' how each scenario unfolds in a given sector. Each of the three scenarios is intended to be positive and a challenging vision of how the European Union could be moving toward sustainability by 2020. Each of the scenarios is laid out more fully in Section 2.4, and broken down into: Driving forces; How the trends of the 1990s led to this scenario; Europe 2020 — Main theses; Europe 2020 — Sectoral implications; Key indicators; Policy issues; and Threats and dilemmas. This is done in order to make the assumptions, ideas and problems underlying each scenario as explicit as possible. Each scenario suggests possible developments within a number of key sectors and issue areas, and also includes a short fictional narrative illustrating 'A day in the life' of a typical European at home and at work in 2020.

Section 4 of this document contains a fully referenced background analysis, which reviews available information on the main trends and projections at both the global and European levels, and which may be taken as evidence for one or more of the scenarios. The main themes contained in the scenarios are cross-referenced to the relevant section of this background analysis by means of numbers in square brackets — e.g. [1] — which refer to the paragraph number in the annex.

Using scenarios

These scenarios were prepared specially for the Forum. They are based on a methodology found to be highly effective by businesses, governments, NGOs (non-governmental organizations) and others. None of them is a prediction. The future may contain elements from all three. You may find that you strongly disagree with some elements of one or more of the scenarios. But you are invited to take part in an exercise where you may discover elements of legitimate concern in those elements you may tend to consider implausible.

Although the scenarios cover a broad range of environmental, economic and social issues at a broad level, it is clearly not possible for them to cover all possible issues in fine detail. This would not necessarily be desirable in any case, since the aim is for people to use the scenarios to explore implications and to try and answer such questions themselves, rather than for the scenarios to try to provide a complete set of answers. Similarly, the scenarios do not try to recommend which policies and actions are required to attain a given future, but instead they raise some of the key issues that policy-makers must face.

The scenarios are perhaps most effective when seen as a powerful tool to broaden perspectives, raise questions and challenge conventional thinking. Used in this way, the scenarios for a sustainable Europe provide an opportunity to further the development and implementation of policies and actions for sustainable development in Europe by:

- Establishing a wider, more inclusive understanding of sustainable development;
- Fostering informed participation in SD decision-making;
- Empowering and legitimizing stakeholders with plural perspectives;
- Fostering creative and innovative thinking on SD;
- Identifying blind spots and limiting assumptions;
- Confronting the inherent complexity and uncertainty of the future;
- Enhancing the resilience of strategies and policies for SD;
- Developing shared goals for a sustainable Europe;
- Understanding priorities;
- Pinpointing intermediate steps during the transition phase.

Assumptions

A number of common assumptions apply to all of these scenarios, and there are further assumptions that are specific to each scenario which are presented with the scenarios themselves in Section 1.3. The shared assumptions include the following:

- Although Europe will be moving in the direction of sustainability by 2020, a totally sustainable Europe is most unlikely by that date;
- Europe can only achieve sustainability in cooperation with the rest of the world;
- By 2020, the current 15 Member States of the EU will hold only 5% of the world's people, with a low scenario of 360 million (fewer than today) and a high scenario of 422 million people;
- In 2020, people aged over 60 in the EU will account for 25% of the total population (up from 20% today), and people under 20 will fall to 21.6% (from 25% today);
- The European Union in 2020 could be much larger than today (14 countries have already applied at some point for EU membership, including Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Norway, Romania, Slovakia, Slovenia, Switzerland and Turkey.

Surprises

An inevitable issue in any future-oriented work is how to deal with surprises which, by their very nature, are unpredictable. If we look back 25 years to 1970, some of the surprises since then which have had an important influence include:

- The Antarctic ozone hole, Chernobyl;
- Successive oil shocks; the 'lost development decade'; Third World debt;
- Deregulation and privatization; the stock market crash of 1987; emergence of the Asian 'tigers';
- The collapse of communism; the Gulf War;
- Explosive growth of the IT industry; revolutionary change to management systems, organizational forms and financial markets.

Looking ahead 25 years to 2020, we might see surprises such as:

- Revolutionary new energy and materials technologies; success of nanotechnology;
- Another oil shock; 'meltdown' on the financial markets;
- Bankruptcy and collapse of the United Nations system;
- A major war in the European region;
- Sudden perturbations of global climate or another major environmental disaster;
- Large-scale values shifting towards environmentally conscious lifestyles.

The purpose of the scenarios is not to try and anticipate such surprises, and surprises are not included in the three scenarios. But we cannot ignore the possibility of surprises, both good and bad, when planning for the future. We can use the scenarios to help us 'simulate' future conditions and examine how different policies would be likely to cope with different kinds of surprises. In this way, the scenarios can help us to develop more resilient policies and institutions that can better cope with surprises.

Health warning

Finally, a counsel of humility when looking to the future. Recently, Peter Drucker, the writer on

business who, at 86, is still credited by many as the most astute observer of modern society, argued that 'the critical areas (China, Russia and India) are ones in which the Western democracies have practically no influence'. It is sobering to put the question of European sustainability into this wider context. But whether one agrees with Mr Drucker or not, it is surely true that there is far more in heaven and earth than can be dreamt of in our philosophy.

2.2. Major concerns about Europe's sustainability

There are a number of economic, social and environmental trends which, if they continue unchanged and are not acted upon, may lead Europe in an unsustainable direction. There are other trends, such as the development of new technologies, innovative approaches to policy design and changes in consumption patterns, which hold opportunities for positive change.

For the General Consultative Forum on the Environment, 'the central challenge for Europe will be to ensure international competitiveness and high levels of employment during the transition towards a more environmental friendly and sustainable economy' (see *12 principles on sustainable development*, February 1995). Concern is also great among citizens of Community countries (see box).

Europeans and the environment

82% of Europeans think protecting the environment is an 'immediate and urgent problem' (this is 3 percentage points less than in 1992, but 8 to 10 points more than in 1988 and 1986). National percentages are as follows:

Austria	76	Italy	89
Belgium	63	Luxembourg	87
Denmark	86	Netherlands	—
Finland	77	Portugal	81
France	76	Spain	82
Germany	85	Sweden	94
Greece	97	United Kingdom	80
Ireland	76		

72% of Europeans (3 percentage points more than in 1992) consider that it is necessary to ensure economic development while protecting the environment. 18% (–4 points) state that the environment should take precedence over the economy, and less than 6% (+2 points) think economic development should be given priority.

Source: 'Europeans and the environment', *Eurobarometer* 43.1 *bis*, 1995.

Looking across the range of factors that influence Europe's prospects for sustainability, many trends stand out, including:

Environment

- Continuing stress on air, water, biodiversity and land resources [32];
- Accelerating consumption of resources and energy, especially in the developing world [61];
- Growing emissions of CO_2 and other greenhouse gases [65,76];
- Mounting concern about the links between environmental quality and health [24].

Economy

- High unemployment and rapid changes in the nature of work [21];
- Increasing emphasis placed upon competitiveness [4,21];
- Globalization, liberalization, privatization and deregulation [15];
- Increasing interdependence through cross-border trade and investment;
- The rise of the information economy [39].

Society

- Sense of insecurity and threats to cultural heritage;
- Continuing population growth and cross-border movement of people [23];
- Ageing of European populations, changing retirement patterns [22];
- Widening disparities in society; growth of an 'underclass'; drugs, crime, etc. [25];
- Changing family structures, values and lifestyles [26].

Politics

- Growing distrust of traditional political structures [27];

- Rising nationalism, xenophobia and other challenges to democracy[23];
- Increasing demands for transparency, openness and participation[19,29,31];
- New threats to international security[27];
- Growing ineffectiveness of the policy process in the face of organized special interests.

Technology

- Rapid innovation in materials and energy technologies, biotechnology, communications and other fields[39].

These trends may have different implications for development at regional, European and global levels. But at the heart of concerns about Europe's unsustainability is the inability of policy, economic actors and society to cope with these trends or respond to them effectively. Moreover, there may be surprises which could generate additional risks or threats for a European environment and society that is already under stress.

The exact unfolding of any of these trends into the future, and the changing nature of the forces that drive them, cannot be predicted. Some of them may accelerate along existing trajectories, while others may slow down or even reverse direction altogether. Although they are linked together in a systemic manner, many of them are independent of each other, and may evolve in seemingly contradictory directions. Their complexity defies simplistic analysis, and provides an important reason for using scenario techniques.

2.3. Three scenarios for a sustainable Europe: Some key factors, assumptions and questions — and a matrix of 'headlines'

The three scenarios represent three different responses to a common set of issues, as noted in Section 2.1. They all represent significant departures from the status quo trends identified in Section 2.2, and they are all 'hard choices' in the sense that they present significant challenges to business, government and citizens. Each scenario highlights and responds to some of the trends, and ignores, downplays or attempts to control others. Each scenario includes both 'responses' to a series of challenges, and 'choices' for certain goals and opportunities. Leading responses and choices in the three scenarios may be summarized as follows:

- **Opening opportunities**: The driving concern is Europe's ability to compete in the global market and create jobs, and the leading response is a focus on liberalization and market driven technological innovation as the way to safeguard economic progress, and thereby afford environmental and social improvement.
- **Guiding change**: The driving concern is growing social and economic security, and the leading response is new policies to provide the appropriate signals to economic actors and to deliver a balance of cohesive social, environmental and economic outcomes.
- **Transforming communities**: The driving concern is the inability of current policies to get to the root of social and environmental decline, and the response is a reform of priorities to favour qualitative development over quantitative growth. The choice is for stronger communities, high goals of human development, and simpler, less stressful lifestyles.

Each scenario is entirely independent of the others, and the order of the scenarios is in no way significant. In particular, the existence of one does not stem from the failure of another, and no 'progression' of any sort is intended to be implied by the particular order in which the scenarios are presented below. All of the scenarios envisage a role for industry, government and civil society, and take account of Europe's relations with the rest of the world. No scenario is intended to be more or less favourable to a particular group in society. All of the scenarios have explicit and implicit values, and all of them imply a particular attitude to risk and uncertainty.

The matrix on the next two pages summarizes key factors under each scenario.

	Scenario 1: Opening opportunities	Scenario 2: Guiding change	Scenario 3: Transforming communities
Driving forces	• Policies of 1990s fail to deliver growth and jobs. • Problems tackled and environmental quality improved through growth and innovation based on more liberal policies. • Growing move towards individual choice and responsibility. • New social, economic and technological structures emerging with the information economy.	• Market alone is unable to solve problems unguided. • Social and economic disparities are increasing, environmental issues are not being resolved. • Popular support for integrated solutions to balance economy and environment. • Citizens welcome a stronger government role in maintaining standards of living and securing stability and certainty in a changing world.	• Societal tolerance for social, environmental and health problems has reached its limit. • Solutions require significant change in the course of economic and social development. • Desire for stronger communities, more focus on real quality of life, and simpler and less stressful lifestyles.
Energy	• All subsidies removed. • Liberalization of energy markets — fossil and non-fossil compete freely. • Energy intensity continues to decrease.	• EU-wide energy strategy. • Taxes and incentives for energy efficiency. • Large R&D programmes for non-fossil fuel energy. • Nuclear power still used.	• High taxes on fossil fuels. • Intervention programmes for photovoltaic and other non-fossil energy. • Nuclear power phased out altogether.
Agriculture	• The common agricultural policy (CAP) being completely phased out. • Biotechnology increases productivity and reduces environmental impact. • Land unsuited to agriculture taken out of production.	• CAP is an integrated agriculture and land-use policy, with environmental protection a priority. • Low input/'organic' agriculture replaces 'conventional'. • A few carefully controlled biotech applications.	• CAP becomes a system of incentives for Community supported agriculture, stressing local production. • The 'permaculture' approach reduces land and water needs, while increasing productivity.
Transport	• Personal vehicles and privatized networks are universal. • Vehicles are hyper clean and efficient, both in production and use. • Sophisticated traffic management systems reduce congestion. • IT has in any case reduced the demand for travel faster than was predicted in the 1990s.	• Private vehicles heavily controlled and taxed. • Investment to improve infrastructure, user information and vehicles. • Mandatory targets for pollutants such as VOCs. • Manufacturers required to develop ultra clean-burn engines for 'hypercars'. • Taxes on freight-miles are incentive to minimize packaging, source locally.	• Transport, especially by air and road, is very strictly limited (for example, a 70% cut in car use compared to 1995). • Almost all transport of people is by public vehicles. • Land-use patterns and lifestyles are changing to accommodate reduced mobility.
IT, telecommunications and manufacturing	• Dematerialization and efficiency improvements driven by innovation and intelligent systems. • Resulting environmental benefits are an incidental but significant bonus. • Strict environmental liability is major driver for industrial clean-up.	• Steady increases in eco-efficiency due to incentives and regulations. • EU develops integrated IT and clean manufacturing strategy. • Large EU R&D support and subsidies for perceived strategic 'clean' technologies.	• IT and telecommunications remain very important in a world of reduced mobility. • Highly durable, recyclable products form bulk of demand. • Almost all enterprises see themselves as providers of services rather than products.

