Indicators for Monitoring Integration of Environment and Sustainable Development in Enterprise Policy

Final Report

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1. Introduction and aims of the report

The broad political objective of sustainable development within the EU requires a concerted effort to integrate economic, environmental and social concerns across all areas of policy. In principle, all policy measures should be seen as a means for achieving more sustainable development, not just environmental and social policy, but energy, transport, agricultural, and enterprise policy as well. Policy objectives, policy processes and the evaluation of policy impacts all need to be considered from the perspective of sustainable development. This imposes both new burdens, as well as opening up opportunities, as more integrated policy-making has the potential to bring synergies and multiplier effects that have previously been left unexploited. For instance, there may be substantial competitiveness advantages to pursuing resource efficiency objectives within industrial policy, or positive employment effects could arise from encouraging greater recovery and recycling of post-consumer wastes.

Taking practical steps towards the integration of sustainable development objectives in all areas of policy poses many challenges. To begin with, the definition of sustainability objectives is usually complex, with overlapping economic, environmental and social dimensions. In already difficult and contested areas of policy there is a risk that sustainable development is sidelined as a worthy, but intractable objective. There is also a risk that introducing new requirements into the policy process will make it more inflexible, less adaptive and slower moving. In an era when public policy needs to be increasingly flexible, responsive and co-operative, integration needs to be achieved efficiently. Policy indicators are one way of ensuring that sustainability issues are being consistently and transparently considered right across public policy. They provide benchmarks for policy performance, set a framework for reporting to a wider stakeholder community on the benefits (and costs) of policy, and permit targets for policy to be set.

The aim of this study has been identify indicators that can support the formulation of an integration strategy and monitor the integration of environment and sustainable development into enterprise policy. Our proposals and recommendations build on existing initiatives in the area of sustainable development indicators. They also take into consideration the approaches taken by integration strategies in other EU policy sectors (transport, agriculture etc). The study would like to contribute to the ongoing discussion about indicators for monitoring integration processes, which currently lacks a harmonised methodology.

The report describes how a consortium led by SPRU-Science and Technology Policy Research at the University of Sussex, UK approached the task of developing integration indicators for EU enterprise policy.[1] The main elements of the report are:

- a conceptual framework for considering the integration of sustainable development in enterprise policy;
- a focused set of integration indicators for enterprise policy;
- some illustrative examples showing how these indicators could be reported; and
- recommendations on how integration indicators could be implemented.

[1] Other project partners were: Wuppertal Institute (D); Institute for Environmental Studies, Free University of Amsterdam (NL) and Associazione Impresa Politecnico, Milano (I).

The study took an iterative and participative approach including desk studies, workshops with stakeholders inside and outside the European Commission, interviews with stakeholders and a web-based consultation process.

2. Setting the scene: The Cardiff process and enterprise policy

The concept of sustainable development, to which the international community signed up at the UN Conference on Environment and Development (UNCED) conference in 1992, calls for a reconciliation of economic, social and environmental objectives. Today, it is widely agreed that these objectives should be applied across different domains of policy.

The European Union has made the integration of sustainable development – and specifically of the environment - into all areas of policy a central objective. Most importantly, the **Amsterdam Treaty** (1997) identifies the integration of environmental and sectoral policies as the way forward to sustainable development. Article 6 of the EC Treaty as amended by the Amsterdam Treaty states:

> Environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities referred to in Article 3, in particular with a view to promoting sustainable development.[2]

Responding to this request, the **European Council** launched the development of sectoral integration strategies. In particular, the **Cardiff Council** (June 1998):

- invited the Commission to report to future European Councils on the progress in meeting the requirements of the Amsterdam Treaty;
- invited all relevant formations of the Council to establish their own integration strategies within their respective policy areas;
- requested identification of indicators for monitoring progress with the environmental integration strategies in different sectors; and
- invited the Transport, Energy and Agriculture Councils to start the process of developing and implementing integration strategies.[3]

Successive European Councils asked other sectors to join the integration process, namely the areas of development, internal market, industry, general affairs, economic and financial questions and fisheries. The **Helsinki Council** (December 1999) requested that a proposal for a 'long-term strategy dovetailing policies for economically, socially and ecologically sustainable development' should be presented at the **Gothenburg Council** in June 2001.[4]

The industry sector was invited by the **Vienna Council** (December 1998) to develop an integration strategy.[5] In response, the Industry Council presented one year later the **Report to the Helsinki European Council**, which examines the objectives, actors and instruments of sustainable

[2] Consolidated Version of the Treaty Establishing the European Community.
[3] European Council (1998). Cardiff European Council - presidency conclusions. SN 150/98. Cardiff.: no. 32-34.
[4] European Council (1999). Helsinki European Council - presidency conclusions. SN 300/99. Helsinki.: no. 50.
[5] European Council (1998). Vienna European Council - presidency conclusions. SN 300/98.

industrial development.[6] While the agriculture and transport sectors focus on the integration of environmental concerns, the industry report emphasises the importance of all three pillars of sustainability (environment, social development and economic development). It also highlights the specific context of industry policy, namely that industrial policy is a broad collection of actions and interacts with other policy areas, for instance trade, competition, energy, transport and taxation policies.

The **Industry Council** set out five principles for the integration of sustainable development and industry policy:
- competitiveness as the focus of industrial policy;
- cost-efficiency and the use of market-based instruments;
- the promotion of voluntary action;
- co-operation with stakeholders; and
- special attention to small and medium-sized enterprises.

The Council invited the Commission to "submit, as soon as possible, to the Council, as a contribution to the strategy, an action plan for promoting integration".[7] It set itself the objective of completing an operational integration strategy by the end of the year 2004. It emphasises the need for indicators and sets out some objectives and characteristics:

> 'Policy and performance indicators provide a tool to monitor the implementation of an integration strategy in industry. Those indicators should take into account the objective of industrial policy, i.e. increasing the competitiveness of the European industry, and allow for an evaluation on how industry and industrial policy are integrating environmental requirements and contributing to the achievement of sustainable development. [...]
>
> Indicators serve as a measure of progress. They are not a substitute for policy. They are indicative of the magnitude of achievements and possibly also of further progress to be aimed at'.[8]

A first contribution to the development of an integration strategy in the field of industrial policy was the **Commission Staff Working Paper on Sustainable Industrial Development**.[9] It sets out, in very general terms, the interactions between sustainable development and industrial policies. It emphasises the need to integrate all three pillars of sustainable development, and stresses the importance of economic instruments and assessment tools.

The European Commission **Report on environment and integration indicators to the Helsinki Summit** aims to set out a structure for an overall environment and integration indicator system.[10] It argues that this system should have two aims:

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[6] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union: 11..

[7] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union: 11.: p 9.

[8] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union: 11.: p 7f.

[9] *SEC (1999) 1729.*

[10] European Commission (1999). Report on environment and integration indicators to Helsinki Summit - Commission working document SEC(1999) 1942 final. Brussels.: p 2.

- allow for a regular review of progress towards the achievement of policy targets; and
- allow for the communication of results to all stakeholders and the wider public.

The report emphasises that a range of indicator products is needed which includes environmental indicators as well as sectoral integration indicators. Indicators should generally be limited in number, relevant, responsive, simple and policy-related. According to the report, the objective of sectoral integration indicators is to 'link environmental concerns with the activities in the sector' and to 'provide a tool for monitoring and benchmarking the implementation of the integration strategy'. It defines five generic criteria for all sectoral indicator sets:

- policy relevant (representing relevant driving forces, trends and key levers);
- analytical soundness;
- easy to understand;
- based as far as possible on existing data; and
- properly interpreted at the appropriate geographical level.

The present study represents a contribution to the Council strategy. It takes into account the recent **re-organisation of the European Commission**. With effect from 1st January 2000, the old Industry Directorate-General (DG III) was merged with the DG for Small and Medium-sized Enterprises and the innovation directorate from the Information Society DG. The new DG Enterprise (DG ENTR) has a broader remit and includes new sectors and tasks. The first official statement on enterprise policy since the re-organisation of the directorate-general the Commission defines the aims of its policies in this area:

> 'Enterprise policy needs to address the entire business environment to enable enterprises, whatever their size, their legal form, sector or location, to grow and develop in a way that is compatible with the overall EU goal of sustainable development. In Enterprise Europe, anyone with a commercially feasible idea should be able to realise it in the best business conditions, with access to the best research and technology, and then deliver it, by the best possible means, to the appropriate market'.[11]

Enterprise policy, then, has the following elements:

> 'First, we must encourage risk-taking and the spirit of enterprise. Second we need to build a dynamic enterprise environment in which companies can be created, grow and innovate, supported by risk capital and an effective innovation and research policy. Third, we have to ensure that our enterprises have effective access to markets, both internal and global, in which to sell their products and services'.[12]

[11] European Commission (2000). Challenges for enterprise policy in the knowledge-driven economy - Proposal for a Council Decision on a Multiannual Programme for Enterprise and Entrepreneurship (2001-2005) - Communication from the Commission. COM(2000) 256 final. Brussels., p. 6f.
[12] P 2.

3. Review of EU integration indicator initiatives

In developing integration indicators for enterprise policy, we have built on the work of other initiatives within the European Commission. These are reviewed and commented on below.

3.1 European Environment Agency

Referring to the Commission's call for a coherent system, the EEA has proposed a 'Common Framework for sector-environment integration indicators'.[13] The EEA *integration indicator framework* defines 'clusters' of indicators relevant at the sectoral level, including socio-economic drivers:

1. Socio-economic performance of the sector (scale and major trends in sector)
2. Environmental performance of the sector
3. Eco-efficiency performance of the sector
4. Integration (institutional, market, management) measures and policy effectiveness

This approach was felt by stakeholders of this study to be too focused on the environmental dimension of sustainability, with too little consideration being given to the social and economic dimensions. Nevertheless, the interactive process used by the Agency to develop sectoral indicators was considered to represent best practice in the field, and was emulated in this study.