	Scenario 1: Opening opportunities	Scenario 2: *Guiding change*	Scenario 3: Transforming communities
Consumption and Lifestyles	• Information-rich retailing means consumers more aware of health and environment issues. • New markets for more environmentally sensitive products, services and forms of leisure, including greener tourism. • Some consumers demand super-'green'/'fair' trade products.	• Information awareness campaigns promote demand for clean, efficient and locally produced products. • 'Green' alternatives are available, not expensive, and accompanied by 'neutral' performance information. • Tourism much more tightly regulated than in the past.	• No consumption growth in pounds of material weight; use of services grows. • Goods have much higher design and conceptual input, thanks to pervasive changes in values. • Society is changing along the lines of 'not more but better': a shift from quantity to quality.
Cities	• Cities are refurbished and become attractive again. • Efficiency increases and new applications of telematics obviate need for radical overhaul of planning.	• EU-wide strategy for sustainable cities. • Bold initiatives in planning and higher building standards reduce travel demand, energy and water use.	• Eco-villages and towns. • Economic role of cities changes drastically in line with changing social and economic priorities. • Few new buildings are taller than a tree.
Science and technology	• New technologies permit growth while using energy and other resources more efficiently. • Widespread use of telematics and IT. • Most R&D is conducted in private sector, although governments continue to fund basic research.	• Regulations and incentives to ensure that 'environmentally-friendly' goods and services are not at a disadvantage. • Substantially increased and more coherent R&D, particularly at EU level.	• New technologies are needed for radical ecological modernization and maximum recycling efficiency. • Research is increasingly directed to meeting real needs in a socially and environmentally compatible manner.
Europe: Regional and international dimensions	• EU role limited to defending integrity of internal market, managing external trade policy and maintaining price stability. • Global trade and investment liberalization diminishes EU policy role. • Importance goes to city-regions able to attract foreign investment.	• European dimension key to SD. • Decision-making procedures reformed. • Ineffective regulations removed and replaced. • Fiscal policy is matter of shared sovereignty between EU and Member States, facilitating ecological tax reform.	• 1980s/90s focus on EU integration replaced by focus on promoting robust local and regional economies. • IT/networking minimizes resource flows, transport. • EU treaties modified, give priority to environmental sustainability over free flow of goods and services.
Institutions	• Governments make markets work efficiently and make better use of the creative forces of entrepreneurship. • Open and accessible markets. • More streamlined regulatory systems with clear and equitably enforced rules. • Sound and transparent financial and legal systems, and efficient administration.	• Government role to achieve full integration of environmental, social and economic policies. • Active participation of all the main actors in society (administrations, enterprises, general public). • Broadening and deepening of the instruments for control and behavioural change. • Greater use of market forces.	• Government role to make sure that a country does not exceed environmental space, and that the use of that space is distributed in a socially acceptable way. • Government policy screened for elements obstructing SD. • Institutions increasingly decentralized, participatory and community-focused.

2.4. Three scenarios for a sustainable Europe

Scenario 1: Opening opportunities

Scenario 1 — Driving forces

EU policies of the 1990s fail to deliver growth and jobs[21]. The only way to solve these problems, and to improve environmental quality, is to innovate and grow through more liberal policies[88,89]. These policies also satisfy the move towards individual choice and responsibility, as well as the changing social, economic and technological structures that are emerging with the information economy.

Scenario 1 — How the trends of the 1990s led to this scenario

Continuing trends: Globalization, liberalization and technological innovation continue apace; increasing cross-border trade and investment, and growing competition from Asia and China[4]; strong focus on competitiveness and economic progress; rapid transition to post-industrial, information society and subsequent change in patterns of economic and business organisation and work and home life.

Declining trends: Limited change in consumer values and consumption patterns[91], slowing of social and environmental decline.

Scenario 1 — Europe 2020: Main themes

The economic dimension: Economic development is based on new patterns of more 'eco-efficient' growth emphasizing services, knowledge and new materials. Knowledge is viewed as the key resource of the European information economy, and is now high value and high cost. The economy is cleaner, leaner, more productive and more competitive[88]. Governments have reduced the number of areas in which they act and control. They emphasize promoting competition, and there is strong anti-trust law. Privatization has continued, subsidies to industry have stopped, and there are no longer any national 'champions'. Markets are very responsive to consumer demand, and there is a strong market for 'green' products, although this is still limited to a niche market of consumers, as it was in the 1990s. Financial markets play an important role in the 'greening' of industry, not least because of the strict liability laws.

The social dimension: The social partners embrace the need for continuous change, for a shift towards a high-skill economy, despite the social dislocations and changes in employment patterns that this entails. Social services provide a 'floor' of basic services such as health and education, which includes education up to secondary level, and a social 'safety net'. Other services are privatized and opened up to competition, resulting in improved service at lower cost.

The environmental dimension: Growth now has few environmental impacts, with production and consumption progressively de-linked from resource use and pollution. The benefits from growth are also used to fund the great clean-up of the pollution legacy from the 20th century. Environmental policy has moved from technology-driven standards to ambient quality standards, within a framework of least-cost regulation. Market mechanisms drive improvement through the combination of strong tradable property rights and liability law. There are targets for environmental improvements, but these are set and adhered to through voluntary agreements. Distorting production subsidies, notably in the CAP and in energy markets, have been ended. This has not only improved environmental incentives but also economic efficiency. Environmental campaigners focus their attention on building tightly-knit alliances with the business sector and consumers to accelerate the diffusion of cleaner technologies and products.

The political dimension: Following the move to a single currency, the European Union of 25 Member States rationalized its mandate to limit its role to defending the integrity of the internal market, managing external trade policy and maintaining price stability. Global trade and investment liberalization diminishes the importance of EU policy. Great importance goes to city-regions able to attract mobile foreign investment, which form like-minded networks within and outside the EU. Even where government takes more of a 'back seat' role, there are new forms of governance that fill the vacuum and guide corporate behaviour. Citizen mistrust of government and business information on the sustainable development performance of production and products gives way to independent certification by coalitions of environment, development, trade union and human rights organizations for sensitive goods (food, forest products, health care, tourism and transport)[31].

The international dimension: The EU is no longer preoccupied with presenting itself externally as a bloc. There has been limited liberalization of immigration, attracting skilled workers to support the economy as Europeans age. Europe retains an

influential, albeit diminished, role within the new G7 (EU, NAFTA, China, India, ASEAN, the Latin American 'Mercosur' free trade area, and the Russian Federation). Foreign direct investment continues to grow faster than trade, which in turn grows faster than GDP, and the economy is now truly global in scale and connection. EU exports have grown from 15% to 30% of GDP[9,12]. Aid to developing countries has been reduced as it has not generally worked, and is now focused purely on basic needs and humanitarian concerns. EU internal and external markets have been fully opened, and the move to global free trade proves to be of far greater benefit to developing countries than aid used to be. Global environmental issues are tackled through joint implementation and negotiated agreements, but the WTO social and environmental standards have not changed since the 1990s. The Rio logic of publicly financed sustainable development as a model for resolving environmental issues is now discredited.

Scenario 1 — Europe 2020: Sectoral implications

Agriculture: EU agriculture becomes more and more competitive on the world market. Price support and quotas are abolished, leading to significantly reduced agricultural expenditure, which is essential in a growing EU. Agriculture increasingly takes place in large mechanised operations as more 'marginal' farmers go out of business. This takes pressure off natural resources, which can be preserved in protected areas. Increasing use is made of biotechnology and external inputs, which are necessary for a world where many countries cannot feed themselves[80].

Energy: Technological progress has resulted in significant decreases in energy and carbon intensity as smokestack industries close. Energy systems are moving towards gas and nuclear power, and are aiming towards hydrogen as an energy carrier. Subsidies and incentives are removed from fuel extraction, energy generation and distribution. Fossil and non-fossil fuel companies (none of them State owned) compete in an open market. Nuclear power only becomes competitive if commercial solutions are found for waste disposal. As current known reserves become depleted it becomes more viable to use non-fossil fuels, or to extract from less accessible sources. Improving energy efficiency has become more and more important since it saves money. Energy intensity continues to decrease[70].

Transport: Access to efficient transport is vital for economic growth and is a personal right. Private cars are the main mode of transport and networks are privatized. Governments regulate only on essential issues of health and safety. Vehicles become progressively cleaner and more efficient and VOCs and other pollutant levels are significantly reduced as a result. Traffic management systems become increasingly sophisticated to reduce congestion. IT has in any case reduced the demand for travel faster than was predicted in the 1990s[48].

Scenario 1 — A day in the life: A European at home and work

Adrianna has a breakfast of muesli made from grains genetically engineered to be resistant to pests and disease. Then she gets ready for work. Adrianna drives a 'hypercar' taxi (a lightweight, streamlined vehicle from Daewoo Poland which consumes 20% of the fuel and emits 10% of the pollution of mid 1990s models). The vehicle's onboard computer continually downloads data on traffic flows and congestion from the city's privatized traffic authority, and advises her how she can maximize the number of fares she will take today. Adrianna used to be an opera singer and prize-winning cook; but there is less demand than ever for such skills in 2020, and the pressures to work long hours are growing.

Scenario 1 — Key indicators

- 3% annual GDP growth, leading to a doubling of EU per capita GDP;
- Reduction in public spending from 50 to 30% of GDP;
- Low inflation and stable money;
- Indicators are GNP and separate, non-integrated, satellite environmental accounts.

Scenario 1 — Policy issues, potential threats and dilemmas

Environment:

- Will an approach based on property rights and liability create a US-style litigious society?
- How will common resources be managed in a system based on individual environmental property rights?
- Can the market deliver environmental quality standards, and is it vulnerable to surprise?
- Will there be adequate sanctions against environmental laggards?
- Can a mechanism for safe management and disposal of nuclear waste be found?

- Does the EU have the capacity to deregulate on environmental policy?
- Can the eco-efficiency 'treadmill' be sustained?[90]

Economy:

- What can be done about free riders, globally or nationally?
- Can the EU sustain the innovation needed to drive economic development?
- What is the future of service sector jobs in the face of global competition?

Society:

- How will society cope with increasing job insecurity and stress?
- How can increasing disparities in wealth and their social effects be dealt with?

Scenario 2: Guiding change

Scenario 2 — Driving forces

The market alone is seen to be unable to solve problems unguided: social and economic disparities are increasing, while environmental issues are not being resolved. Following a period of social and environmental decline, there is a new burst of political will and popular support for measures to create integrated solutions and find a balance between the economy and the environment. Citizens welcome a stronger government role in maintaining standards of living and securing stability and certainty in a changing world.

Scenario 2 — How the trends of the 1990s led to this scenario

Continuing trends: Environmental and social decline continues; continuing stress on air, water, biodiversity and land resources; accelerating emissions of greenhouse gases; insecurity and persistent unemployment, and growing numbers of old people faced with declining social security systems; growing nationalism and populism; growing disparities in society, crime, drugs and the rise of an underclass[25].

Declining trends: Less focus on innovation and economic growth as ends in themselves, few new breakthroughs in materials, manufacturing processes or energy technologies.

Scenario 2 — Europe 2020: Main themes

The economic dimension: The EU is co-funding large-scale investments in environmental infrastructure, including transport systems, waste treatment, and new and renewable energy supplies. These investments have a win-win result by also providing a Keynesian boost to employment. There is a managed wind-down of unsustainable industries, supported by re-training and subsidy schemes. New structures emerge for reaching 'voluntary agreements' among governments, businesses, trade unions and environmental organizations on key transition issues, such as the phase-out of unsustainable technologies in a way that does not affect jobs, and changing consumption patterns through environmental organizations mobilizing their membership to action. Green groups focus lobbying efforts on using EU regulations and funding to pull up environmental performance in Eastern and Central Europe[30,34].

The social dimension: Society has high levels of security and social services and a strong economy, although with limited conspicuous consumption. There are common welfare systems that provide for the possibility of a dignified livelihood rather than just providing a minimal social safety net. Compulsory savings schemes are in place to promote savings and investment and limit short-term consumption. Basic rights to environmental quality, social security and employment have been enshrined in a 'Charter of basic social, environmental and economic rights' for all Europeans. The EU sees its role as protecting the livelihood of Europeans, rather than European companies. Where there are trade-offs, the EU seeks to favour citizens. At the same time, it is legitimate to limit personal freedoms for the good of society as a whole. Rights to social and environmental quality, as well as to information, have been strengthened since the 1990s. There is extensive participation with stakeholders and citizens at local and national levels to set priorities and guide policy development.

The environmental dimension: There is universal producer responsibility for environmental impacts. Information is seen as a public good, rather than a commodity to be traded on markets, and the Eco-Management and Audit Scheme (EMAS), toxic release inventories, labelling and life cycle analysis (LCA) are all mandatory. There are subsidies to promote eco-efficient companies, and also to fund environmental research and development[34].

The political dimension: The legitimate role of governments as stewards of the public good has been reaffirmed. Their overall priority is to maintain standards of living, within a context of stability and certainty. Market approaches are used as important tools of policy, but it is recognized that markets cannot guarantee social or environmental results, or the speed of their attainment. Markets are therefore not used to set targets, which is a social and political process, and policy ensures that narrow economic rationality does not endanger other goals. To promote the transition to sustainability, governments seek to change corporate and consumer behaviour, and universalize best practice, through a radical overhaul of regulations and incentives. The European dimension is central to the realization of sustainable development. Decision-making procedures are reformed to allow old, ineffective regulations to be removed and replaced by a smaller number of new and effective ones. Fiscal policy becomes a subject of shared sovereignty between the Union and the Member States, facilitating ecological tax reform. Ecological tax reform is seen as an incentive rather than a way to make prices tell an indeterminate ecological 'truth'. All these changes require a large infusion of political will. Other mechanisms of environmental policy include information, transparency, fiscal measures and education.

The international dimension: The economy is predominantly intra-regional rather than global, and EU policy focuses on the internal market. There is an EU-wide commitment to maintain public services in health, education and key utilities such as energy, water and telecommunications. Externally, Europe plays a strategic role in mediating between China and the US. The EU has strong borders, and continues a policy of managed trade. In particular, WTO's social and environmental standards are tightened. Aid is targeted to help developing countries make the 'green' transition[17,18].

Scenario 2 — Europe 2020: Sectoral implications

Transport: Transport policy across the EU becomes more coherent, and great emphasis is put on the integration of different modes. Walking and cycling are encouraged. Investment focuses on improving infrastructure (including development of light rail systems in many cities), user information and the cleanliness and efficiency of vehicles. Pollutants such as VOCs are nearly eliminated via mandatory targets. Private vehicles and fuel are heavily taxed, thus contributing revenue to enhanced public transport systems. There are increasing restrictions on the number of cars allowed into certain areas at certain times, particularly city centres. Manufacturers are required to develop alternatives to the internal combustion engine by 2015[48].

Energy: Significant effort is made to reduce carbon dioxide emissions, including the introduction of carbon and energy taxes and incentives for efficiency. Reformed energy and transport policies for the whole European Union help reduce the growth in oil consumption. A major switch to gas is made, largely part for environmental reasons. As part of an EU-wide strategy that includes targets for increased energy efficiency there are large R&D programmes for non-fossil fuel energy[74].

Agriculture: The common agricultural policy (CAP) becomes an integrated agriculture and land-use policy, with environmental protection (including restoration of degraded land) a priority. Low input and 'organic' agriculture replaces 'conventional' agriculture, and a few very carefully controlled biotechnology applications are slowly coming online[80].

Scenario 2 — A day in the life: A European at home and work

Over a breakfast of organic sausages (each precisely labelled and coded by contents and packaging) Brunhilde and her daughter Inge check the laundry and recycling roster on their interface to the apartment-block computer. It's Inge's turn to perform the communal duties. But she doesn't mind because the chores will earn them a few credits which will be good for anything from a bird watching trip to her university saving funds.

Brunhilde take the superfast tram from the corner of their block directly to the local business centre in the old city centre. Brunhilde works at Resources plc, an environmental consultancy that specializes in providing sustainable resource management solutions. Resources plc has thrived since the introduction of legislation that sharply curtails the exploitation of new mineral reserves and water supply sources. But Brunhilde is worried. She knows the group of companies to which hers belongs is in deep financial trouble. The competitive position *vis-à- vis* US and East Asian multinationals is simply untenable, and large-scale job losses are inevitable.

Scenario 2 — Key indicators

- 2.5% economic growth to resolve the social/economic/environmental trade-offs;
- Unemployment reduced from 11 to 7%;
- The standard of living for citizens is maintained and where possible improved;
- Tax reform is mostly revenue neutral, but taxes do not decline;

- The 1990s rush to globalization and liberalization is limited;
- Indicators of progress include human development index (HDI) and a limited green GNP[7];
- Reduction in CO_2 emissions to meet Toronto targets (20% cut by 2005);
- Target is for no critical environmental loads to be exceeded;
- There are strict reduce/re-use/recycle targets.

Scenario 2 — Policy issues, potential threats and dilemmas

- How can the necessary trade-offs between economic, social and environmental goals be made? Who decides what the trade-offs should be?
- Is 2.5% growth together with a 20% cut in CO_2 emissions realistic?
- How strong can social and environmental limits to trade be without endangering the global trading system?
- Will there be enough political will to change framework conditions and impose solutions that will be unpopular with certain interest groups?
- What will be the impact in developing countries of EU trade restrictions?
- Will fiscal instruments for environmental quality add to growing divisions between rich and poor?
- Will the cost of environmental targets and requirements be prohibitive, especially for small companies?
- Is it really possible to 'have everything' as the win-win argument suggests?
- Will tough environmental targets constrain innovation and competitiveness?
- How quickly will the possibilities for cheap environmental win-win solutions be exhausted?
- Is it realistic to imagine changing the WTO?

Scenario 3: Transforming communities

Scenario 3 — Driving forces

EU policies of the 1990s fail to tackle the root causes of growing social insecurity, declining quality of life and environmental degradation. There is a spreading conviction that radical changes are required to markets, government regulation and lifestyles which will put the goals of social justice and environmental sustainability first. This means implementing policies that strengthen local communities, expand the social economy, tackle vested interests and encourage less stressful lifestyles.

Scenario 3 — How the trends of the 1990s led to this scenario

Continuing trends: Environmental and social decline continued, and the traditional policy-making process became increasingly ineffective in the face of organized special interests. This resulted in demands for tougher government action, along with pressures for greater transparency, openness and participation, producing more decentralized and community oriented decision-making systems. Attitudes to environment, work and lifestyles continue to develop along the lines of 'not more, but better' and people seek greater satisfaction from social and cultural relations rather than increased material wealth[94].

Declining trends: The 1990s stress on globalization, liberalization and privatization is greatly reduced. Competitiveness in the 1990s definition becomes less important, as economies become more localized. Much less faith is placed in the ability of technological innovation alone to deliver environmental improvement.

Scenario 3 — Europe 2020: Main themes

The economic dimension: European policy now aims to achieve a triple balance between the public, commercial and social economy sectors; between the local, European and global levels of development; and between work, leisure and community action. Government efforts are especially geared towards providing an economic framework within which enterprises seeking to satisfy Europe's rising social needs (in particular urban regeneration and care for the elderly) can prosper. Tax reform has shifted the fiscal burden away from individuals and enterprise and onto resource use, pollution and 'speculation'. There are controls on capital movements and a speculative tax, along the lines of the Tobin tax proposed in the 1990s[18]. A new wave of community-based organizations promote local development techniques such as micro-credit and local currencies. Economic policy-making is also based on an analysis of a more complex range of social, economic and environmental indicators, using new indices such as the ISEW alongside monetary measures[7,8]. Targets for economic growth are

set within a broader context of Europe's 'fair share' of global ecological carrying capacity.

The social dimension: Changing the pattern of development has greatly reduced the need for defensive expenditures, and as a result people begin to feel a higher quality of life as measured in terms of happiness and optimism as distinct from purely material wealth. The focus on meeting real needs has catalysed job creation in fields such as helping the aged, primary health care, community services and improving environmental quality. Enjoyment is increasingly experienced through 'low impact' activities such as art, music and appreciation of the natural world rather than environmentally-intensive goods such as sports cars and foreign travel. Environment and development groups target their resources on developing their own solutions to unsustainable consumption and production patterns.

The environmental dimension: The technological, institutional and economic limits to eco-efficiency have become apparent. Addressing environmental concerns therefore requires priority being placed on radical reductions in resource use and pollution through changes in infrastructure, lifestyles and the scale of the economy. Prices increasingly 'tell the ecological truth' as governments internalize costs through ecological tax reform. The proximity principle is used as a planning device to encourage the expansion of local and regional patterns of production and consumption, thereby cutting unnecessary freight and personal transport. Powerful moral pressure is exerted against conspicuous consumption, even stronger than pressure against smoking in the late 1990s. European environmental regulation on transport requires the elimination of large-engined and inefficient vehicles. Most local authorities now take tough action to curb waste at source through taxation, planning and awareness raising. Nuclear power and the use of chlorine in industrial processes have been largely phased out, and policies seek to decrease use of fossil fuels to sustainable levels as rapidly as possible. New technological development concentrates on more appropriate technology that is environmentally sound, durable, cheap, easy to maintain, and suited to its task. Environment and development groups target their resources on developing their own solutions to unsustainable consumption and production patterns.

The political dimension: Greater decision-making powers are awarded to the European Parliament as the elected arm of the Union. Policies become more accountable to parliamentary review and critique. Following the success of the 'Local Agenda 21' movement, the 1990s debate on subsidiarity is taken forward with new emphasis being placed on decentralization. The primacy placed on economic integration at the European level in the 1980s and 1990s is modified with greater emphasis given to promoting robust local and regional economies, and minimizing unnecessary resource flows and transport through widespread use of IT and networking. EU treaty provisions are modified to allow both Member States and regions to give priority to environmental sustainability over the free flow of goods and services. The voluntary social auditing of the 1990s has evolved into stakeholder co-determination boards in major transnational companies, advising management on corporate strategy and the trajectory of innovation[19].

The international dimension: The EU has a greatly reduced, but still significant, role in the world. It has lightened its ecological footprint and cut its reliance on imported material and energy resources. This improves Europe's security by reducing dependence on unstable regions, notably the Middle East. The EU has taken the lead in establishing international trading schemes for scarce environmental resources and global pollution (such as CO_2). The revenues from these are targeted at an expanded and refocused international development effort, targeted at tackling the root causes of poverty worldwide. The power of transnational corporations has been limited, and stakeholder management ensures that corporate decisions are truly in the global interest[14].

Scenario 3 — Europe 2020: Sectoral implications

Transport: Transport, especially by air and road, is heavily restricted. Large areas of cities are pedestrianized and land-use patterns and lifestyles are changing to reduce the need for mobility. Local sourcing of goods takes priority wherever possible. Good public transport systems are designed to cater for the needs of everyone in the community and most journeys are by foot, bicycle or public transport[50].

Energy: Nuclear power is phased out by 2010 and a programme of radical change to energy supply and demand is implemented with the aim of phasing out fossil fuel use after 2100. The energy content of goods and services is analysed to identify the most effective way of reducing energy use, which is the main priority. The reduction in transport substantially reduces demand for oil, and a major initiative to improve the energy efficiency of buildings yields significant reductions in household energy consumption. Fossil fuels are heavily taxed and a large intervention programme for photovoltaic and other non-fossil fuels is implemented, with an emphasis on local generation. Partnerships with other parts of the world (both developed and developing) help to defray costs[76,77].

Agriculture: The common agricultural policy (CAP) becomes a system of incentives for Community-supported agriculture, stressing local production.

The 'permaculture' approach reduces land and water needs, while increasing productivity[81].

Scenario 3 — A day in the life: A European at home and work

Angharad is up before dawn and, as the sun rises, she picks plums, pears and apples in the community square that, together with the solar heated swimming pool, is surrounded on three sides by the 40 'low-impact' homes of their urban 'village' — a redeveloped inner city block. Nick — Angharad's old father — calls to her from the kitchen, where (despite his advanced age) he's prepared a delicious breakfast of garden produce and fish from the nearby stream.

Angharad loves her home life, but is greatly frustrated by the lack of opportunities in her working environment. Although she doesn't mind taking elderly people to and fro in a rickshaw, she feels frustrated that there have been so few opportunities for her to develop her business acumen and to travel far afield. And, like many people in 2020, she is anxious at the apparent incapacity of the EU to face up to Chinese expansion.

Scenario 3 — Key indicators

- Phasing out nuclear power;
- Improved quality of life as measured by indicator of sustainable economic welfare (ISEW);
- Reduction of economic disparities, no poverty or homelessness;
- Progress toward elimination of fossil fuels as rapidly as possible;
- Less economic and industrial concentration;
- Working week reduced to 30 hours, widespread work-sharing;
- Changing consumption patterns, increasing product durability, less travel;
- More communal resources (e.g. libraries), more hire and less purchase of goods;
- More sharing of economic and family activities among men and women.

Scenario 3 — Policy issues, potential threats and dilemmas

Environment

- What if some environmental concerns prove to be overstated?
- What if measures taken are still not adequate to cope with environmental change?

Economy and politics

- Is a steady-state economy really possible? Can we step off the economic 'treadmill'? Where will jobs come from?
- Will there be mass capital flight from the EU? Are there adequate returns in a steady-state economy?
- Will industry leave the EU? What would be the impacts on jobs and society?
- Will government be able to get a mandate for significant cost internalization?
- How can policies be coordinated in a decentralized EU?
- How will free riders or objectors be dealt with?

Society

- Will Europeans accept the declining importance of a steady-state EU in a growing world?
- Will threats to individual liberties and lifestyles be acceptable?
- What role is there for individual aspiration and ambition?
- Who do citizens feel solidarity with? Global eco-rationing or local community values? Can 'thinking globally and acting locally' work?

2.5. How the scenarios respond to the concerns expressed by the Consultative Forum

In response to the scenarios, the Forum identified five key clusters as the key values and concerns that should guide the shaping of SD policies:

- Employment and competitiveness;
- Environment, nature and health;
- Social security and cohesion;
- Cultural diversity;
- Personal freedom and democracy.

Set out below is an indication of how the scenarios respond to the concerns:

	Scenario 1: Opening *opportunities*	Scenario 2: Guiding change	Scenario 3: Transforming *communities*
Employment	New opportunities through the *information/service* economy. But dilemmas: constant change, job insecurity and likely convergence of wages to global levels.	Public backed employment *rights and retraining* assistance. Dilemma is cost and inflexibility.	Labour intensive local *development, plus work* sharing. But how to maintain standard of living? And is it really feasible?
Environment	High value placed on personal health and private environment. But dilemmas: can individual health be isolated? How to manage common goods?	Strategies and targets achieved by regulatory reform and incentives. Ecological values balanced with social and economic. Dilemma: will there be enough political will? How can trade-offs be made?	Respect intrinsic value of nature. Overriding priority given to avoidance of health risks. But dilemma of technological immobilization?
Social security	Privatized; minimal safety net. Dilemma: danger of rising social divisions, crime; breakdown of social contract and cultural diversity.	Maintain services and extend rights, using the market as a possible provider. Dilemma: will this cost more than Europe can afford?	More community provision/preventative health. But slowdown of technological innovation. And will people take responsibility for themselves and others?
Culture	Whole new global cultural dimensions open up, but *Europeans fear a loss of* identity.	Subsidies for European arts and culture and restraints on *foreign imports. Dilemma:* can you control a borderless global culture?	Rediscovery of local distinctiveness but how to *respect multiple identities and* personal freedoms?
Democracy	Consumer first; minimal role for public choice. Dilemma: how to prevent plutocracy; what happens if the poor have no stake in society?	Emphasis on representative democracy and formal rights. But are parliamentary systems sufficiently responsive, and can corruption be tamed?	Stress on participatory democracy and local control. But how to coordinate internationally, prevent fragmentation and free riders?