3.2 Sectoral integration indicators

The **Transport and Environment Reporting Mechanism** (TERM) developed by the European Environment Agency and the European Commission starts from key issues relevant to policy: efficiency of transport technologies; effectiveness of transport use; and development of other factors driving transport use (e.g. land use planning).[14]

Integration indicators reflect changes in these domains, and 'monitor the effectiveness of policy interventions via certain key policy leverage points', such as transport and land-use planning. The majority of the preliminary TERM indicators published by the EEA in December 1999 relate to driving forces (transport demand and structure) and responses (mainly price signals). Only six out of 32 indicators are descriptive environmental indicators (pressure, state, impact). Ten indicators refer to policy responses, three linking policy measures to drivers (for instance, proportion of vehicle fleet meeting air emission standards).[15]

The European Commission (DG TREN and Eurostat) published **Integration Indicators for Energy** in 1999.[16] This indicator set focuses on the three broad objectives of energy policy:

[13] European Environment Agency (2000). Common framework for sector-environment integration indicators - EEA paper for the meeting of the EPRG expert group on indicators, 13-14 April 2000. Copenhagen..
[14] European Environment Agency (1999). Towards a transport and environment reporting mechanism (TERM) for the EU. Copenhagen..
[15] European Environment Agency (1999). Are we moving in the right direction? Indicators on tranport and environment integration in the EU. Executive summary. Copenhagen..
[16] European Commission (1999): Integration Indicators for Energy – Data 1985-97, Luxembourg.

security and diversity of supplies; prices and competitiveness; and environmental protection. The proposed indicator set is organised into 5 sections: energy supply (17 indicators); final energy consumption (19); energy industry (7); energy markets (9); energy and the environment (13). This indicator pocketbook is due to be further developed taking also into account the 'Preliminary Set of Indicator Groups and Indicators' annexed to the report from the Energy Council to the Helsinki Summit.[17] This list distinguishes 4 groups of indicators: contextual indicators; environmental indicators; energy market indicators; and energy efficiency indicators

In the agriculture sector, the Commission has published a list of **Indicators for the integration of environmental concerns into the Common Agricultural Policy**. In a communication to the Council in January 2000.[18] Like the TERM indicators, they are based on the EEA's Drivers-Pressures-State-Impacts-Response (DPSIR) framework.

But there are also clear differences to the TERM framework. First, of the 29 indicators, the majority are descriptive environmental indicators. They measure resource inputs (e.g. water), emissions (e.g. CH4) and the state of the environment (e.g. soil quality). Only four indicators relate to policy measures.[19] Three indicators describe non-environmental characteristics of the sector.[20] Second, the approach emphasises accuracy and complexity, rather than simplicity. The report highlights that indicators 'must give a sufficiently accurate picture of the underlying processes', especially because farming involves 'a range of biophysical and site specific processes'.

So far, no separate integration-indicators have been developed in the **Internal Market** sector. The Council considers the integration-indicators developed for transport, energy, agriculture and enterprise to be relevant for the integration in internal market policies since those constitute the main economic areas of the Single Market. The Commission has been asked by the Council to examine areas that can be monitored on the basis of already available statistical data. Likewise, no specific integration-indicator initiatives are known for the **ECOFIN** (economic/financial) and **Development Co-operation** policy.

[17] Council of the European Union (1999): Report to the European Council on the Strategy for integrating environmental aspects and sustainable development into energy policy (Doc. 13773/99 ENER 140 ENV 426), (adopted by the Energy Council on 2 December 1999)

[18] European Commission (2000). Indicators for the Integration on Environmental Concerns into the Common Agricultural Policy - Communication from the Commission. COM (2000) 20 final. Brussels..

[19] These are: areas covered by agri-environmental programmes; regional levels of good farming practice; regional levels for environmental targets; and area under nature conservation

[20] These are: organic producer price premium; holder's training levels; and area of organic farming

4. Challenges for enterprise integration indicators

The review of indicator initiatives and preliminary discussions with Commission officials brought out a number of challenges and lessons for enterprise policy integration indicators. These formed the basis for framing the approach taken in this study and are outlined below.

The specific function of integration indicators
Integration indicators have to meet the specific information requirements of an integration strategy, which goes beyond measuring the sustainability of a sector. The Cardiff integration process is based on the assumption that sectoral policies tend to take insufficient account of sustainable development issues, especially in the early stages of decision-making. Indicators and reporting mechanisms should support learning within the policymaking process, aiming to open procedures to a wider set of social and environmental concerns. They should also allow external stakeholders to monitor progress towards integration. These specific functions require an **innovative indicator framework** and **indicator sets**.

Challenges of a wide-ranging policy area
Enterprise policy poses particular challenges for the development of integration indicators. First, enterprise policy cuts across all business activities, and therefore affects broad areas of social and environmental concern. The generation of wealth through innovation and new businesses, the ultimate objective of enterprise policy, covers such a wide arena that it is difficult to define a comprehensive set of indicators that is still manageable. Linking the complex area of sustainable development with the broad area of enterprise policy requires **selective**, **transparent** and **illustrative** indicators.

The ambiguous link between enterprise policy and sustainable development
Adding to this challenge, the links between enterprise policy and sustainability are indirect and ambiguous (both positive and negative), rather than direct and well understood, as in some other sectors such as energy, transport and agriculture. Sectoral integration indicators need to evaluate the integration into policy of sustainability considerations, as well as the contribution of policy to the achievement of (or threat to) sustainable development.[21] However, it is a recognised problem that the outcome of a specific policy measure is almost impossible to evaluate.[22] This is particularly true for the enterprise sector. Social and environmental developments in the enterprise sector are influenced by many factors outside the control of the sector policy, e.g. other sector policies (taxation, social policy, etc.) and external trends (economic growth, consumer behaviour, etc.). It will therefore be difficult to assess the direct sustainability impact of enterprise policy by a simple set of indicators. Instead, a **combination of performance and policy process indicators** is required.

[21] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union: 11.: p 7f.
[22] Carter, Klein et al. (1992). How organisations measure success: the use of performance indicators in government. London: Routledge., p. 14f.

Indicators and policy issues

The diversity of sustainable development indicator sets confirms that the selection of indicators and the aggregation of data are largely subjective processes. Indicators always reflect political aims and priorities and should not aim to replace policy.[23] The policy aims in relation to enterprise policy and sustainable development are, however, not clearly defined. The relevant policy documents remain unspecific about which aspects of sustainable development should be addressed and how they should be achieved.[24] This may be explained by the cross-cutting nature of the sector as well as the recent re-organisation of the European Commission (creation of the new DG Enterprise). As a consequence, the task of the study goes beyond the 'technical' translation of clearly defined policy issues into indicators. A significant component of the study dealt with identifying *policy issues* on the basis of a *consultative process* involving Member State representatives, EU institutions and non-governmental stakeholders.

Data needs

Sectoral integration indicators have created new data needs. Even in the agricultural and transport sector, where data availability is comparatively good, only a minority of indicators can be made operational without the collection of additional information. On the one hand, it is important to take into account the likely quality of existing and future data. On the other hand, indicators should take policy issues as a starting point rather than data availability. This dilemma can only be avoided if all the *full range of available data sources* is considered, including surveys and non-governmental statistics. An area considered to be important should not be excluded from the indicator set only because data is not available. It could be addressed by a more *qualitative assessment* until appropriate quantitative information is collected.

[23] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union: 11.: p 7f.

[24] Industry Council (1999). Report from the Industry Council to the European Council on the integration of sustainable development into European Union industry policy. 13549/1/99 REV 1. Brussels: Council of the European Union. European Commission (2000). Challenges for enterprise policy in the knowledge-driven economy - Proposal for a Council Decision on a Multiannual Programme for Enterprise and Entrepreneurship (2001-2005) - Communication from the Commission. COM(2000) 256 final. Brussels. European Commission (1999). Report on environment and integration indicators to Helsinki Summit - Commission working document SEC(1999) 1942 final. Brussels.

5. Developing enterprise policy integration indicators

5.1 Approach of the study

Given the difficulties of evaluating the specific outcomes of policy measures, but aware that these outcomes may be large and widespread, integration indicators for enterprise policy need to strike a balance between *relevance for enterprise policy* and *relevance for sustainable development*. The study team developed a system of integration indicators which distinguishes between three categories of indicators. These are concerned with economic, social and environmental outcomes (**headline indicators**), with identifying significant overlaps between enterprise policy and sustainability (**integration indicators**), and with monitoring how enterprise policy processes take into account sustainability objectives (**process indicators**). Taken together, these indicators can provide a broad picture of the process and outcomes of the integration of sustainable development objectives in enterprise policy. These are shown in Table 1.

Headline Indicators	Headline indicators monitor key economic, social and environmental trends. They highlight favourable developments as well as unresolved problems in the area of sustainable development.
Integration Indicators	Integration indicators link economic objectives of enterprise policy to social and environmental objectives. They assess whether enterprise policy is exploiting potential 'win-win' opportunities.
Process Indicators	Process indicators describe activities within businesses and policy-making institutions, which can improve the integration of sustainable development into enterprises and enterprise policy.