3. BACKGROUND ANALYSIS: CRITICAL DIMENSIONS FOR EUROPE'S PROGRESS TOWARDS SUSTAINABILITY: 1970-1995-2020

3.1. Introduction to the background analysis

This Annex is designed to provide analytical support for the three scenarios contained in Section 2. The Annex contains three parts: a review of framework issues (economic, social political and environmental questions); a review of four key sectors (agriculture, energy, industry and transport); and a summary of two cross-cutting issues (the urban environment and consumption patterns).

The Annex focuses on the driving forces and concerns shaping Europe's prospects for sustainable development. It therefore does not contain a full-scale assessment of the state of Europe's environment, or present forecasts for particular environmental problems. Much useful additional information on these themes can be obtained in *Europe's Environment* (EEA 1995a), *Environment in the European Union 1995* (EEA 1995b) and the Commission's review of the fifth environment action programme (CEC 1996c).

For ease of reference, paragraphs are numbered for comparison with the scenarios in Section 2.

The Forum has identified 12 principles of sustainable development (see Box 1).

Box 1 — 12 principles of sustainable development

A global agenda

1. Sustainable development cannot be achieved in isolation from the rest of the world. Policies for trade, economic and social development aid and environmental protection should be considered in the context of the international implications for both Europe and developing countries.
2. Policies and patterns of development, production and consumption should recognize the population issue, in Europe as well as the rest of the world, and move towards being sustainable in the light of the projections for growth in population worldwide.

Limits to traditional growth patterns

3. The integrity of natural systems — soil, water, air and biological diversity — should be preserved, and where possible, restored.
4. Economic and social development should respect the physical limits that exist for resource use and regeneration.

Equity and cost internalization

5. The benefits and burdens of policies should be shared equitably by all segments of society. Where serious inequalities are unavoidable, some form of compensation should be considered.
6. Policies should have clear objectives and be based on detailed assessment of the issues and related risks, assessment of the impact, sound science and sensible balance between costs and benefits leading to full internalization of all costs.
7. Economic and social development, environmental protection and social equity are interdependent and all policies which should be tested for their impact on each area are not considered in isolation.
8. Where there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing precautionary measure which are cost effective and which have merits in their own right.

A shared responsibility

9. Decisions affecting sustainable development are a shared responsibility. They should be open and based on informed participation by affected and interested parties. A personal sense of responsibility and involvement should be promoted amongst all sectors of society. This requires a knowledgeable public, a free flow of information and fair and equitable opportunities for review and redress.
10. In addition to appropriate regulatory measures, a mix of market-based instruments, including fiscal and economic incentives and a flexible approach should be used to harness private energies and capital to promote sustainable development. The contribution which individuals and society as a whole can make on a voluntary basis should be encouraged.

The nature of the challenge

11. One key to success will be a willingness to experiment. Given that some solutions will require fundamental changes to the status quo and accepted practices, policies should be introduced — where possible — on a phased basis, to minimize the inequalities between winners and losers.
12. The central challenge for Europe will be to maintain international competitiveness during the transition toward a more environmentally friendly and sustainable economy.

3.2. Framework of cross-cutting issues

3.2.1. The economic dimension

Economic growth

[1] The annual monetary output of the global economy almost doubled to USD 20 trillion (USD 20 000 000 000 000) between 1970 and 1994. However, rising world population meant that average per capita income grew by only a half to USD 3 500. Of this USD 20 trillion, three-quarters was accounted for by the high income economies of Western Europe, North America and Japan (*Vital Signs*, Worldwatch, 1996).

[2] The European Union is currently the world's largest economic bloc, accounting for about a quarter of world GDP (Eurostat 1995). The EU's average per capita income now stands at ECU 15 944, lower than both the USA (ECU 20 972) and Japan (ECU 29 014), but five times the world average.

[3] Although growth projections are notoriously unreliable, the World Bank has estimated that by 2030, world GDP could rise to about USD 69 trillion, with the Asia-Pacific region growing fastest from about USD 1 trillion to nearly USD 10 trillion. Despite slower projected growth rates, income in the rich world would still more than double by 2030, according to the World Bank (World Bank, 1992).

[4] Rapid growth in China has been the subject of much attention in recent years. If China's economy expands at 10% in 1995 as projected, then it will be the fourth consecutive year of double-digit growth, leading to an overall expansion of some 56% over just four years (*Vital Signs*, ibid.). Observers in the IMF and the World Bank now believe that in terms of purchasing power parities, the Chinese economy is similar in size to Japan. Extrapolations of recent growth rates have led to forecasts of China becoming the world's biggest economy in a generation's time (CEC 1995a).

[5] More broadly, there is growing recognition that GDP is an inadequate indicator for steering economies towards sustainability, failing to express a comprehensive picture of human welfare or accounting for the environmental costs of growth. Additional satellite accounts have been prepared, along with alternative composite indices, notably UNDP's Human Development Index and Herman Daly's Index of Sustainable Economic Welfare. The latter shows a marked decoupling of growth and welfare since 1970 in the USA, Germany and the UK, largely due to rising inequality (OECD, 1995; UNDP, 1996; FOEE, 1995).

Box 2 — The limits to growth?

Sustainable development, as defined by the Brundtland Report, is based on the assertion that a new era of growth is needed to tackle global poverty, and that to be sustainable there must be a change in the content of growth 'to make it less material- and energy-intensive and more equitable in its impact' (WCED, 1987). As a result, the challenge is to continuously improve technology, institutions and human capacity to manage the natural environment more efficiently and fairly. This countered the view expressed in 1972 in *The limits to growth*, that there are absolute constraints to economic expansion, population growth, pollution generation and resource depletion and that these would be reached 'within the next 100 years' if present trends continued (Meadows, et al., 1972). Others had also argued that only through a 'steady-state' economy could environmental sustainability be achieved (Daly 1970).

Simple extrapolations of growth and environmental degradation can lead to some bleak forecasts for the future. Thus, the World Bank recognizes that 'if environmental pollution and degradation were to rise in step with such a rise in output, the result would be appalling environmental damage ... fortunately such a rise need not occur nor will it if sound policies and strong institutional arrangements are put in place' (World Bank, ibid.). Similarly, Gro Harlem Brundtland has argued that 'it is simply impossible for the world as a whole to sustain a Western level of consumption for all. In fact, if seven billion people were to consume as much energy and resources as we do in the West today we would need 10 worlds not one to satisfy our needs' (Oslo I 1994).

The European Commission argues that 'there is no simple linear relationship between economic growth and pressure on the environment', but cautions that 'there is nothing automatic about such a move towards environmentally sustainable development', necessitating a robust policy framework relying more than in the past on market based instruments (CEC, 1994a).

Hard choices and structural changes in production and consumption patterns may be needed to guarantee that future growth does not accelerate environmental decline. The Factor 10 Club of academics, policy-makers and business executives concluded that 'in industrialized countries, the current resource productivity must be increased by a Factor of 10 during the next 30 to 50 years as a prerequisite for meeting the goal of long-term global sustainability' (Factor 10, 1994). If improvements of this order are to be achieved then where economic growth and environmental sustainability conflict 'it will become necessary to put sustainability first' (Oslo II 1995).

Recently, arguments about the environmental limits to growth have re-emerged as part of the 'Towards a sustainable Europe' campaign initiated by Friends of the Earth Europe. In this view, 'environmental space' is built on two pillars: first, that the amount of pollution and resources that can be used without impinging on the access of future generations is 'by definition limited and partially quantifiable'; and second, that each country has a right to the same amount of environmental space per capita (Milieudefensie, 1992). Indeed, 'Towards a sustainable Europe' argued that growth cannot be wholly de-coupled from resource use and pollution, necessitating a shift to a 'steady-state' economy, constrained by the introduction of an absolute 'ceiling' on the use of environmental resources (FOEE 1995). Full circle in almost 25 years ...

Indicators

Measuring sustainable development

[6] Different visions of sustainable development use different yardsticks to evaluate success and failure. At the national level, there is increasing recognition that the traditional indicators by which governments, businesses and civil society have measured economic development progress have failed to account for the environmental and social costs of development. In particular, standard national income accounts provide no sense of whether changes in gross domestic or gross national product (GDP/GNP) are sustainable or whether growth has been gained through the depletion of renewable or non-renewable resources, or at the cost of environmental pollution or degradation that will have to be cleaned up later. To remedy this, two broad approaches have been taken.

(A) Reforming national income accounts

[7] A number of initiatives are now under way at the international level to reform conventional national income accounts to incorporate the social and environmental dimensions of sustainable development. Since 1990, the United Nations Development Programme has produced annual reports using a composite human development index (HDI), bringing together a country's life expectancy, educational attainment and standard of living statistics indicators, which shows that countries with low growth do not necessarily have low human development and vice versa. A similar approach is adopted by the index of sustainable economic welfare (ISEW), which adjusts GNP to account for income inequality, unpaid household work, spending to offset environmental costs, estimates of environmental damage and depreciation of natural capital. In the UK, this has meant that while the UK's GNP per capita has grown 2.3 times between 1950 and 1990, the ISEW has been falling since the mid-1970s and by 1990 was almost back to the 1950 level: in other words, there has been no real growth in overall welfare due to increasing inequality and environmental damage.

(B) Developing a basket of indicators

[8] Another approach is to argue that sustainable development is too complex to be reduced to a single measure such as GNP growth or a composite index such as the HDI or ISEW. Instead, baskets of social and environmental indicators can be developed to broaden the information used to make decisions for sustainable development. At the international level, the UN Commission on Sustainable Development has developed a set of 112 indicators, while the OECD regularly publishes a set of environmental indicators. Some of the most interesting work in the development of SD indicators has, however, taken place at the local level, where cities such as Seattle in the US have involved their citizens in participatory exercises to find indicators which resonate with their own sense of sustainability (for example, choosing the number of salmon in a local river as an indicator of water quality).

Trade

[9] International merchandise trade stood at over USD 4.2 trillion, more than tripling in value since 1970. In fact, trade growth is now outpacing the expansion of the world economy as a whole by a factor of three. Trade in services, now worth over USD 1 trillion is also growing rapidly (Worldwatch, 1993). The EU is the world's largest trading bloc, making up 21.5% of total world trade (imports and exports), excluding intra-Community trade, compared with 18% and 10% for the USA and Japan respectively. The EU's share of world trade continues to rise, climbing 2% between 1990 and 1993. The EU also imports over three times more from least-developed countries (LDC) than does the United States, and twice as much as the other G7 partners put together.

[10] The world trade system has become progressively more liberal since 1970, notably following the GATT Uruguay Round, concluded in Marrakesh in April 1994 with the establishment of the new World Trade Organization (WTO). But major barriers and distortions remain, notably for agriculture, textiles and services. It is estimated that developing countries lose some USD 100 billion annually in agricultural sales as a result of quotas, tariffs and other trade barriers (Worldwatch, 1993). The 'dumping' of agricultural surpluses on world markets by the EU and other developed countries will be partially curbed as a result of the Uruguay Round by limitations imposed on export subsidies; the Multifibre Arrangement on clothing and textiles will be phased out by 2005.

[11] Looking ahead, a number of competing visions for world trade emerge, which will be reflected in the WTO's first ministerial summit in December 1996 in Singapore.

[12] **(a) Global free trade**: Building on the growth of regional trade agreements, a leap could be made to a global free trade system by 2020. The EU has already completed its single market and intends to expand to include perhaps up to 15 Central and Eastern European and Mediterranean countries. The EU has also agreed to establish a Euro-Mediterranean free trade zone by 2010. Elsewhere, the 18 countries of the Asia-Pacific Economic Cooperation Agreement have committed to free trade and investment in the region by 2010 for high-income countries and 2020 for the rest, while 34 countries in the western hemisphere have agreed to set up a Free Trade Area of the Americas (FTAA) by 2005, building on the existing North American Free Trade Agreement (NAFTA). Other smaller regional trade agreements include the ASEAN Free Trade Area (AFTA) and Mercosur in Latin America (Bergsten, 1996; Wolf, 1996). A global free trade regime for goods and services would be bolstered by agreements on investment and competition, as proposed by the EC.

[13] **(b) Managing global trade**: UNCED concluded on the need to make trade, environment and development mutually compatible and reinforcing. This involves global recognition of core labour standards as proposed by the EU, France and the USA, and efforts to reconcile trade and environment policies, as suggested in the Commission's recent communication (CEC,1996). In the future, action could also be taken to address those environmental aspects of trade which clearly fall outside national control, such as international transport, and work towards a more explicit balancing of trade and environment policies through the establishment of a panel on trade, environment and sustainable development, perhaps as a precursor to a global environmental organization acting as a 'green' counterweight to the WTO (Esty, 1994).

[14] **(c) Fair and sustainable trade**: Criticisms of globalization and free trade are mounting (Nader, et al., 1993). Trade liberalization encourages a 'race to the bottom' in terms of social and environmental standards, and allows countries to draw unsustainably and unfairly on the environmental resources of distant countries, creating 'ecological footprints' in the process (Hines and Lang, 1993; Rees, 1992). Greater reliance on domestic resources is required for sustainable development: thus, the sustainable Europe campaign argues that there should be a 50% reduction in Europe's net use of overseas agricultural land by 2010, with a ban on the import of agricultural fodder (FOEE, 1995 and 1996). International trade should also be organized more explicitly to achieve social and environmental goals, for example, through International Commodity Related Environmental Agreements (ICREAs), which would provide trade preferences to goods exceeding critical norms, replacing the EU's existing trade regime through the Lomé Convention and the generalized system of preferences (de Vries and Kox, 1995).