TABLE 1: CATEGORIES OF ENTERPRISE POLICY INTEGRATION INDICATORS

The process for identifying indicators within each category varied, but was linked. The first step was to define the domains for headline indicators. These refer to the key policy issues at the interface between enterprise policy and sustainable development. These domains would identify issues or themes that would be addressed by indicators. A second step was to elaborate alternative indicators within each domain that could illustrate a policy relevant problem, either directly or as a proxy. This 'long' list of indicators was then presented to an expert group of policymakers or technical specialists and narrowed down to a 'short' list of headline indicators. A third step was to develop 'integration indicators' proper, which seek to illustrate direct overlaps between economic, social or environmental impacts of enterprise policy. This involved a 'triangulation' between headline indicators. The fourth, and somewhat separate, step involved the development of indicators that seek to show how far sustainable development is being considered in the formulation and implementation of enterprise policy. A more detailed view of the study approach is presented in Figure 1:

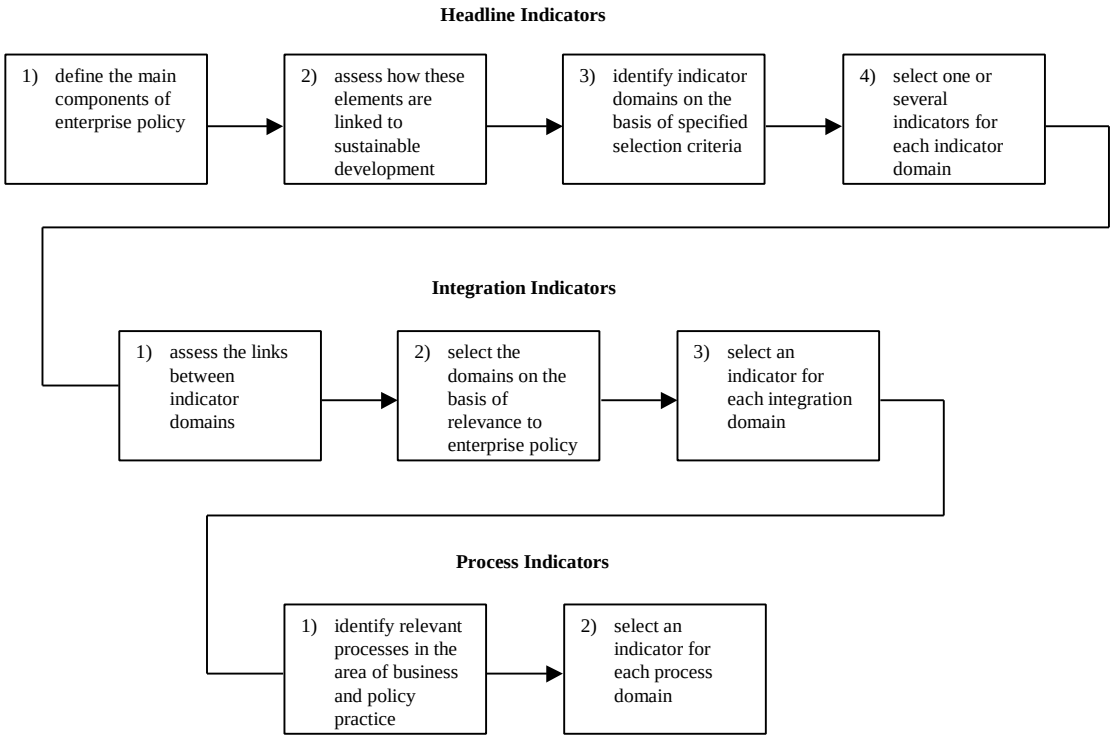

FIGURE 1: STEPS IN THE DEVELOPMENT OF ENTERPRISE POLICY INTEGRATION INDICATORS

All of these tasks were approached through an interactive and consultative process, which involved the expertise of the research team as well as contributions from stakeholders. We have sought at each stage to take account of comments and suggestions, and these have been extremely valuable in the development of what is designed to be a practicable approach to reporting on the process and achievements of integration. The main stages of consultation carried out in the study are illustrated in Table 2.

Consultation	Stakeholders	Purpose
1. Start-up workshop	Commission services	Establish scope and purpose of integration indicators
2. Interviews	Environmental focal points in MS Industry/Enterprise ministries	Identify national-level integration and indicator initiatives
3. Partners workshop	Study partners and commission official	Identify indicator domains
4. Workshop	MS Industry/Enterprise/ Sustainable Development policymakers	Discuss general approach, indicator domains and indicator lists
5. Web consultation	MS policymakers, Commission services, sector-based trade associations	Comment on general approach and indicator sets
6. Workshop	Commission services	Discuss final indicator lists and technical aspects of implementation

TABLE 2: CONSULTATION CARRIED OUT IN THE STUDY

5.2 The components of enterprise policy

As explained in section 2.2, EU enterprise policy is an emerging concept. Unlike most other policy sectors, objectives and instruments of enterprise policy are not yet clearly defined. A general definition of 'enterprise policy' as articulated in the **Communication on Enterprise Policy**[25] was taken as a starting point. Broadly stated, enterprise policy has three components: **entrepreneurship; innovation; and market access**. DG Enterprise is currently developing benchmarks for this field of policy. The purpose of this project was not to benchmark entrepreneurship; innovation; and market access, but to help identify the wider social, economic and environmental implications of enterprise policy.

Entrepreneurship is concerned with the creation of businesses through the exploitation of new technologies and market opportunities. Opportunities for new businesses are created as a result of changing market conditions (such as deregulation and regulation), by technical change, and by underlying growth in the economy that provides opportunities for specialisation. Changing tastes and social habits may also play a role. Entrepreneurship is usually concerned with new business start-ups in highly dynamic and fast-growing sectors of the economy. Key policy issues are the provision of good market and technical information to new start-up ventures, the availability of skilled and experienced personnel, the removal of legal and regulatory barriers, and the availability of venture capital. A more general question about the 'culture' of entrepreneurship is also considered important.

[25] European Commission (2000). Challenges for enterprise policy in the knowledge-driven economy - Proposal for a Council Decision on a Multiannual Programme for Enterprise and Entrepreneurship (2001-2005) - Communication from the Commission. COM(2000) 256 final. Brussels..

Innovation is concerned with the successful commercialisation of new ideas in the market. Innovations usually encompass technical changes in products and process that are linked to organisational changes within firms and markets. The nature and rate of innovation follows sectoral patterns. Generation of new innovations depends on three main factors: technological opportunity; market demand; and appropriability of economic rents through innovation.[26] All innovation involves uncertainty and risk. At the level of the enterprise, there are a number of features generally held to promote innovation: strong management, technical and marketing capabilities; well established routines of technology 'search'; strong external links to the national and international science base; strong links to suppliers of technology; and strong links with users and the market. Key policy issues relate to the strength of science and technology research and training; the development of incentives (tax relief and subsidies) for innovation; the dissemination of 'best practice' across many firms; and protection of intellectual property rights where wider welfare benefits are believed to hold.

Market access is concerned with the ability of firms to sell into markets. Market access may be restricted for a wide variety of reasons: structural (entry costs may be high); physical (there may be inadequate infrastructure along which firms can reach customers); legal (existing market regulation may exclude new entrants); and trade barriers (tariff or other barriers may exist which exclude firms from export markets). In general, arguments that market access may need to be restricted in order to meet other economic, industrial and employment objectives are no longer widely accepted. Overwhelmingly, national, EU and international policies are concerned with removing barriers to entry, and promoting market access.

To simplify, we have taken enterprise policy as being concerned with **the creation of innovative new businesses that have wide access to markets**. While most enterprise policy will be aimed at individual firms, it is clear that a wide range of contextual economic and social factors also determine the development of new and innovative businesses (the availability of skilled people, the availability of capital, the availability of high quality market information, a strong research and technology base, a culture of entrepreneurship and so on). Enterprise policy therefore needs to operate at several levels: the firm, the sector, the region, the member state and the EU as a whole. The main components of enterprise policy are presented in the table 1.

[26] G. Dosi, The nature of the innovative process, in G. Dosi et al., Technical Change and Economic Theory, Pinter, London, 1988.

Policy domain	Attributes
Generic	1) Simplification of regulation and de-regulation 2) Infrastructure provision - ICT - Transport / logistics 3) Education and Training
Entrepreneurship	1) Access to finance - Venture capital 2) Support for Small and Medium-Sized Enterprises - Training - Information - Networks - Facilities
Innovation	1) Access to the science base - Business links to universities - Science parks - Dissemination 2) Innovation infrastructure - Testing labs - Standards organisations 3) Intellectual Property Rights 4) Creation of new market demand - Regulation - Economic incentives - Procurement - Information, labelling and certification
Market access	1) Market information and capacity building 2) Product standards - CEN/ISO - SHE standards 3) Harmonisation of regulation - Technical rules - Permits 4) Access to global markets - Support for extension of trade regimes - Support for dispute procedures

TABLE 1: ELEMENTS OF ENTERPRISE POLICY

5.3 The link between enterprise policy and sustainable development

Linking sustainable development and enterprise policy provided us with a conceptual challenge. The two fields inhabit very different value systems with different dimensions that do not necessarily support each other. For example, innovation policies may lead to social exclusion, economic instability and damage the environment. The aim here is develop a way of linking the two fields. Our chosen approach was to merge the three dimensions of enterprise policy with the three dimensions of sustainability in a 'policy grid' that helps to identify the key linkages of the respective policy fields.

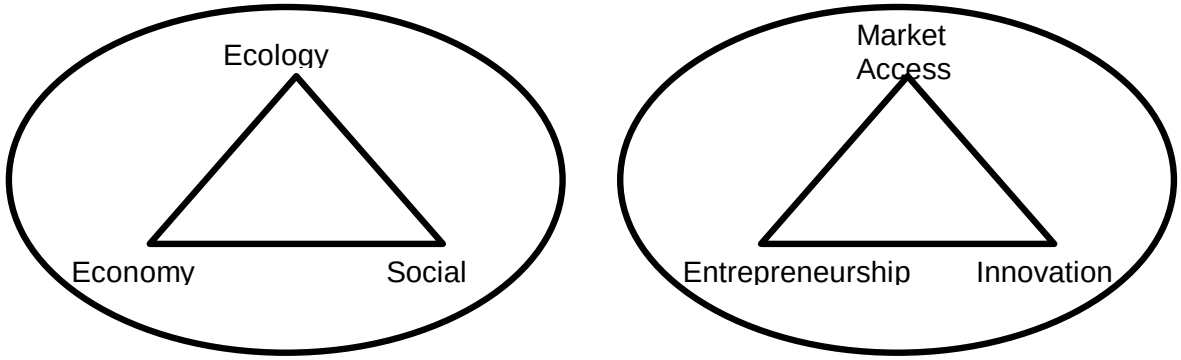

FIGURE 2: PILLARS OF SUSTAINABLE DEVELOPMENT AND ENTERPRISE POLICY

To develop indicators of the integration process in enterprise policy we need to ask: what would an enterprise policy that integrated sustainable development objectives look like? If we assume that by definition a successful enterprise must be economically sustainable, then we are primarily concerned with the question of how enterprise policy promotes, inhibits or contradicts social and environmental pillars of sustainable development. Seen from the perspective of the enterprise, social objectives include a commitment to high safety, health and ethical standards for its own workers. They may also include commitments to animal welfare, gender and other targets, as well as strong links into communities where it is situated.

Environmental objectives include a commitment to improving resource productivity, reducing direct emissions to the environment and reducing indirect emissions to the environment by producing low impact goods and services (by improving energy efficiency, encouraging recycling, and innovating products with improved environmental performance for instance).

At a minimum, a sustainable enterprise policy would aim to facilitate the effective implementation of existing European and national regulations and standards. More generally, the aim would be to encourage excellence and 'leadership' in handling social and environmental aspects of business. Beyond this, an integrated enterprise policy will enable 'win-win' opportunities – in which innovation and entrepeneurship reinforce sustainability – to be exploited by business.

Entrepreneurship and sustainable development

There is a two-way link between entrepreneurship and sustainable development. On the one hand, the two may reinforce each other: market opportunities and policies supporting sustainable development can result in new firms and economic activities. New businesses (including businesses operating in the e-economy) may find new ways of providing more resource efficient products and services. On the other hand, tensions between the two may also arise. New businesses may encourage new environmental risks, while safety, health, environmental, ethical, animal welfare (and so on) regulations and norms may impede new business creation.

Innovation and sustainable development

The relationship between innovation and sustainable development is primarily concerned with the link between business innovation and the environment. This is also a two-way relationship. Environmental pressures (regulatory, market or stakeholder) may stimulate or impede innovation. Innovation is frequently a component of a corporate or business response to environmental problems – whether this is the development of a new abatement technology, or the commercialisation of an eco-friendly product. In a parallel process, many businesses have sought to integrate environmental objectives into the management of innovation over the past decade or so. Encouraging this process could be another aim of an integrated enterprise policy.

Market access and sustainable development

The link between market access and sustainable development is concerned mainly with the creation of markets for 'greener' goods and services, and barriers to markets that exist for greener goods and services. First, the question of market demand: To what extent can enterprise policy, in opening markets, also provide encouragement for greener goods and services? Does policy support infrastructures that will enable market entry of more radical green products (hydrogen-driven cars etc)? The second issue is concerned with potential contradictions between enterprise and competition policy and sustainable development. This is significant when we consider the market of public administration. How far can environmental criteria be used in public sector purchasing? Do environmental criteria represent barriers to competition or trade?

Conclusion

The aim of this section has been to define how the general fields of enterprise policy and sustainable development may be linked, and to draw out policy issues that might be illuminated by integration indicators. These links are illustrated in Table 2. We have also emphasised that in most cases the **links are two-way**. Enterprise policy may encourage more sustainable production and consumption, or reduce its sustainability. Many of the links identified are qualitative. A mix of both qualitative and quantitative measures is therefore needed.

TABLE 2: LINKS BETWEEN ENTERPRISE POLICY AND SUSTAINABLE DEVELOPMENT

	Economic Dimension	**Social Dimension**	**Environmental Dimension**
Generic			
1) Regulatory reform	Reducing costs of bureaucracy	Employment	Material and travel savings Stringency of regulation
2) Infrastructure		Access to services / social cohesion Working time Civil society mobilisation Regional employment	E-/De-materialisation Logistic impacts Supply-chain restructuring Landscape impacts
3) Education and Training		Employment Access to education	Awareness raising
Entrepreneurship			
1) Finance 2) SME support 3) Science – start-up links	Start-up creation, revenues Flexibility of growth	Employment Ethical employment Working conditions	New environmental products services
Innovation			
1) Access to science 2) Innovation infrastructure 3) IPR 4) Creation of market demand	New products and services Productivity changes Economic growth Public expenditure/GNP	Employment Awareness of science & technology Ethical issues / impacts of new technology	Abatement, process and product innovation 'Rebound' effect New risks and uncertainties New env'l management tools
Market Access			
1) Market information and capacity building 2) Product standards 3) Harmonisation of regulation 4) Access to global markets	Growth Structural change/Specialisation Impact on local and regional economic activities Trade (intra and extra EU)	Cultural diversity Employment Income level Consumer responsibility Social impacts on developing countries	Transport Transfer of clean technology Growth of services Supply chain management

5.4 Selection criteria for indicator domains

Having broadly described a set of indicator categories and broad links between enterprise policy and sustainable development the next stage of the study was to identify a set of indicator domains (specific issues that would be illustrated using integration indicators).

Indicator domains were chosen according to **six selection criteria**. These were:

1. Be relevant to enterprise policy (policy leverage);
2. Cover all three dimensions of sustainable development;
3. Have a EU-wide or global significance;
4. Refer to a clear and communicable issue;
5. Allow measurement of significant differences in performance (benchmarking and trends); and
6. Be measurable by means of existing or potentially available data.

5.5 Developing Headline Indicators

The process of defining headline indicators involved bringing focus to the many possible links that had been identified between enterprise policy and sustainable development, and illustrated in Table 2. Proposals for a long list of indicators were discussed by a group of national enterprise policy makers and Commission officials to produce a shorter list. A principal of symmetry was imposed on the selection of domains, with each of the three 'pillars' of sustainable development being illustrated with five headline indicator domains. The final list is discussed below.

5.6 Developing Integration Indicators

Given the ambiguous and two-way nature of the links identified, there was perceived to be a need for indicators illustrating overlaps **between** headline domains that were significant and where synergies between enterprise and sustainable development could be achieved. To identify these integration indicator domains stakeholders were consulted using a simple matrix shown in Figure 3. They were invited to rank in importance linkages in the unshaded cells covering the relationship between economic and environmental and social indicator domains, and environment and social domains. As a result of this process, 6 integration indicators were identified as significant and relevant to enterprise policy.

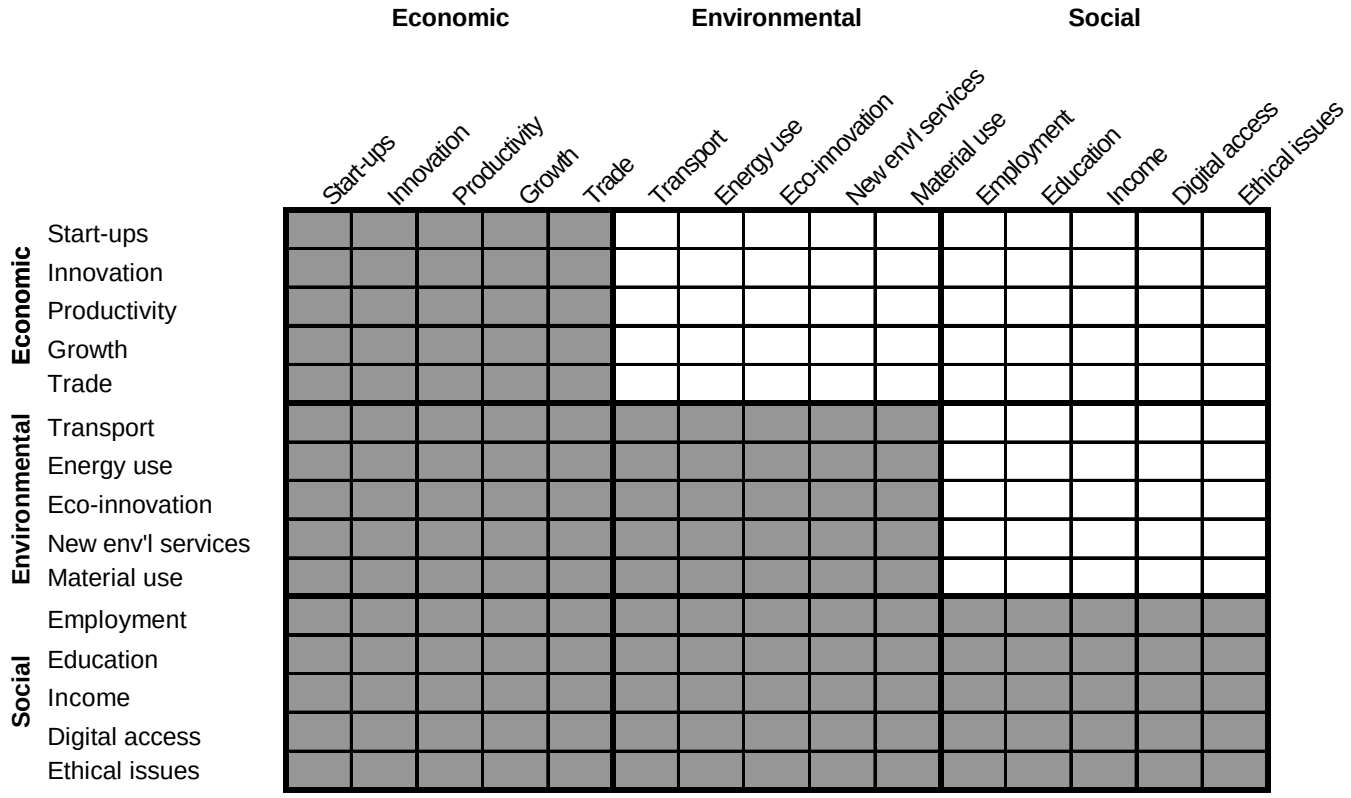

FIGURE 1: POTENTIAL INTEGRATION INDICATOR DOMAINS AND THEIR LINKAGES

5.7 Developing Process Indicators

Process indicators were developed and refined during two stakeholder workshops. These involved mainly experts from Member States Ministries of Industry and Economic Affairs as well as representatives of DG Enterprise. First, several functions of process indicators within public and private sector organisations were defined. Process indicators should:

- relate to processes that are relevant to sustainable development;
- remain focused on enterprise policy;
- refer to the business as well as to policy;
- refer to policy design as well as implementation; and
- address processes within EU institutions as well as between EU institutions and MS.

Business and policy process, which are thought to influence sustainable development were taken as a starting point. A preliminary set of indicators was later reviewed by the study team with regard to feasibility and data availability.