Financial flows

[15] Cross-border capital flows are now expanding more rapidly than trade flows, which in turn have been growing faster than world output. Over USD 1.5 trillion crosses international frontiers every 24 hours on the currency markets of which less than 5% is financing trade. Looking at the North-South balance, private capital flows have now recovered from the mid-1980s slump brought on by the debt crisis, which led to a virtual halt in new bank lending to the South. They now outstrip public finance in the form of aid and loans. Thus, in 1994 official development assistance accounted for USD 59 billion and private flows for USD 110 billion (OECD, 1996). Estimates for 1995 suggest that private capital flows reached a record USD 200 billion.

[16] Over 80% of private foreign direct investment to the developing world is directed to just 10 countries, all in Asia and Latin America. China alone accounted for USD 27.5 billion in 1993. Nevertheless, the external debt burden of developing countries has grown nine times since 1970 to USD 1 945 billion, with debt service amounting to USD 199 billion, more than

double the total flows of development assistance. Sub-Saharan Africa is particularly badly affected from a continuing lack of private finance. Its debt burden is more than 10% of Africa's annual output of goods and services (*Vital Signs*, ibid.).

[17] Since the Earth Summit in Rio in 1992 (UNCED) industrialized countries have not increased development assistance to support sustainable development in the South. The UNCED secretariat had estimated that a quarter of the total USD 600 billion required each year in public expenditure in developing countries to implement the Agenda 21 action programme should come in the form of concessional funding from the North. At USD 125 billion this would have been more than double aid flows in 1992 of USD 61 billion. In reality, aid flows have declined since then as a result of fiscal retrenchment in the North. They now stand at perhaps the lowest level in real terms for 20 years. Eight EU Member States now provide less aid than in 1992, although aid from the EC itself has grown slightly, largely due to multiannual financing agreements. The drive to low deficit or balanced budgets in both the EU and the USA is likely to ensure that public aid flows will continue to stay flat or decline further in the foreseeable future.

[18] New financial instruments are being proposed as a way of overcoming constraints to traditional aid finance, including demilitarization funds, pollution taxes and taxing foreign exchange speculation. Thus, putting a price on scarce 'environmental space' (such as a global cap on greenhouse gas emissions) could lead to a very significant transfer of resources from rich to poor nations, as industrial polluters who currently emit the most buy permits from the developing world. Some estimates suggest USD 500 billion to USD 1 trillion could be raised in this way each year (UNDP, 1994). A solution which would require less consensus at a global level would be the spread of 'joint implementation' projects for global conventions (starting with climate), which could accelerate investments in developing countries while cutting pollution (Heller, 1996). The idea of taxing foreign currency flows, first proposed by Nobel Laureate James Tobin in 1978, has been revived, notably by the late French President François Mitterand at the 1994 Copenhagen Social Summit. Some analysts argue that a 0.5% tax could raise global revenues of USD 1.5 trillion each year (UNDP, 1994).

[19] There is also growing experimentation with local currency schemes to enable communities to mobilize new resources for development. Over 300 communities in Europe are using local exchange trading systems (LETs), which provide a computer-based system for facilitating trade, using either the national unit or time as the unit of measurement (Douthwaite, 1996). Others are proposing different services (CEC, 1993a; *Europe 99*, 1993).

3.2.2. The social dimension

Population

[20] World population grew from 3.7 billion in 1970 to 5.7 billion in 1995, and continues to expand by some 87 million each year, although the growth rate is slowly declining (ICPQL, 1996). The EU's population stood at 370 million in 1994, approximately 6.5% of total world population, down from about 9.5% in 1970 (Eurostat, ibid.). Births per woman in the EU, at approximately 1.4, are at an all time low. At present the equivalent of the EU's population is added to the world total every 4 years and 3 months. Looking ahead 20 years, UN population projections range from a low of 7.10 billion people in 2015 to a high of 7.83 billion, a difference of some 720 million (UNFPA, 1996). All but 1% of future population growth will be concentrated in today's developing countries, and no less than two thirds of this will occur in two regions, Africa and South Asia (ICPQL, 1996). For the EU, Eurostat estimates that by 2020, the current EU could hold only 5% of the world's people, with a low scenario of 360 million (fewer than today) and a high scenario of 422 million people.

[21] One consequence of this growth in population will be an expansion of the global workforce from 2.5 billion to 3.7 billion people (International Labour Organization — ILO). However, neither the developed or developing countries have been able to create jobs in line with either economic or population growth: thus, while the global economy will have doubled in size between 1975 and 2000, employment growth will have increased by less than half (UNDP, 1993). In the EU, over the past decade, unemployment levels have remained high between 8 and 11% of the workforce. As part of the Delors White Paper on growth, competitiveness and employment, the European Commission suggested a target of creating 15 million jobs by 2000, and has subsequently proposed a European pact of confidence for employment (CEC, 1993a; CEC, 1996b).

[22] The world population is also ageing, with the most rapid changes occurring in the developing world, where the population over 65 may quadruple over the next 30 years to around 1.2 billion (WRI, ibid.). In the EU itself, the proportion of inhabitants under 20 has fallen from a third to under a quarter between 1970 and 1995, while the proportion over 60 has grown from 17.5 to 20.4%. These trends are projected to continue so that by 2020, older people in the Union will account for 25% of the total and young people will fall to 21.6% (Eurostat, ibid.).

Box 2 The Mediterranean context

1987). But, despite a doubling in total global income, the numbers of people worldwide living in poverty has continued to rise over the past three decades from 944 million in 1970 to 1.3 billion in 1994 (ICPQL, ibid.): 905 million adults remain illiterate, and 120 million children do not go to primary school. 1 000 million people do not have basic health services. 1.3 billion do not have clean water. 1.9 billion are without rudimentary sanitation. 780 million are chronically undernourished. 120 million people are officially unemployed, and a further 600-700 million are under-employed.

[25] Inequality between rich and poor more

the UNDP has estimated that if all unpaid activities were charged at market rates then they would be equivalent to USD 16 billion annually, equivalent to some 70% of global monetary output.

Box 4 — Relaunching the North-South agenda

To relaunch the flagging development agenda, the Development Assistance Committee of the OECD has proposed the following 'ambitious but realizable goals' for shaping the 21st century (OECD, 1996):

- A reduction by one-half in the proportion of people living in extreme poverty by 2015;
- Universal primary education in all countries by 2015;
- Demonstrated progress towards gender equality and the empowerment of women by eliminating disparities in primary and secondary education by 2005;
- A reduction by two thirds in the infant mortality rates and a reduction by three quarters in maternal mortality, all by 2015;
- Access through the primary health-care system to reproductive health services for all individuals as soon as possible and no later than 2015;
- Implementation of national strategies for sustainable development by 2005, to ensure that current trends in the loss of environmental resources — forests, fisheries, freshwater, climate, soils, biodiversity, stratospheric ozone, hazardous substances — are effectively reversed at both global and national levels by 2015.

3.2.3. The political and institutional dimension

Global governance

[27] The world political system has undergone revolutionary changes, perhaps most notably the collapse of centrally-planned communism in the former Soviet Union and Central and Eastern Europe. The last fragments of European colonialism are disappearing, notably with the fall of the apartheid regime in South Africa and the transfer of Hong Kong to China in 1997. The era of Third World commodity power has come and gone, but new regions have risen to global prominence, notably the countries of East Asia.

[28] But the potential changes may offer for a more cohesive approach to global governance has not yet been realized. The United Nations system is in crisis, facing huge financial problems, with a deficit of USD 3.25 billion, of which USD 1.3 billion is owed by the USA. The UN also faces an urgent need to reform itself to respond to new challenges to world security, and the rise of rival decision-making bodies at the global and regional levels, notably the Group of 7 club of rich nations, first established in 1975. As UNCED demonstrated, the exclusive nature of government-to-government diplomacy is under challenge as new actors rise to prominence in global affairs, notably multinational corporations and non-governmental organisations.

[29] The Commission on Global Governance, chaired by Ingvar Carlsson, has proposed a number of reforms to reform international relations, including:

- **Ethics**: A global civil ethic is needed to underpin a common commitment to core values;
- **Security**: The conception of security should be broadened from State interest to that of people and the planet, with a new right of petition by non-State actors to bring situations endangering people to the attention of the Security Council;
- **Economics**: An Economic Security Council should be formed to provide global leadership that would be more representative than the G-7 and the Bretton Woods Institutions and more effective than the UN.
- **UN Reform**: Replacing the existing permanent members (Britain, China, France, Russia and the USA) with a panel of five members, two from the industrialized world and one each from Africa, Asia and Latin America. Also introducing an annual Forum of Civil Society alongside the General Assembly representing States (CGG, 1995).

Box 5 — Competing scenarios of global governance

In 1995, the Group of Lisbon, bringing together 19 international thinkers, produced a wide-ranging analysis of future trends in a globalizing world. They were highly critical of trends they saw as leading to a world dominated by a new ideology of competitiveness. The future was viewed along two alternative axes: first, the degree of global governance by either the market or cooperative mechanisms; and second, the intensity of global integration set against tendencies for localism and fragmentation (Lisbon, 1993). From this, six competing scenarios of the world in 2010 were produced, the first three driven by fragmentation and the next three by integration:

1. **Apartheid:** The highly developed regions and countries effectively de-link from the rest of the world, setting up an economic and cultural wall between rich and poor. Prosperity will drive from de-materialized growth and new information infrastructures, and policy will be driven by the need to develop national pacts between businesses, labour and governments to achieve international competitiveness. (The participants thought there was a low degree of probability to this outcome.)
2. **Survival**: Global fragmentation takes place in a context of a privatized and deregulated market economy, and each enterprise, city, region and social group focuses on survival and the promotion of self-interest through zero-sum competition. (The participants thought this scenario was largely unfolding, with a fairly high probability of becoming dominant in 20 years.)
3. **Pax Triadica:** The global order fragments, but within a relatively stable regime controlled by the rich triad of North America, Europe and East Asia. A tacit and explicit consensus will exist among the triad to co-govern the world to ensure political stability and socioeconomic development. Cold War competition between blocs will be replaced by mobilization of science and technology for civilian applications and limited trade wars. (The participants thought many of the elements for this scenario were already at work, for instance, the G7.)
4. **Sustainable global integration:** Principles of global commons, human solidarity, wealth sharing, social and environmental accountability, dialogue of cultures are translated into daily life at the company, city, national and international levels. Global problems require new rules and institutions. The imperative of the free market is replaced by the imperative of a socially and environmentally accountable cooperative economy. (The participants thought the probability of this scenario occurring in the next 20 years was extremely low).
5. **Regionalized global system:** An integrated world economy is based on two-tiered cooperation, through regional trade agreements (e.g. EU, NAFTA, APEC, Euro-Med, Mercosur, etc.) and planetary coordination amongst these regions: this will lead to a reorganization of the UN system. (The participants thought the world was moving in this direction as far as regional integration is concerned, but the UN structures have yet to adjust.)
6. **Gattist**: A single integrated economy is established at the global level, mirroring the EU's common market, and mirroring the full realization of the principles of GATT and the WTO. There will be free circulation of goods, services, capital and people, and a radical shake-up of present national and regional banking, insurance, monetary, fiscal, agriculture and competition policies. (The participants thought this was rather unlikely within the next 20 years.)

European governance

[30] At the European level, the European Economic Community has been transformed since 1970 from a limited free trade zone of 6 Member States to a 15 member European Union, with a comprehensive mandate and increasingly complex institutional structures. Further enlargement to the East and South is projected for the years ahead, including the Associated Countries of Poland, Hungary, the Czech Republic, Slovakia, Romania, Bulgaria, Latvia, Lithuania, Estonia and Slovenia, along with Cyprus and Malta. The 1996 Intergovernmental Conference is aimed at reforming the current EU structures to make them more effective and bring them closer to EU citizens.

[31] Strengthening environmental policy is one way in which the Union could better respond to the 'pressure being brought by public opinion for greater respect for the limits imposed by the environment and sustainable development' (Reflex, 1995). The Commission has suggested that this goal could be achieved in two ways: stressing the citizen's right to a healthy environment, and integrating environmental requirements into other parts of the Treaty (CEC,1996d). The European Parliament has gone further, urging the inclusion of environmental objectives as part of the mission of the Union, calling for environmental protection requirements to be given priority over the principle of free movement of goods and freedom of imports, and stressing the right of Member States to introduce more stringent national standards (EP,1996). A coalition of six environmental organizations has called for sustainable development to be made the paramount objective of the Union, for the environment to be integrated into all other policy areas and for the democratic deficit to be removed from the EU's institutional structure (CNE, EEB, T&E, FOEE, Greenpeace International, WWF, 1995).

Box 6 — The Consultative Forum and the Intergovernmental Conference

The Forum stated that the environmental dimension should lie at the very core of the evolution of the European Union and that making clear that sustainable development is one of the main objectives of the Union is an obligation that follows from these commitments. The Forum put forward amendments to the text of the treaty of the Single European Act.