6. The indicator set

In all **32 indicators** for enterprise policy integration were proposed. These include **15 headline indicators** (5 economic, 5 social and 5 environmental), **6 integration indicators** and **6 process indicators**. Following discussions at the second stakeholder workshop it was decided to include a larger set of environmental sub-indicators, bringing the number of environmental headline indicators to eleven, in 5 categories.

Indicator sheets describing the indicator, unit of measurement, data source and its relevance are presented in Appendix 1. For some example indicators the sheets also include an assessment of current data on a European level.

A. Headline indicators

Headline indicators draw attention to key economic, social and environmental trends. They highlight **favourable developments** well as **unresolved problems**. They look at trends on a very general level but some of them can also be analysed in a sectoral breakdown.

Indicator domain	Sub-Indicator domain	Indicator
ECONOMIC		
1. Economic Development		Annual growth rate of GDP at constant prices (% change)
2. Productivity		Total factor productivity
3. Entrepreneurship		Procedures and weeks necessary for company registration (number)
4. Innovation		General expenditure on R&D as a share of GDP (%)
5. Investment		Investment in equipment as a share of GDP (%)
SOCIAL		
6. Employment		Unemployment rate as a share of total labour force by gender (%)
7. Education		Population with upper secondary education (% of total)
8. Income distribution		Distribution of income (income quintile ratio)
9. Access to digital services		Population with Internet access (% of total)
10. Working conditions		Workers reporting working at high speed or to tight deadlines during at least one quarter of their working time (% of total)
ENVIRONMENT		
11. Energy use		Gross inland energy consumption per GDP (TOE per million Euro)
12. Air emissions	12a. Greenhouse Gas emissions 12b. SO_2 emissions 12c. NO_x emissions 12d. VOCs emissions 12e. Dust emissions	Aggregated CO_2, N_2O and CH_4 emissions (million tonnes CO_2 equivalent) SO_2 emissions (million tonnes) NO_x emissions (million tonnes) VOC emissions (million tonnes) PM10 emissions (million tonnes)
13. Transport	13a. Freight transport 13b. Passenger transport	Freight transport by mode (tonne-kilometres) Passenger transport by mode (journeys)
14. Waste		Waste generated from daily household and commercial activities (tonnes)
15. Resource Use	15a. Water use 15b. Materials use	Use of public water (million tonnes) Direct material input / total material requirement (million tonnes)

B. Integration Indicators

Integration indicators **link established economic objectives** of enterprise policy **to social and environmental objectives**. They assess whether enterprise policy is able to exploit potential win-win situations between these issues.

Indicator domain	Indicator
1. Innovation and environmental innovation	Number of patent applications in the environmental sector
2. Competitiveness and resource efficiency	Water used and waste generated by industry per unit of value added in the industry sector
3. Entrepreneurship and environmental services	Number of start-ups offering environmental services
4. Market access and environmental technology	Trade balance in environmental technology
5. Innovation and resource efficiency	Knowledge based sectors as share of gross domestic product
6. Innovation and employment	Number of jobs created in the ICT sector

C. Process Indicators

Process indicators address activities within businesses and policy-making institutions, which are seen to **improve the integration of sustainable development** into enterprises and enterprise policy. If reliable quantitative data is lacking, a qualitative assessment can be carried out.

Indicator domain	Indicator
BUSINESS	
1. Environmental management	Number of EMAS and ISO 14001 registered environmental management systems
2. Social reporting	Number of firms publishing data about social aspects of the enterprise
3. Product labelling	Number of manufacturing companies producing one or more products awarded with the EU Eco-Label
POLICY	
4. Environmental assessment of policies	Number of policies, programmes and plans for which an environmental assessment has been undertaken at the planning stage
5. Public expenditure	Share of expenditure made using criteria which include social and environmental issues
6. Market access for green products	Products or services purchased by the organisation as part of its procurement, which are recognised as being socially or environmentally advantageous

7. The way forward

We believe that this set of 32 indicators provides a solid basis on which DG-Enterprise could report and monitor progress towards the objective of integrating sustainable development into its activities. We also recommend that this indicator set could be applied at the member state level, with a final aim being to report on national and EU integration processes and outcomes. In this section we discuss some of the practical questions of reporting on integration. We begin with some general points and conclude with some practical guidance on how DG-Enterprise could provide regular and authoritative reports.

7.1 Implementing enterprise policy integration indicators

On the basis of experience developed in this study and on knowledge of other sustainability indicator exercises,[27] we make a number of recommendations for a general approach that could be taken to reporting and monitoring the integration.

Reporting modalities

We recommend that the reporting on integration of environmental and sustainable development into enterprise policy is **regular** and **fully transparent**. We believe that a **bi-annual reporting cycle** would be appropriate and technically feasible. This compares with typically annual social and environmental reporting by companies and 5-year sustainability reporting cycles in countries like the UK.

We also recommend that the reporting and assessment be carried out by the Directorate-General **internally** in order to build up capacities and to promote learning. We believe that inherent to the process of integration is a process of internalisation in the organisational routines and knowledge of the DG.

Finally, we believe that the indicator report should include a short **assessment report.** This would provide a commentary on the overall picture, past achievements and future challenges. The report would also contain some **commitments** about changes that might be required in enterprise policy to take account of negative trends or to exploit new opportunities for synergies between enterprise policy and sustainability that have been identified. This assessment and review process should involve larger parts of the DG, and be co-ordinated by the Director-General.

The report would be **publicly available** in printed form and via the Internet. More detailed background data and analysis could be retained for internal use.

Setting targets

The importance of policy targets is that they make clear to policymakers and stakeholders alike **what constitutes success**. If possible, indicators should therefore be expressed in relation to policy objectives. For example, attaining a share of 12% renewable energy in EU gross domestic energy consumption in 2010.[28] Policy objectives can be found more often in the area of the environment and in relation to sector performance. In the case of headline

[27] For a full review see: J. Hertin et al, Indicators for Monitoring Integration of Environmental and Sustainable Development in Enterprise Policy, First Interim Report, SPRU, Falmer, 25 May 2000.

[28] European Commission (1997) White Paper on Renewable Energies, COM (97) 599, 26/11/97.

indicators, these targets need to be agreed in co-operation with other sectors (environment, transport, energy, agriculture and so on). Targets for some process indicators could be set independently by policy communities at the EU and national levels.

Level of measurement

In order to keep the assessment simple and accessible, we recommend that it should **focus on the European level**. A breakdown for particular economic sectors, or Member States could be given where specific trends should be highlighted. Over the longer term that would be value in developing co-ordinated **multilevel reporting** at both the EU and Member State levels. This would encourage a broad process of institutional learning and of harmonisation across different Member States, with evident benefits for performance aggregated at the EU level.

Data availability, quality and collection

Authoritative indicators require good data and careful analysis. Of the 32 indicators we have recommended, we have been able to identify established sources of data at the EU level for 15 (details are provided in Appendix 2). Some of the other indicators require further data processing and analysis (principally the integration indicators some of which are ratios of headline indicators), while others require completely new data to be collected. This level of data availability is consistent with other similar initiatives (TERM, for instance).

We recommend that the task of data collection, checking and normalisation in relation to headline and integration indicators is not carried out by the Enterprise DG, but by Eurostat. Data collection for the construction of process indicators needs to be done in-house.

7.2 Guidelines for reporting

We recommend that the reporting process include four stages: review of indicators; data collection; assessment; and dissemination and communication. These are briefly described below.

Review indicators

A revision of the indictor set may be become necessary for a number of reasons: new issues in sustainable development; improved understanding of causal relationships; changed political priorities; re-organisation of the administration and so on. We therefore recommend that a preliminary stage of reporting involves a review of the appropriateness of the indicator set. There will be a tension to overcome between retaining consistency and therefore comparability between reporting periods, and reporting on issues that have political and intellectual currency. We recommend that this review should include **a small workshop** involving primarily Commission services, but also a small number of critical external stakeholders.

Data collection

We have recommended that data collection be the responsibility of both Eurostat (headline and integration indicators) and DG-Enterprise (process indicators). We have shown that about half of the data required for our proposed data set are already available from established data sources. No further action is required on these. Collection of data for the remaining indicators will in many cases require new procedures and protocols to be developed by Eurostat, statistical agencies in Member States, and by DG-Enterprise itself.

We recommend that a review is carried out within the Commission of the feasibility and costs of collecting this data. This review should report within 6-9 months, allowing a final decision to be made about modalities for data collection.

Assessment

Data analysis and presentation as indicators is a relatively simple process, and should involve no more that a few weeks of effort by one person. We have recommended that this work is carried out within DG-Enterprise. Assessment of the indicators and decisions about commitments that may be needed to correct or exploit identified trends will require a higher-level and more consultative approach. We recommend that a draft report is made available to the Director General and that decisions about necessary changes and commitments be made at the senior management level.

Dissemination and communication

Dissemination to external stakeholders is important. The assessment report should be written in accessible language and available from the European Commission website. Links would be made to other relevant websites (similar reports in integration from other Commission services).

8. Integration indicators and sustainable development strategy

In this final section we make some reflections about how the specific integration indicators process in DG-Enterprise is related to broader developments in the Commission and at the Member State level.

8.1 Integrating the integration process

The integration indicators for the enterprise policy of the European Union should have a strong relation with those of other sectors; not only of the Internal Market and ECOFIN council formations, but also the transport and other sectors, which are related to a sustainable enterprise policy. We therefore recommend the active facilitation of networking and interaction between the responsible services and scientific institutions. These links would stimulate communication of experience and progress and thereby an '**integration of integration strategies**' which could have four elements:

Expert network

Our study has shown that Member State as well as EU experts see integration as a difficult task, which addresses novel and challenging issues. Many of these challenges are common to all sectors and the potential for cross-sectoral learning is large. Better communication among experts would create a comprehensive knowledge base and improve efficiency. It would also support the emergence of harmonised methodology and common headline indicators.

Harmonised methodology for the development of sectoral indicators

Presently, the institutions developing indicators employ very different methodologies. The different styles of presentation lead to inconsistent and partly incomplete views of problems and possible solutions. A harmonised methodology could increase the transparency and accountability of strategies, facilitate comparisons and improve their quality. Indicators are the technical prerequisite for the 'policy coherence' primarily by supporting the political task of harmonising of targets and timetables.

Cross-sectoral headline indicators

The current work on sectoral integration indicators is characterised by diversity. If experts and the European Commission services continue working separately, heterogeneous indicator sets could make the overall integration process overly complex and difficult to manage. A generic set of generic set of headline indicators could guide the integration process towards commonly agreed policy issues. It could contribute to a cross-sectoral harmonisation of strategies and facilitate a successful monitoring of progress.

Common procedures for reporting

Work on procedures for reporting on integration indicators is only just starting. The Transport sector is currently most advanced on the way towards a comprehensive reporting mechanism. A harmonised reporting scheme for the different sectors would not only be (cost) efficient but also increase transparency. Issues to be addressed include the frequency of reporting, methods for dissemination, guidelines for interpretation and all other components that make the indicator fully operational. An important issue in this context will be the availability of data.

8.2 Complementing the strategy for sustainable development

Recent development in the EU Member States show that policy integration with the perspective of a sustainable development is increasingly seen as a responsibility of the heads of state. In Germany, for example, a Sustainability Council has been created in June 2000, directly under the responsibility of the Chancellor. This development is in many aspects similar to the creation of 'green cabinets' and similar institutional innovations in the U.K. and Finland. On the European level the development of a Sustainable Development Strategy by the Forward Studies Unit under the President of the European Commission is a parallel response. On the other hand, sustainable development cannot be implemented 'by decree'. Since the UN Conference on Environment and Development in 1992 cross-sectoral and stakeholder dialogue has become a core element of the sustainability discourse. Sustainability strategies have to create a sense of ownership in order to be accepted and eventually implemented. This concerns not only non-governmental stakeholders, but also governmental administrations.

The policy innovation of the Cardiff process has been that of an interactive process, which emphasises the responsibility of the sectors themselves. The process is based on a mandate by the European Council but carried out through a strategy developed by the respective sectors. Early experiences, for example with the agriculture and transport sectors, suggest that this has improved the problem recognition and initiated learning processes. Based on the results of the current process we do not believe that the Cardiff integration strategy can be substituted with a single Sustainable Development Strategy of the European Union. The sector integration strategies and the Sustainable Development Strategy can rather be seen as complementary elements. By meshing bottom-up sector strategies and a top-down Sustainable Development Strategy the European Union could set an example for innovative and appropriate governance responses to the global challenge of a sustainable development.

8.3 The role of Member States

The integration process in the EU enterprise / industry sector needs to run in parallel with similar activities in the Member States. Although many enterprise/industry ministries are now engaging far more positively with the environmental/sustainable development agenda, there is as yet little concrete evidence of action. Integration is seen as an issue for most Member States, often stimulated by the Cardiff process. But this study has shown that few countries have begun to develop coherent strategies for the integration of environment and sustainable development in the enterprise and industry policy. Some member states use other indicators (competitiveness indicators, environmental indicators), but none have brought these together in a systematic way. We believe that integration indicators based on the framework developed in this study would also be appropriate at the member state level.

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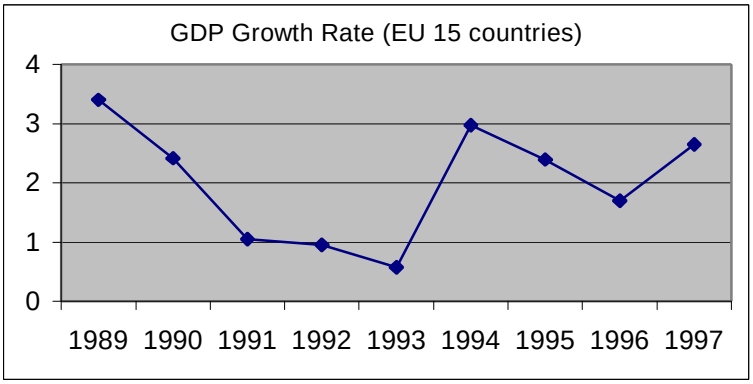
Appendix 1: Indicator Sheets

For each indicator, an 'indicator sheet' provides key information about the indicator: the indicator name, the unit of measurement, the relevance, and the data source. In some cases, current data and a short assessment are given to illustrate how the reporting could be carried out.

A.1 Headline Indicators – Economic

1) Economic growth	
Indicator	Annual growth rate of GDP at constant prices
Unit	% change
Relevance	GDP at constant prices measures the volume growth of GDP, eliminating price level changes (inflation). The harmonious and balanced development of economic activities is one of the main objectives of the European Union (Art 2, EC Treaty). The indicator is part of the structural indicators set. [29]
Data source	Eurostat National Accounts
Data	
Assessment	

2) Productivity	
Indicator	Total factor productivity (labour and capital)
Unit	ratio
Relevance	The indicator aggregates labour productivity and capital productivity. It measures the overall efficiency of the use of both factors in the economy.
Data source	This indicator is currently under development as part the structural indicators set (see COM(2000) 594 final). It is expected to be available during 2001.

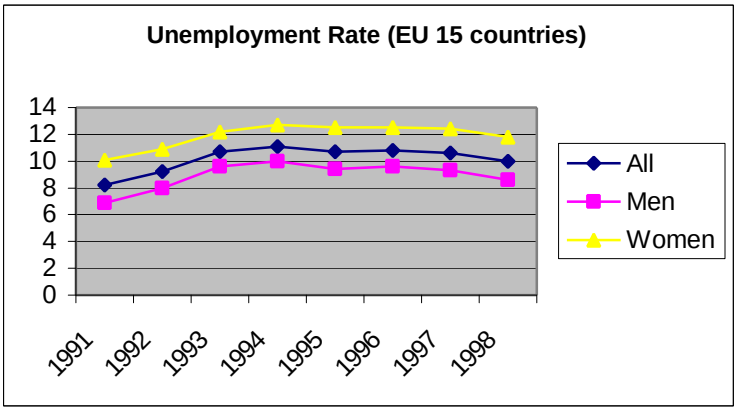
[29] Structural indicators are currently developed by the European Commission in response to the Lisbon Council as an instrument for better structural policies aiming for high levels of employment, innovation, economic reform and social cohesion in a knowledge-based economy (COM(2000) 594 final).

3) Entrepreneurship	
Indicator	Procedures and weeks necessary for company registration
Unit	Number of procedures and weeks
Relevance	Facilitating the process of starting a businesses is one of the aims of enterprise policy. Eliminating unnecessary burdens associated with the registration of a new company is expected to contribute to a dynamic and adaptable economy.
Data source	Currently under development by DG Enterprise as part of the Competitiveness Scoreboard.

4) Innovation	
Indicator	General expenditure on R&D per GDP
Unit	% of Gross Domestic Product
Relevance	Expenditure on research and development (R&D) gives an overall assessment of the research effort made by business and government. It is a measure for the development and exploitation of new technologies and new knowledge, which drive economic growth and wealth creation. The indicator is part of the structural indicators set (see footnote 28).
Data source	Eurostat R&D Statistics

5) Investment	
Indicator	Investment in equipment (market prices) as a share of GDP (current prices)
Unit	% of Gross Domestic Product
Relevance	Investment in the acquisition of new equipment indicates the spread of technological innovations throughout the economy. It is an indicator for economic performance and competitiveness.
Data source	Eurostat (indicator V90152 of the COMPET data set)

A.2 Headline Indicators - Social

6) Employment	
Indicator	Unemployment rate as a share of total labour force by gender
Unit	%
Relevance	High levels of employment is one of the main objectives of the European Union (Art 2, EC Treaty). The indicator reflects the strategic target set by the European Council for employment. The distinction by gender reflects the importance attached to increased female participation in the labour market by the European Council (cf. COM(2000) 594 final). The indicator is part of the structural indicators set (see footnote 28).
Data source	Eurostat Unemployment Statistics
Data	
Assessment	After a rise at the beginning of the 1990s, unemployment fell slightly from 11.1% in 1994 to 10% in 1998. This level is considered to be too low by the European Council who aims to ensure full employment (cf. Lisbon European Council Conclusions). There is also a significant gender gap with women's unemployment rate being more than three per cent higher than men's.

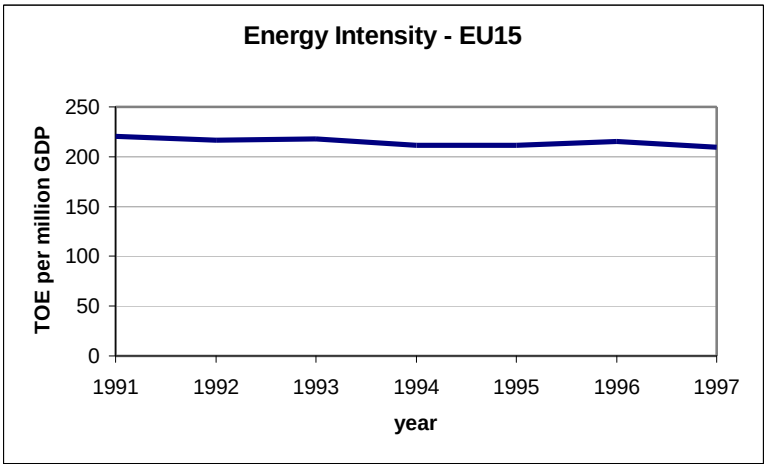
7) Education	
Indicator	Population aged 25-59 having completed at least upper secondary education
Unit	% of total
Relevance	Levels of formal qualification are an indicator for access to education and to other resources linked to education (for example employment).
Data source	Eurostat