3.2.4. The environmental dimension

[32] Global environmental action has been transformed since 1970 from almost non-existence to an increasingly extensive system of soft and hard law, reflected in over 100 international environmental agreements, institutional change within the UN and Bretton Woods system and numerous action plans, most notably Agenda 21 agreed at the second world summit on environment and development at Rio in June 1992. Nevertheless, these actions have not yet managed to change significantly the course of key economic and social trends that continue to lead towards long-term unsustainability. Thus, the preamble to Agenda 21 states that: 'we are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill-health and illiteracy and the continuing deterioration of the ecosystems on which we depend for our well-being' (UNCED, 1992).

[33] The EU has become an important driver of environmental policy both for its Member States and internationally. Over the past 20 years, over 200 binding pieces of environmental legislation have been agreed at the EU level. More recently, the fifth environmental action programme represents a significant evolution in recent years towards a more strategic approach to promoting the environmental dimension as part of overall sustainable development for the Union, focusing on target sectors, key environmental themes and a broadening of the range of policy instruments (CEC, 1993a).

[34] Nevertheless, the European Environment Agency's 1995 *Review of the fifth programme* concluded that 'without accelerated policies, pressures on the environment will continue to exceed human health standards and often limited carrying capacity of the environment. Actions taken to date will not lead to full integration of environmental considerations in economic sectors or to sustainable development' (EEA, 1995). Since the late 1980s, a number of attempts have been made to grapple with long-term trends in Europe, and suggest the consequences of taking the necessary action to achieve sustainable development. These include:

[35] **A. The European common garden** (1992): As part of the East-West Interparliamentary Meeting in May 1992, RIVM prepared two contrasting scenarios of the pan-European environment in 2010, first an extrapolation of current trends (GLOBE I) and second, a full implementation of best available technologies (GLOBE II) (Sesimbra, 1993). The scenarios model different environmental outcomes against a backdrop of forecasts for global and regional economic growth, population, energy consumption, transport and land use, and produce estimates of the costs of different environmental options. Forecasts were produced for a range of conventional environmental issues, such as climate change, ozone depletion, low-level smog, radioactivity, acidification, pollution of soil and groundwater, rivers and seas, health and ecosystems. Although GLOBE II demonstrates that cost-effective environmental improvements can be made within the existing growth-oriented economic model, it does not, however, guarantee 'sustainability'. For example, GLOBE II leads to reduced carbon dioxide emissions of about 10%, but does not achieve the Toronto goals for climate change of a 20% cut by 2000.

[36] **B. Benefits of integration** (1994): A consortium of research organizations was contracted by the European Commission to assess the economic impact of the fifth environmental action programme in the existing European Union in 2010 (DRI, et al., 1994). Three scenarios were established, following a similar approach to RIVM, modelling a projection of 'business as usual' trends (the REF Scenario), the implementation of policies in the pipeline (the PIP scenario), and the integration of environmental and economic policies, largely through changes in fiscal policies, on the model presented by the fifth programme (INT). Forecasts of economic growth and sectoral activities are again related to key environmental parameters, such as climate change, acidification, toxic substances, biodiversity, water quality, water resources, waste, the urban environment and coastal zones. Results similar to GLOBE II emerge from the RIVM exercise. The REF scenario not surprisingly leads to a substantial deterioration of the environment; the PIP scenario, significant environmental benefits, but at a cost of lower GDP than in the REF; the INT reduces pressure on the environment and achieves slightly higher annual growth rates (2.2% compared with 2.15% under the REF and 2.1% under the PIP scenarios). Again, however, these improvements are not sufficient to achieve 'sustainability', with CO_2 emissions under the INT scenario 5% higher in 2010 than 1990, largely due to growing transport volumes.

[37] **C. Sustainable Europe** (1996): Building on the *Action plan: Sustainable Netherlands,* published in 1992, Friends of the Earth Europe have launched a Sustainable Europe campaign, which involves the creation of a pan-European scenario for 2010 (FOEE, 1996). The approach taken by Friends of the Earth Europe

differs markedly from both the RIVM and DRI studies: first, no macro- or sectoral economic modelling is involved; and second, the scenario is designed to demonstrate what is needed to achieve sustainability, based on the concept of 'environmental space'.

Box 7 — Long-range scenarios for climate change policy analysis

The International Petroleum Industry Environmental Conservation Association (IPIECA) held a workshop in early 1996 to explore the use of scenarios for developing policy options to address climate change (IPIECA, 1996). IPIECA identified a 'cycle of uncertainty', comprising six components, all subject to varying degrees of uncertainty, which made scenarios a potentially useful tool for policy analysis. The six areas of uncertainty included: the primary effects of climate change; the impacts on ecosystems; impacts on socioeconomic systems; the policy response; levels of greenhouse gas emissions; and greenhouse gas concentrations.

The workshop found that scenarios for policy analysis must be built in a fashion that allows assessment of the environmental and socioeconomic consequences, not only of climate change, but also of climate change policies on factors such as economic growth, employment, trade, energy security, investment, tax policy and the role of national and international institutions. Although IPIECA has not developed its own set of scenarios of climate futures, it found that scenarios can be useful for investigating uncertainty and its consequences for decision-making, using the following criteria and principles:

- The purpose of the scenarios must be defined;
- Scenarios should not be confused with forecasts;
- Scenarios must address all the major elements and key uncertainties;
- Scenarios must be plausible and internally consistent in ways which can be validated;
- Assumptions, component relationships and input values must be transparent;
- The legitimacy and credentials of the originators must be apparent;
- Outputs from scenarios must be effectively communicated;
- Scenarios and models have complementary functions.

3.3. Sectoral issues

3.3.1. Industry and technology

[38] The European Union is the world's leading centre for industrial production. Although industrial production grew at a steady rate through the 1980s, employment fell by a fifth. Furthermore, with the rise of the service sector, industry now accounts for only a quarter of EU GDP (Eurostat, 1995). Structural changes in Europe's economy have resulted in a shift away from heavy industry with high rates of resource use and pollution to light consumer industries with much lower environmental impacts. As a result, over the past two decades, the industrial sector has steadily cut its levels of pollution and rates of resource use: energy use per unit of output has fallen by about 20% and material use per unit has fallen by 50% (EEA, 1995b). Looking ahead, these trends appear set to continue with the office and electronic data-processing sub-sectors projected to benefit from fast demand growth during the rest of the 1990s. In general, those sectors known to have important damaging effects on the environment — such as metals, textiles and cement branches — are located towards the lower end of the growth spectrum; the notable exceptions are plastics, rubber, pulp and paper, which are likely to see above average growth (DRI, et al., 1994).

[39] Europe could thus emulate the switch that has taken place in the USA, whereby 'information age' expenditure on telecommunications and data processing has now overtaken 'industrial age' spending on manufacturing equipment and products (IPIECA, 1996). The information and communications revolution could accelerate the general trend within advanced economies to use fewer resources per unit of output. One 'optimists' scenario for 2010 thus suggests that there will be a 30% substitution of physical transport by telecommunications, stabilizing transport use of 2000 levels despite a 50% growth in world trade (Johnston and Pestel, 1995). More broadly, there is growing evidence of a possible merger between environmental goals and technological innovation (Fussler, 1996). There are now growing numbers of examples of products which provide services with decisively fewer materials and less energy on a life cycle basis. These include laser printers that are more efficient per printed sheet by a factor of 15 than ink jets, and modern cars providing the same service with a factor of 10 less material intensity (von Weizsäcker, 1995).

[40] Opinion is divided, however, on the policy environment required to stimulate these technological changes, and ensure that they serve sustainable development. One line of thinking argues that governments cannot impose this innovation or legislate for the information revolution. Rather they need to develop a framework of cooperation with businesses, public authorities and NGOs to develop a sense of common purpose linking the information society with the goals of sustainable de-

velopment (Johnston and Pestel, ibid.). Others argue that institutional constraints and vested interests against these positive trends remain formidable. One tool for tackling these bottlenecks would be ecological tax reform to increase the price of resources and consequently reduce the cost of labour (Schmidt-Bleek,1996). Another is to increase the corporate accountability for the environmental performance of their processes and products. This could involve the introduction of mandatory environmental management systems and reporting (EPE, 1996).

3.3.2. Transport

Trends in use and impacts

[41] The transport services industry in the EU generated approximately 4% of the EU's GDP between 1980 and 1990 and employed roughly 4.5% of the workforce (*Economist*, 1996). It also imposed heavy environmental and social costs on Europe, accounting for nearly 70% of CO, approximately 60% of NO_x, 50% of VOCs and 10% of SO_2 emitted in the EU (*Economist*, 1996). European transport is responsible for the deaths of 60 000 people each year (Short, 1994) and the European Commission has estimated that crowded roads impose costs equivalent to 2% of GDP. The total external costs of transport are likely to be far higher; estimates from the USA for the external costs of cars range from 5.3% of GDP to 12% (*Economist*, 1996).

[42] Hence, increasing transport efficiency and reducing the negative impacts of transport will continue to be major issues in Europe far into the 21st century. Over the last 20 years road transport use, particularly the use of the private car, has increased far faster than any other mode. Passenger car use (measured in vehicle-kilometres) approximately doubled between 1970 and 1990 whilst goods vehicles increased by 80% and buses and coaches by 60% (Eurostat, 1995). In 1992, road transport in the EU 15 accounted for 79% of passenger-kilometres (3 296 thousand million pass-km), 70% of freight in tonnes-kilometres (DG VII) and the majority of transport-related pollution (*Economist*, 1996).

[43] Governments have invested heavily in road networks; the length of motorways has doubled over the past 20 years whilst the railway network has only increased by 8% (Eurostat, 1995). By 2010 the number of cars in the EU is predicted to be 167 million or 503 cars per 1 000 inhabitants, compared to 381 per 1 000 in 1992 (CEC, 1992). In countries with a much lower base of car ownership — India has two cars per 1 000 inhabitants, China only one (Heierli, 1995) — demand is rising much more quickly. Globally the number of cars in the world has risen five times faster than the population over the last 20 years and by 2020 it is estimated that the number of cars on the road will be approaching 1 billion (*Economist*, 1996).

[44] The share of final energy consumption accounted for by transport in the EU rose from about 20% in 1970 to 30% in the early 1990s; over the same period industry's share has fallen. More than 83% of this is accounted for by road vehicles; although the fuel efficiency of vehicles has increased, the benefits have been offset by increasing vehicle ownership and use (Eurostat, 1995).

[45] Air travel also continues to rise across the world, particularly in Europe, where demand rose 6.8% in 1995, and Asia-Pacific. Demand is predicted to double in volume terms by the year 2000 although there are already serious constraints in terms of airport capacity, particularly in Europe (Commerzbank, 1996).

[46] The transport equipment industry is one of the EU's principal industrial sectors, second only in terms of turnover, to the food industry. Motor vehicles account for over three quarters of the sector's output, followed by the aerospace industry which accounts for 14% (CEC, 1993).

[47] Concern about the environmental, health and social impacts of increasing demand for transport has grown dramatically in recent years. Most European countries have already introduced policies which require or promote use of cleaner technologies and individual countries and companies as well as the EU itself (e.g. 'Car of tomorrow' programme) are investing in research and development. Although many of these policies have been successful, for example emissions of VOCs, NO_x and CO are falling in some Member States due to the introduction of catalytic converters and energy efficiency per vehicle per km has increased, these benefits are likely to be overwhelmed by increasing vehicle ownership and use.

[48] There is much research going into the development of alternatives to the petrol driven car. The main focus for the future is on electric or hydrogen powered vehicles or hybrids, which supplement electrical energy stored in batteries with other sources of power. The general consensus amongst the car industry and academics is that the internal combustion engine

will go on propelling most cars until at least 2025, although battery driven electric vehicles, fuel cells and hybrids will play an increasingly important role (*Economist*, 1996).

[49] The next 25 years are also likely to see increasing use of information technology in traffic management. Telematics could lead to smarter vehicles which could react to changes in traffic conditions. IT could be used to reduce or restrict car use by measuring individual journey length and pollution emitted and charging accordingly (*Economist*, 1996).

[50] Driving is likely to become increasingly expensive and difficult in the future. Initiatives which are currently in operation around the EU or are being considered include raising parking charges, charging for individual journeys and the introduction of fuel and/or carbon taxes. Road pricing has already been introduced in several countries and the Netherlands is planning to introduce it on key routes in the Randstad by 2000 (*Economist*, 1996).

Key issues

[51] The main issues influencing attitudes towards policy that are likely to be important in future transport policy include the following.

[52] **Pollution**: Local impacts from, NO_x, SO_x, VOCs, Pb and particulates. Health impacts are an increasing cause of concern and are leading to local action against the car in some places. The health impact of pollution may be one of the key triggers in changing attitudes towards cars. The contribution to greenhouse gas emissions from transport are a source of growing concern as the proportion accounted for by transport rises and global vehicle use continues to increase rapidly. This is likely to become an increasingly important factor in the transport debate.

[53] **Social effects of current transportation**: There are different interpretations as to the social impacts of transport, particularly in terms of dependence on the car and the effect of this on communities, which calls for a different policy prescription. Most people recognize the impacts of congestion but there is much debate about how much potential there is to increase efficiency and what is the best way of doing this.

[54] **The extent to which behaviour changes are needed**: Should the focus be on developing an efficient and competitive transport system based on cleaner vehicles and other technical improvements or does a sustainable society require radical changes in land-use planning and behaviour to reduce our dependence on the car?

[55] **Role of government in influencing transport**: How much of a role should government have in transport policy, at what level (regional, EU, national) and what type of policies should be used (incentives, regulations, economic instruments, curbs on the use of vehicles).

[56] Overall, the key dilemma is how to reconcile efficient and competitive transport networks vital for a healthy economy while reducing the social and environmental costs of transport.