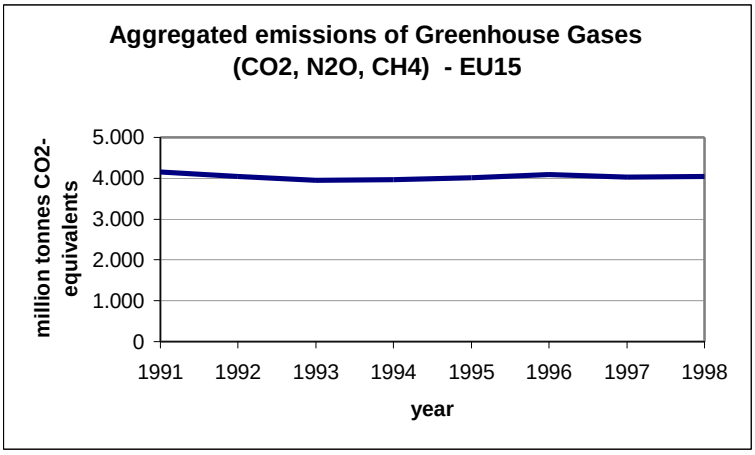
8) Income distribution	
Indicator	Distribution of income (income quintile ratio)
Unit	Ratio of highest-earning 20% to lowest-earning 20%
Relevance	This ratio compares the total net monetary income available to the richest 20% of the population with that available to the poorest 20% (income from work, property income, capital income, private and social transfers). The indicators describes how the financial income is spread throughout the society and indicates the degree of social cohesion. The indicator is part of the structural indicators set (see footnote 28).
Data source	Eurostat European Community Household Panel

9) Access to digital services	
Indicator	Internet on-line active accounts (residential and business users) per 100 inhabitants
Unit	% of total
Relevance	A high level of Internet connections is seen as a way to ensure equal access to the variety of public and private services available online. The Lisbon Council called for full access to the Internet by all households by the end of 2001. The indicator is part of the structural indicators set (see footnote 28).
Data source	European Information Technology Observatory; Eurostat will provide harmonised data from 2001

10) Working conditions	
Indicator	Workers reporting working at high speed or to tight deadlines during at least one quarter of their working time
Unit	% of total
Relevance	The share of the workforce working at high speed or to tight deadlines Lower injury rates are a reflection of better management and structural change in the economy. Industries with high injury rates may be seen as less socially sustainable.
Data source	European Foundation for the Improvement of Living and Working Conditions - European survey on working conditions in Europe

A.3 Headline Indicators - Environmental

11) Energy use	
Indicator	Gross inland energy consumption per GDP
Unit	Tonnes oil-equivalents (TOE) per million Euro
Relevance	Energy intensity expresses how much energy is required to produce one unit of GDP. It is used to indicate how efficient an economic entity (national economy, sector, company) is using the natural resource of energy. Increasing energy efficiency is a common objective of EU energy policies. Energy consumption is closely related to a number of key environmental concerns, in particular air emissions. The indicator is part of the structural indicators set (see footnote 28).
Data source	Eurostat Energy Statistics
Data	
Assessment	Energy intensity of EU15 has been falling about 4.6 % during the nineties (1991-1997). However, the energy use in absolute terms has increased by about 4.9 % in the same period (GDP increased absolutely by 10.3%). The ultimate objective of an energy efficiency strategy is to decrease energy use absolutely whilst GDP is rising.

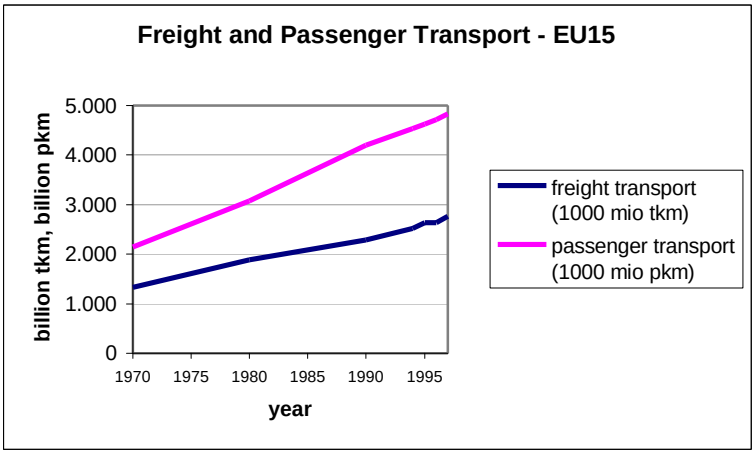
12) Air emissions	
12a. Greenhouse Gases	
Indicator	Aggregated CO_2, N_2O and CH_4 emissions
Unit	Million tonnes CO_2-equivalent
Relevance	This indicators measures the three main greenhouse gases causing global warming: • CO_2 (from burning fossil fuels for energy and from transport), • N_2O (from fertiliser use and industrial processes), and • CH_4 (from agriculture, decomposing waste on landfills and emissions from fuels). The main contributor to the aggregate is CO_2 with more than 80 %. Climate change is a key area of European environmental policy (cf. 5th Environmental Action Programme1993-2000 (OJ C 138, 17.5.93). In the Kyoto protocol, the EU committed itself to reduce greenhouse gas emissions by 8 % until 2008-2012 from its 1990 level.
Data source	European Environment Agency ETC-AE
Data	
Assessment	During the nineties these three aggregated greenhouse gas emissions have been decreasing slightly about 2-3 %.Whereas CO_2-emissions almost stabilised during the nineties, N_2O and CH_4 decreased significantly by around 16 % and 9 % respectively. Fossil fuel energy consumption remains the main driver for CO2-emissions.

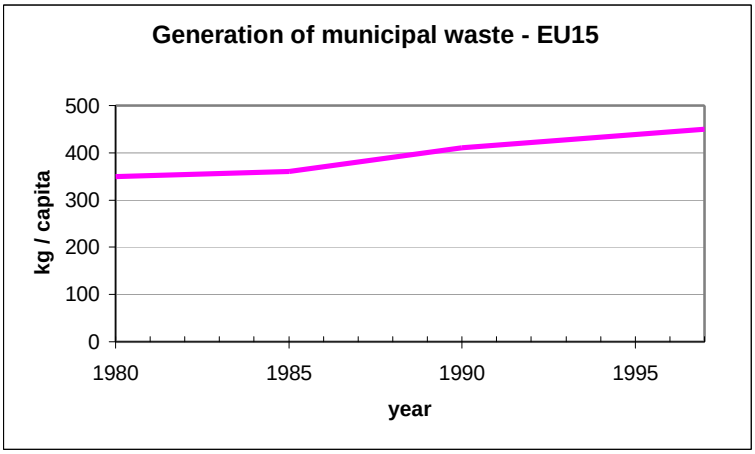
12b. SO_2 emissions	
Indicator	SO_2 emissions
Unit	million tonnes
Relevance	SO2 emissions contribute to acidification and local air pollution, causing harm to human health and the environment. Acidification is a key area of European environmental policy (cf. 5th Environmental Action Programme1993-2000 (OJ C 138, 17.5.93)
Data source	European Environment Agency

12c. NO_x emissions	
Indicator	NO_x emissions
Unit	million tonnes
Relevance	NOx emissions contribute to acidification and local air pollution, causing harm to human health and the environment. Acidification is a key area of European environmental policy (cf. 5th Environmental Action Programme 1993-2000 (OJ C 138, 17.5.93))
Data source	European Environment Agency

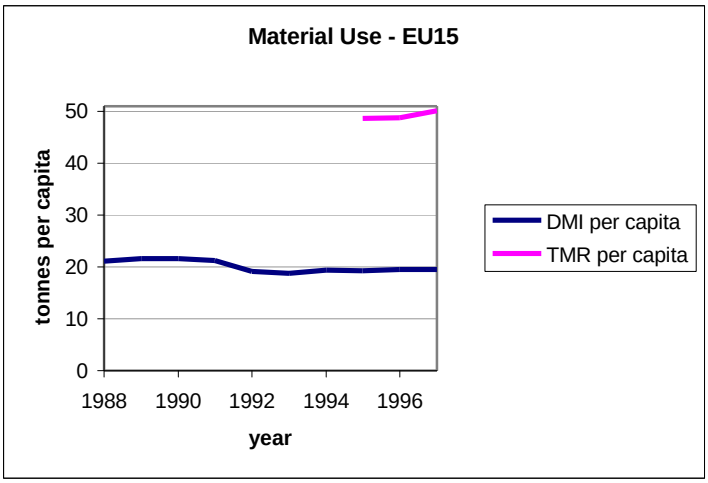
12b. VOC emissions	
Indicator	VOC emissions
Unit	million tonnes
Relevance	Volatile Organic Compounds (VOCs) contribute to the formation of ground level ozone, which harms human health and the environment. Ground level ozone levels continue to be regularly exceeded during the summer and are a key area of environmental concern (cf. Global Assessment of the 5th Environmental Action Programme (COM(1999) 543 final))
Data source	European Environment Agency

12b. Dust emissions	
Indicator	PM10 (particulate matter with a diameter smaller than 10 micro meter) emissions
Unit	million tonnes
Relevance	The emission of particulate matter contributes to air pollution, causing harm to human health and the environment. The size of the particulates determines their atmospheric dispersion characteristics and is therefore relevant for air quality.
Data source	European Environment Agency

13) Transport	
Indicator	Freight and Passenger Transport
Unit	billion tonne-km, billion passenger-km
Relevance	The dramatic growth in transport, particularly by road and air, and the resulting environmental problems, emphasise the need to focus policies on transport demand management. The overall objective is to break the link between transport and economic growth.
Data source	European Commission (DG ENTR, Eurostat)
Data	
Assessment	Over the past three decades globalisation of economies, the Single Market and increase in welfare have led to a considerable increase in demand for transport. Both, freight and passenger transport have grown more rapidly than GDP.

14) Waste	
Indicator	Generation of municipal waste
Unit	kg per capita
Relevance	Waste represents the loss of both material and energy resources. Main environmental impacts associated with waste are the use of land for landfills and leaching of harmful substances, air pollution and toxic residues from incinerators, as well as air and water pollution from landfills.
Data source	OECD
Data	
Assessment	The generation of municipal waste has been increasing from around 350 kg/capita in 1980 to around 450 kg/capita in 1997. This is considerably higher than the target for the year 2000 in the 5th Environmental Action Plan (330 kg/capita).