Options for change

Technology and innovation

[57] Existing and potential uses of technology range from developing cleaner versions of existing vehicles or developing alternatives to using it to reduce or restrict vehicle use.

(a) **Cleaner, lower emitting internal combustion engines** (e.g. catalytic converters, unleaded petrol, clean-burn engines, increasing fuel efficiency).

(b) **Alternative fuels and vehicles** (e.g. methanol and ethanol fuelled engines, electric, hybrid and fuel cell powered vehicles; redesign of vehicles — for example the use of composites — to reduce the power required).

(c) **Information technology** (e.g. telematics, smart cards for road pricing, navigational aids).

[58] The general consensus amongst the car industry and academics appears to be that the internal combustion engine will go on propelling most cars for at least the next 30 years, although alternatives such as battery driven electric vehicles, fuel cells and hybrids are likely to play an increasingly important role. During this period some petrol cars may be replaced by small electric town cars and around 2010, fuel cell cars becoming more realistic, the electric vehicle is unlikely to be viable before 2025 (*Economist*, 1996).

Policy and institutional challenges

[59] The policies favoured and the speed with which changes are brought in depend on the attitudes of citizens and governments, firstly

towards the costs and benefits of current use and trends in transport and secondly towards the extent to which technical solutions can lead to substantial improvements. Options include:

(a) **Increasing the cost of driving**: This can be done by increasing fuel taxes, carbon taxes, road pricing, pollution charges using smart cards, and increasing parking charges. There is much interest in road pricing, which is being introduced in several countries. Three large cities in Norway have road charging systems and the Netherlands is planning to introduce it on key routes in the Randstad by 2000.

(b) **Restricting traffic use**: From certain areas, at certain times, banning particularly polluting vehicles. Several cities already ban petrol vehicles from their centres and other cities, towns and protected areas restrict the number or type of vehicles allowed into them at certain times.

[60] Other options include:

(c) **Incentives/support for less polluting vehicles** such as cleaner vehicles, public transport.

(d) **Rethinking land-use planning** to reduce dependence on the car.

(e) **Enhanced investment** in technology and IT to improve efficiency.

3.3.3. Energy

Current energy consumption

[61] Energy consumption has been rising for the last two decades and reached 326 exajoules (or about 157 million barrels of oil) in 1993, 49% higher than 20 years earlier. OECD countries consumed over half of all commercial energy in 1993 but demand has been rising more slowly here than in other parts of the world. The EU accounts for 17% of global energy demand despite having only 6% of the global population (FOPEE, 1995). The 51 exajoules consumed in the EU in 1991 were divided fairly equally between industry (29%), transport (32%) and household and tertiary sectors (39%) (Eurostat, 1995). Oil accounted for 43.5% of total energy demand, solid fuels for 21%, gas 18%, nuclear 13.5% and renewables for 3.5% (Eurostat, 1995). The EU is heavily dependent on imports from third countries, importing almost half its energy in 1993 (Eurostat, 1995).

[62] Demand has been rising very rapidly in developing countries, trebling since 1973, but from a much lower base, so developing countries still account for less than one third of global energy consumption. Per capita energy use in most developing countries is still very low, on average nine times lower than in developed countries (WRI, 1996).

[63] Concern about the near term adequacy of energy resources has decreased since the 1970s, as estimates of energy resources have increased, for example proved recoverable reserves of natural gas rose 140% over the last 20 years. If energy consumption were to remain constant at current levels it is estimated that proved reserves could supply world oil needs for 40 years, gas for 60 years and coal for 200 years (WRI, 1996).

Key issues

How much will demand increase?

[64] All commentators agree that demand for energy is rising across the world and consumption is likely to rise significantly by 2020 unless radical changes are made. However, estimates as to the likely magnitude of growth vary significantly — see below.

Air pollution

[65] The main cause of concern is CO_2 emissions. Unless major changes are made to energy supply and use, CO_2 emissions are predicted to rise significantly in all areas of the world, including the EU, where most countries are committed to reducing them.

Scale of resources and security of supply

[66] There is no consensus about the scale of fossil fuel resources, with some people arguing that there are still large reserves to be discovered or, that as the more accessible reserves are depleted, it will become more economic to extract fuel from less accessible sources. Other commentators believe that most of the world reserves are now known. A few predict that oil production will peak within the next eight years, whilst others say that this will not happen until 2025. In the EU there is increasing concern about the security of supply as dependence on imports from third, often unstable, countries increases.

The future fuel mix

[67] Whilst some are content to leave this to market forces, others support increased use of natural gas on environmental grounds, whilst others argue that the world should be moving towards a nuclear-free and fossil-fuel free future.

The potential of renewable fuels

[68] Whilst some see these as having little future, others see them as the only future for energy supply. Consequently while some would argue for large investments in R&D and support for their use others see this as unnecessary. There is also much debate about the sustainability and viability of the various renewables.

The extent of potential energy efficiency increases

[69] Some believe that major savings in energy use can be relatively easily achieved but the extent of this and the ease with which energy efficiencies can be improved in developed and developing countries is contested.

Predictions about the future

[70] Many organizations have developed scenarios for future energy consumption, including companies (e.g. Shell, IEPLA), governments (e.g. US), international agencies (e.g. IEA) and non-governmental organizations (e.g. Greenpeace, Friends of the Earth, WEC). The World Resources Institute (1996) compared three sets of predictions about future energy consumption, see table below. The World Energy Council, an international organization promoting the sustainable supply and use of energy, developed four alternative scenarios. Their reference scenario assumes that economic growth will be moderate and progress in improving energy planning, pricing and technology transfer will be good. In the modified reference scenario energy efficiency improvements are assumed to be slower and the high growth scenario assumes a higher rate of economic growth than in the reference scenario. The ecologically driven scenario assumes very high efficiency improvements and a low increase in energy demand from developing countries due to a massive transfer of energy efficient technology.

[71] The International Energy Agency (a sister organization to the OECD) scenarios assume the same population and economic conditions, but in the capacity constraints scenario it is assumed that past patterns of consumption will continue, whereas in the energy savings scenario it assumes that greater improvements in energy efficiency occur through changes in consumer behaviour. The US Department of Energy does not use scenarios but instead shows the range of sensitivity of its predictions.

	WEC scenarios				IEA scenarios		US Dept. of Energy
	High growth	**Modified reference**	**Reference**	**Ecologically driven**	**Capacity constraints**	**Energy savings**	**Reference scenario**
Period	1990-2020	1990-2020	1990-2020	1990-2020	1992-2010	1992-2010	1990-2010
Economic growth	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
OECD	2.4	2.4	2.4	2.4	2.5	2.5	2.3
Former USSR and Central Europe	2.4	2.4	2.4	2.4	2.1	2.1	0.6
Developing countries	5.6	4.6	4.6	4.6	5.3	5.3	2.8-6.1 (varies by region)
World	3.8	3.3	3.3	3.3	3.1	3.1	2.7
% increase in energy consumption over period	98	84	54	30	44	34	22-52
% increase in CO_2 emissions over 1990 levels	93	73	42	5	42	30	26-47

Source: WRI, 1996.

[72] The EU recently developed its own set of scenarios where three alternative views of the future, battlefield (a world of isolationism, power blocks and protectionism), forum (a world of growing consensus and cooperative international structures with a strong role for public administrations and intervention) and hypermarket (a world where the market rules and liberalization and privatization deliver results) were contrasted with the traditional economic view denoted by the conventional wisdom scenario (CEC, 1995).

[73] Despite the different assumptions, all scenarios predicted a continued steady growth in world energy demand (around 2% per annum on average). In the EU decreasing energy intensity keeps growth in energy demand to between 0.7-0.9% per year, with natural gas consumption growing fastest, oil growing slowly, and coal and nuclear consumption declining. Although oil is likely to continue to account for the largest proportion of world energy demand its growth rate is below that of gas which is predicted to grow at up to 2.7% per annum, with both environmental and commercial advantages. Renewable energy is expected to grow at around 2% per year or more, while nuclear energy declines, its advantages in terms of CO_2 emissions outweighed by safety concerns.

[74] EU production of non-renewable energy (i.e. fossil fuels) is predicted to decline by about 20% by 2020 and so import dependency rises from current levels of 48% to between 55 and 70%. The predictions are relatively optimistic about the growth in renewables which increase threefold under the conventional wisdom scenario and could grow at almost 5% in the forum scenario. Despite this only the forum scenario resulted in reduced CO_2 emissions over the long term (due to a major shift to renewables and nuclear), with all the others showing substantial increases over 1990 levels in both the EU and the world as a whole.

[75] The above scenarios and predictions raise some important points. All organizations predict very substantial increases in energy consumption, around 50% by 2020 unless radical changes occur. All see energy consumption in the EU as growing at a slower rate than almost anywhere else in the world, but per capita consumption remaining very high despite increases in energy efficiency. The transport sector is the major single contributor to incremental growth in final energy demand and CO_2 emissions (CEC, 1995). It is clear that that CO_2 emissions will continue to increase unless there are serious changes in energy supply and demand.

[76] Several groups have analysed what would be required to reduce CO_2 emissions to below 1990 levels and meet their vision of sustainable energy production and use. Greenpeace commissioned the Stockholm Environmental Institute to develop an energy scenario which would meet long-term targets for phasing out nuclear energy by 2010 and fossil fuels by 2100. In this scenario about 28% of primary energy consumption would be based on renewables by 2010 and 60% by 2030, cutting CO_2 emissions by about 50% by 2020 and reducing them to zero by 2100. To achieve this would require an increase in the amount of gas used in the short term and a massive development of biomass, solar, hydrogen and hydro-powered energy systems.

[77] The Friends of the Earth 'Towards a sustainable Europe' study considers the most important energy-related problem to be its contribution to the greenhouse effect and to quantify the environmental space accordingly. They calculate that to meet IPCC targets, maximum per capita CO_2 emissions should be 2 tonnes per year which would have to be reduced to 1.7 tonnes per year by 2050 to take population increases into account. Current annual global per capita CO_2 emissions are about 4 tonnes and the average for Europe is 7.3 tonnes. Friends of the Earth consider the feasibility of the uptake of renewable resources envisaged in the Greenpeace scenarios to be overestimated and suggest that greater improvements in energy use could reduce the magnitude of renewables required.

3.3.4. Agriculture and rural development

Trends

[78] Global food output has been increasing at an average rate of 2.3% per year over the last 20 years. In Europe, as in many other parts of the world, farmers have been remarkably successful at increasing food production. In the UK, wheat yields have increased from an average of 2.1 t/ha to 7 t/ha and milk yields from about 11 pints per day to 25 pints per day per cow (Pretty

and Howes, 1993). However, around 800 million people are undernourished today and the Food and Agriculture Organization predict the global annual growth in food output will decrease to 1.8% per year, although this will still be above the rate of population growth (FAO, 1993).

[79] Agriculture currently accounts for 2.5% of European Union GDP and employs 6% of the workforce. It plays a much larger role in the Central and Eastern European countries which are likely to join the EU in the near future, where it accounts for 8% of GDP and employs 25% of the workforce (CEC, 1995b). Many of these countries also have serious agricultural related environmental problems. The common agricultural policy of the European Union which was conceived initially for six Member States in a general food deficit situation has become increasingly complicated, expensive and controversial, accounting for over half the total EU budget and leading to major production surpluses (WWF, 1996). Another major criticism is that its original form did not take the environment, nature or landscape into account and efforts to introduce environmental initiatives subsequently have led to conflicting instruments and incentives. In 1992, the Mac Sharry reforms were introduced, which began to de-link payments from production levels and it is likely that this trend will continue.

Concerns and issues

[80] **Can global food output feed the population in the year 2020?** There are very divergent views as to whether or not this is possible, depending on the assumptions that are made about population (for example Winrock International predict that the population will reach 7.8 billion by 2035 and then decrease, whilst the 'State of the world population' report estimates that the number of people in the world could reach 12.5 billion by 2050), environmental degradation, technological advances and the extent of potential yield increases with low and high use of external inputs.

[81] **What is sustainable agriculture?** Views on this range from those who believe agriculture can only be sustainable if it is entirely organic or that sustainable agriculture is low input agriculture suited to local conditions, through to those who believe that agriculture will only be sustainable if high external inputs and biotechnology are used in order to meet growing global demand (see box).

Box 8 — What is sustainable agriculture? Five schools of thought

'Environmental pessimists'

The world is approaching or has passed the ecological limits to growth. Populations are too high, yield growth has slowed and will continue to slow and may fall, new technological breakthroughs are unlikely and large areas have become too degraded for recovery, dietary shifts towards increasing consumption of meat are an emerging threat since this increases the amount of cereal required. Hence if the world is to be able to feed itself, population control should be the first priority (see Brown, 1994, CGIAR, 1994, Kendall and Pimentel, 1994, Brown and Kane, 1994, Ehrlich, 1968).

'Business as usual optimists'

Supply will always be able to meet increasing demand through innovations in biotechnology and an expansion in the area of land under cultivation. Population growth will slow and the South will substantially increase food imports from the North (see Rosegrant and Agacaolli, 1994, Mitchell and Ingco, 1993, FAO, 1993, Crosson and Anderson 1995).

'Industrialized world to the rescue'

Most countries in the South will never be able to feed themselves for a variety of ecological, institutional and infrastructural reasons and so the looming food gap will have to be filled by modernized agriculture in the North. By increasing production in large mechanized operations, this will allow smaller and more 'marginal' farmers to go out of business, so taking pressure off natural resources which can be conserved in protected areas. These large producers will then be able to trade their food with those who need it, or have it distributed by famine relief and food aid. Any adverse health and environmental consequences of this type of farming is minor compared to that wrought by the expansion into new lands (see Avery, 1995, Wirth, 1995, Dow Elanco, 1994, Carruthers, 1993, Knutson, et al. 1990).

'New modernists'

Yield increases can be achieved through high-external input farming i.e. increased use of fertilisers and pesticides, either on existing 'Green revolution' land or on other high potential areas which will keep the pressure off natural habitats. High inputs are essential if increases in output are to be achieved (see Borlaug, 1992, 1994, Sasakawa Global 2000, 1994, World Bank, 1994, Waggoner, 1994, Paarlberg, 1994, Winrock International, 1994, Crosson and Anderson, 1995).

'Sustainable intensification'

Increases in yield and protection or regeneration of natural resources are possible in currently unimproved or degraded areas through low input agriculture which integrates a wide range of pest, nutrient and soil and water management techniques, so long as farmers participate in all stages of technological development and extension since productivity is as much a function of human capacity and ingenuity as it is of biological processes. It aims for an increased diversity of enterprises as natural processes increasingly substitute for external inputs so the impact on the environment is reduced (see Pretty, 1995, Thompson, 1995, Roling and Wagemakers, 1996).

[82] **The role of European agriculture in a global market.** Should the focus be on farming in a way that meets local needs and plays a key role in the community or is it essential that Europe produces surpluses in order to feed those parts of the world which have food deficits? Should all subsidies be removed so that European prices are reduced to world market levels or not?

[83] **The extent to which the social and environmental role of agriculture should be considered.** While some view agriculture as just another economic sector, others see it as a key to rural development, local communities and the management of the countryside.

[84] **How to reform the CAP.** There is little disagreement about the need to reform the CAP but there are widely divergent views on how this should be done. These range from removing all payments to make EU agriculture competitive on the world market even if this results in many farms going out of business, to the view that payments for social and environmental benefits should be vastly increased.

Box 9 — Consultative Forum — Recommendations for sustainable rural development

- Agriculture must be economically viable over the long term;
- Sustainability should be achieved through interaction of environmental, agricultural, transport, energy and consumption policies;
- The basic obligations of agriculture towards the environment must be negotiated and clearly determined;
- Additional environmental services provided by agriculture must be enforced and developed on identified economic resources;
- European policy must show clear and consistent signals to agriculture;
- European policy should offer possibilities of evolution for farming systems.

3.3.5. Consumption and production patterns

[85] It was the June 1992 Earth Summit which placed consumption once again onto the international environment and development policy agenda. Growing out of increasing 'green consumer' concerns, research and negotiations leading up to the Rio Summit resulted in the judgment contained in the Agenda 21 action plan that 'the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries, aggravating poverty and imbalances' (UNCED, 1992). The Earth Summit highlighted the deep divisions in consumption and pollution between North and South, whereby the 20% of the world's population in the rich 'North' account for 50-90% of consumption and pollution. The disparity between benchmark countries such as the USA and India is even more extreme: the average US citizen consumes 227 times as much gasoline and 115 times as much paper as the average Indian (Parikh, et al., 1991). Developed countries were called upon to take the lead in achieving sustainable consumption.[1]

[86] Since the Earth Summit, governments, businesses, environmental organizations and research institutes have worked at the international level to develop a shared understanding of what is required to achieve sustainable consumption. The 1994 Oslo Symposium hosted by Norway's Ministry of the Environment produced a working definition of sustainable consumption as: 'the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations' (Oslo I, 1994).

[87] Two broad visions of sustainable consumption have emerged to make this definition operational: eco-efficiency and eco-sufficiency.

[88] **i. Eco-efficiency: more with less.** At the Earth Summit, the business community launched the

[1] Sustainable consumption has been defined as 'the use of services and related products which respond to basic needs and bring better quality of life while minimizing the uses of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or products so as not to jeopardize the needs of future generations'. Two broad visions of sustainable consumption have emerged to make this definition operational.

concept of eco-efficiency, which the BCSD defined as: 'continuously adding value to products and services, while constantly reducing energy and material use, pollution and waste' (Schmidheiny, 1992). This drew on the historical record of market economies to continuously reduce the resources used for each unit of economic output (WCED, 1987). The aim of eco-efficiency is to accelerate this process, by encouraging companies to seek out ways of providing the services that customers demand with reduced resource use and pollution (BCSD, 1993).

[89] Leading business commentators and corporations are now arguing that achieving more value for consumers with less environmental impact translates into economic success (Porter and van der Linde, 1995; Hindle, et al., 1993). Products are being rethought according to new 'design for the environment' (ecodesign) criteria. Dow Europe has identified six main dimensions: de-materialization; energy efficiency; toxic elimination; closed loop recycling; borrowing from natural cycles; and extending service life (Fussler, 1995). Eco-efficiency has also been endorsed by the Environment Ministers of the OECD as 'a highly promising strategy to de-couple pollutant release and resource use from economic activity' (OECD 1996c).

[90] The eco-efficiency strategy does, however, contain risks. Continuing growth in consumption can overwhelm the benefits of eco-efficiency, as the energy and transport sectors demonstrate. Thus, despite the 20% energy efficiency improvement in the OECD over the last two decades, total energy consumption rose by a quarter and carbon dioxide emissions grew by 15% (OECD, 1991). Existing economies of scale and inherited infrastructure can also create inertia that restrain the diffusion of cleaner and more efficient patterns of consumption.

[91] Two strands of eco-efficiency thinking have now emerged. The 'pragmatic' version of eco-efficiency supports an incremental approach whereby improvements are only made where they make market sense. However, there is also a 'radical' definition which defines the rate of improvement according to targets based on an assessment of the ecological and social limits within which future economic activity will have to operate. An example of this strand of thinking is the establishment of the Factor 10 Club of academics, policy-makers and business executives, who have concluded that 'in industrialized countries, the current resource productivity must be increased by a factor of 10 during the next 30 to 50 years as a prerequisite for meeting the goal of long-term global sustainability' (Factor 10 Club,1994).

[92] **ii. Eco-sufficiency: enough for all.** Throughout history, consumption patterns have been subject to ethical critique, usually sanctioned by religious injunctions to control the use of certain materials, foods, drinks or luxury practices. In the secular consumer economies of North America, Europe and East Asia, concern for the environment has largely replaced religion as the principal ethical response to consumption. Indeed Elizabeth Dowdeswell, Executive Director of UNEP has argued that 'ultimately, sustainable consumption is not a scientific or a technical question. It really is first and foremost a question of values'.

[93] Although there is now much greater optimism about the possibility of an eco-efficiency strategy to reduce environmental impacts, concern remains that this will be inadequate to achieve sustainability, requiring a shift towards 'a culture of having enough' (Van Brakel, 1995). While the eco-efficiency strategy is aimed at 'getting the same services out of less material', the complementary eco-sufficiency strategy is geared at 'getting the same (or at least adequate) welfare out of less services', including through an appreciation of simpler lifestyles (Sachs, 1993). This approach reflects the evidence of public opinion surveys in the industrialized world of unease with the social and environmental consequences of current consumption patterns. A 1995 survey of American views on consumption, materialism and the environment found 'an intuitive sense that our propensity for more, more, more is unsustainable' (Merck, 1995).

[94] While many earlier proponents of the eco-sufficiency model emphasized the aspect of sacrifice in terms of 'giving up' valued parts of modern lifestyles, the current emphasis is on stressing the positive aspects of achieving a better quality of life, less dependent on material consumption (ANPED, 1995). The role of designers is expanded from the functional focus on efficiency to include the creation of products offering opportunities for new types of consumer behaviour, which place a premium on care in place of disposability (Manzini, 1993). Some argue that a 'need test' addressing this sufficiency agenda should be introduced to complement the traditional, more environmentally-driven business approach to sustainable consumption (Sustainability, 1995). The flip-side of this ethical

search in industrialized countries for a 'culture of enough' from a position of abundance is the imperative in the developing world of meeting the basic needs of those who continue to live in poverty.

[95] Since Rio, this vision of eco-sufficiency has been powerfully underpinned by range of scenarios built on the concept of 'environmental space', mentioned previously. The concept is based on two main principles: first, an assessment that the global environment is by definition limited and partially quantifiable (the principle of limits); and second, that this 'environmental space' should be shared fairly among the countries of the world on an equal per capita basis (the principle of equity). Starting in the Netherlands, the Friends of the Earth family in Europe has organized a sustainable Europe campaign, in which environmental space is used as the basis for drawing up 30 national sustainability plans (Milieudefensie, 1992; FOEE, 1995). The eco-space approach has since been picked up by a number of European environment ministries, notably in Denmark and the Netherlands, as a framework for strategic policy-making (VROM, 1994; MEE, 1995).

[96] The eco-sufficiency vision also has weaknesses. It relies on the assertion of certain normative values, which are both difficult to universalize in pluralist democratic societies, or to use as a basis for trade-off. Interpretations of equity and fairness in the distribution of goods are deeply political issues, with wide divergence between those arguing for egalitarian solutions and those believing that market outcomes are just.

Box 10 — The Consultative Forum's conclusions on consumption and production patterns

The Consultative Forum has recommended that the EU should play a leadership role in addressing this global problem. At home it should set a good example by encouraging the de-coupling of resource use from continued economic growth and then, as a further step, encourage a reduction in absolute terms. Externally it should assist the developing countries in the difficult task to stabilize their impact on the environment while still achieving their economic growth aspirations. The Forum believes there is wide scope for technology cooperation, sharing best practice and joint implementation.

To achieve these goals a process of target setting is required which consists of two elements:

1. Scientific research: Deliver scientific information about carrying capacity and environmental space;
2. Political process: Choose targets, measurable indicators and related time-frames connected to those mechanisms should be chosen.

The Forum identified nine important principles for sustainable production and six principles for sustainable consumption. It concluded that the responsibility of policy-makers include: clear targets; involvement of all partners; basic research; priority to information, and choosing the right instruments (see Section 4.3.3.).

3.3.6. The urban environment

[97] More than 50% of the world's population will live in urban areas by the end of the century, and 60% by 2020. Cities are centres of economic activity and innovation, as well as politics and culture. But they also ultimately consume most of the natural resources and produce most of the world's pollution and waste (WRI, 1996). Europe is first and foremost an urban region. On average, more than two-thirds of European Union citizens live in urban areas, and this proportion continues to increase. In some Member States, as much as 90% of the population are urban (SCP, 1994).

[98] Cities produce a number of direct environmental problems, notably air pollution, noise, traffic congestion, solid waste and water effluents. In many European cities, there are unacceptable short-term peak levels of ozone during summer (EEA, 1995a). In large cities, the proportion of the population exposed to unacceptable levels of noise is two to three times higher than the national average (EEA, 1995b). Through their consumption and production patterns, Europe's cities also make a range of 'ecological footprints' in the form of resource extraction and the generation of pollution (Rees, 1992).

[99] Although each city is to some extent unique, the European urban system has a number of characteristics which distinguish it from other regions, notably the expansive urbanization of North America and the rapid growth in Asia. However, Europe also suffers from a form of 'schizophrenia' between its high density, public transport inner cities and the low-density private car peripheries. Looking ahead, the challenges for Europe's cities are linked to 'the urgency to recreate a dynamic harmony between the hardware and the software of cities, to reconcile the body (forms, colours, odours, sounds) and the soul (culture, history, en-

ergy, magnetism)' (MEGA, 1996). Another theme is rethinking the 'urban metabolism' to reduce the throughput of resources and increase the welfare generated.

[100] The urban environment is now recognized as a crucial arena for future progress towards sustainability in Europe, particularly where the Rio principles of equity, partnership and participation can become real. Globally, the Earth Summit has stimulated the introduction across Europe of 'Local Agenda 21s', participatory plans designed to project how particular communities can contribute to sustainable development. In Europe, this was taken forward with the launch of the 'European campaign of sustainable cities and towns' in 1994; by November 1995, 177 cities had joined the campaign.

[101] Towns and city neighbourhoods are moving beyond simple environmental improvement measures to becoming 'laboratories for ecological innovation' (MEGA, 1996). Freiburg (194 000 inhabitants) in Germany has moved towards a car free city, aiming to cut car use from 50 to 33% through high parking tariffs, fewer parking places and investment in public transport. Branau (17 000 inhabitants) in Austria is aiming to maintain low-waste lifestyles among its inhabitants: it still has no fast-food restaurant, and is using planning permits to continue without one. Bergen (220 000) in Norway has set up an educational project to raise awareness on climate change, by issuing schoolchildren with 'CO_2 ration books', which give personal quotas according to 'environmental space' (T&D, 1995).

3.3.7. Broadening the range of instruments

[102] The Consultative Forum has stated that a broadening of the range of instruments for achieving sustainable development is required. Environmental policy instruments should be: ecologically efficient, economically efficient, practicable, and equitable. The Forum has made the following conclusions:

- There is a need for a strategic approach to implementing the EU policy 'Towards sustainability';
- Policy instruments should be developed to achieve environmental goals and targets in the most cost-effective way;
- A broader range of instruments, including standards/regulations, economic instruments and voluntary initiatives can play a wider role in the EU;
- There is insufficient cost/benefit analysis in defining best practicable options;
- There needs to be transparent and open consultation process between government, industry and the public;
- The Commission should undertake a comprehensive but prioritized review of the cost-effectiveness of the current range of policy instruments for which cost-effectiveness is claimed;
- Best practice among the Member States in implementing innovative and cost-effective policy instruments should be shared.

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