15) Resource Use	
15 a. Water use	
Indicator	Use of public water
Unit	million tonnes
Relevance	Water is a vital resource with various important functions for human health and the environment. In the EU, water resources are under considerable pressure from human activities, especially industry and agriculture. Water is an important area of European environmental policy, addressed (cf. 5th Environmental Action Programme1993-2000 (OJ C 138, 17.5.93))
Data source	European Environment Agency

15b. Material use	
Indicator	Direct Material Input (DMI) /Total Material Requirement (TMR)
Unit	tonnes per capita
Relevance	Extraction of natural material resources form the material basis of an economy and indicates a generic pressure on the environment. The volume of resource requirements determines the scale of local disturbances by extraction, the throughput of the economy and subsequent amounts of emissions and wastes since all inputs convert sooner or later to outputs. Hence, the use of materials indicates how efficient a society is using natural resources. Two highly aggregated indicator are shown: The Direct Material Input (DMI) refers to domestically extracted and economically used material resources and physical imports. The Total Material Requirement (TMR) also includes the 'hidden flows' associated with both domestic material extraction (e.g. mining overburden) and imported goods.
Data source	European Environment Agency / Wuppertal Institute
Data	
Assessment	The Direct Material Input (DMI) to the European economy (i.e. domestic extraction of natural material resources and physical imports) has been fallen by around 8 % between 1988 and 1997 on a per capita basis. This was mainly due to an decrease until 1993. Since then, DMI has been rising again. The Total Material Requirement (TMR), including also the "hidden flows" associated to domestic extraction and imports, has increased by around 3 % between 1995 and 1997.

B. Integration Indicators

1) Innovation and environmental innovation	
Indicator	Patent applications in the environmental sector
Unit	Number and share of total
Relevance	This indicator is a proxy for technological innovation in the environmental sector, which is expected to contribute to mitigating ecological damage as well as to increase competitiveness through the occupation of new environmental markets.
Data source	European Patent Office

2) Competitiveness and resource efficiency	
Indicator	Water used and waste generated by industry per unit of value added in the industry sector
Unit	tonnes
Relevance	This indicator measures the eco-efficiency of industry in relation to water and waste. The indicator is environmentally relevant because industry is a major contributor to environmental pressures in both areas. But reducing the use of water and the generation of waste per unit of value added also has positive economic effects because both activities cause significant costs to business.
Data source	European Environment Agency

2) Entrepreneurship and environmental services	
Indicator	Number of start-ups offering new environmental services
Relevance	New companies are seen as an indicator for a dynamic and competitive economy. An indicator on start-ups offering environmental services could monitor if entrepreneurs also exploit opportunities to offer innovative services that reduce environmental damage (e.g. new energy services).
Data source	Currently, there is no data available for this indicator. Short-term availability of the indicator is limited because the category 'new environmental services' does not correspond to a standard industrial activity (e.g. NACE code). However, a qualitative assessment could be envisaged.

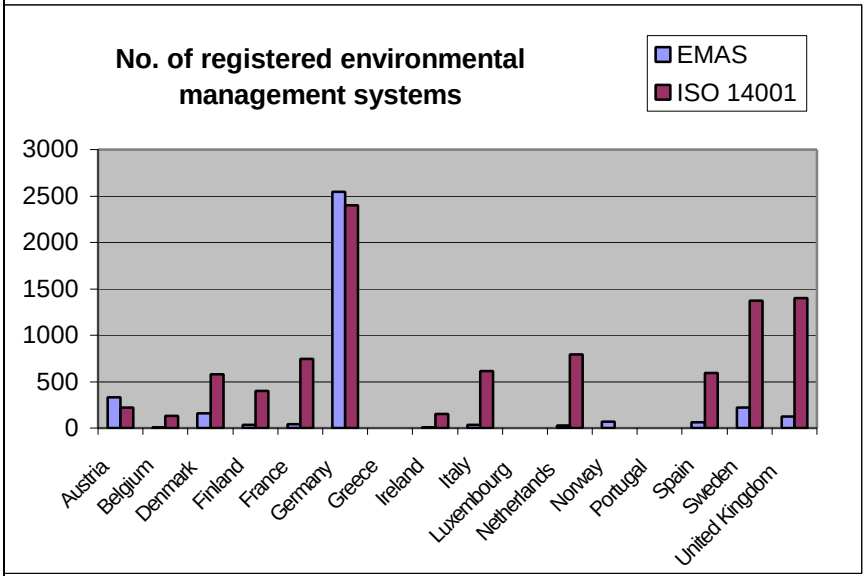
3) Market access and environmental technology	
Indicator	Trade balance in environmental technology
Unit	Euro
Relevance	Environmental technology (including abatement and 'clean' technology) has become an important economic sector. This indicator assesses the international competitiveness of the environmental technology sector. Strong technological capabilities in this sector are an objective of environmental as well as enterprise policy.
Data source	Eurostat

4) Innovation and resource efficiency	
Indicator	Knowledge based sectors as share of gross domestic product
Unit	%
Relevance	Knowledge based sectors (according to OECD definition: communications, finance, insurance, real estate and business services, community, social and personal services) tend to grow relatively fast and are vital for a competitive economy. But they are also less resource intensive than other sectors such as manufacturing and provide therefore the potential for a win-win strategy.
Data source	Eurostat

5) Innovation and employment	
Indicator	Jobs created in the ICT sector
Unit	Number (full-time equivalent)
Relevance	This indicator monitors whether economic growth in the ICT sector (promoted by enterprise policy) has wider social benefits by providing higher employment.
Data source	Eurostat, Demography of Enterprises Statistics

C. Process Indicators

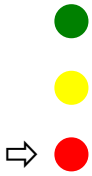
Business

1) Environmental management	
Indicator	Number of EMAS and ISO 14001 registered environmental management systems
Unit	Number
Relevance	Environmental management systems allow firms to evaluate and control their environmental performance. They are expected to reduce the environmental effects from economic activities. EMAS certification ensures the compliance with a recognised standard and a commitment to environmental reporting and continuous improvement.
Data source	EMAS Competent Body, ISO 14000 Information Center
Data	
Assessment	Currently, there are about 3000 EMAS and 9400 ISO 14001 registrations in the EU. Although the number is still rising, the uptake of both environmental management systems has been patchy. Compared to the total number of production sites in Europe, the achieved number of registrations is still small.

2) Social reporting	
Indicator	Firms publishing data about social aspects of the enterprise
Unit	Number
Relevance	Social corporate reporting improves the transparency about social aspects of business. It is expected to contribute to a stronger commitment of companies to social issues such as working conditions, occupational health and safety, training, animal welfare etc.
Data source	Data on this indicator is not yet available. There are however, several online databases of corporate social reports, which could provide the basis of a qualitative assessment (e.g. the Corporate Register at www.corporate-register.com).

3) Product labelling	
Indicator	Manufacturing companies producing one or more products awarded with the EU Eco-Label
Unit	Number
Relevance	The EU Eco-Label provides consumers with information about the environmental information about products, allowing them to make informed choices. The label is expected to promote the diffusion of environmentally friendly products.
Data source	European Commission and Competent Bodies in the Member States

Policy

1) Environmental assessment of policies		
Indicator	Number of policies, programmes and plans for which a Strategic Environmental Assessment has been undertaken at the planning stage	
Unit	Number	
Relevance	Strategic Environmental Assessments identify potential environmental impacts of a policy, programme or plan. It can be used as an information instrument that allows the integration of environmental concerns in the early stages of a decision-making process (see the proposal for a Directive on Strategic Environmental Assessment COM (96) 511 final; the final Directive is expected to be adopted by spring next year).	
Data source	DG Enterprise	
Assessment		Strategic Environmental Assessments are currently not carried out within DG Enterprise.

2) Public expenditure	
Indicator	Share of expenditure considered under criteria which include social and environmental issues
Unit	%
Relevance	Public spending is one of the most direct leverages of public policy making. The integration of sustainable development into policy making requires the consideration of social and environmental issues into spending decisions.
Data source	Data for this indicator is currently not available, but a qualitative assessment can be carried out.

3) Market access for green products	
Indicator	Products or services purchased by the organisation as part of its procurement, which are recognised as being socially or environmentally advantageous
Unit	Number
Relevance	Public procurement covers a substantial part of the EU's GDP and is under direct influence of public authorities. Greening public procurement is an objective of EU policy. Recently, the European Commission proposed that EU public authorities should be obliged to take into account environmental considerations when awarding work contracts or purchasing new equipment (cf. press release IP/00/461 dated 10/05/00).
Data source	Data for this indicator is not currently available. Data collection would also require a clear definition of 'recognised as being socially or environmentally advantageous'. A qualitative assessment can, however, be carried out.

Appendix 2: Indicators and data sources

Indicator Domain	Indicator	Data Source
A.3 Headline Indicators – Economic		
1) Economic growth	Annual growth rate of GDP at constant prices	Eurostat National Accounts
2) Productivity	Total factor productivity (labour and capital)	This indicator is currently under development as part the structural indicators set (see COM(2000) 594 final). It is expected to be available during 2001.
3) Entrepreneurship	Procedures and weeks necessary for company registration	Currently under development by DG Enterprise as part of the Competitiveness Scoreboard.
4) Innovation	General expenditure on R&D per GDP	Eurostat R&D Statistics
5) Investment	Investment in equipment (market prices) as a share of GDP (current prices)	Eurostat (indicator V90152 of the COMPET data set)
A.2 Headline Indicators – Social		
1) Employment	Unemployment rate as a share of total labour force by gender	Eurostat Unemployment Statistics
2) Education	Population aged 25-59 having completed at least upper secondary education	Eurostat
3) Income distribution	Distribution of income (income quintile ratio)	Eurostat European Community Household Panel
4) Access to digital services	Internet on-line active accounts per 100 inhabitants	European Information Technology Observatory
5) Working conditions	Workers reporting working at high speed or to tight deadlines during at least one quarter of their working time	European Foundation for the Improvement of Living and Working Conditions - European survey on working conditions in Europe
A.3 Headline Indicators – Environmental		
1) Energy use	Energy intensity – gross inland consumption per gross domestic product	Eurostat Energy Statistics
2) Air emissions	Aggregated CO_2, N_2O and CH_4 emissions, SO_2, NO_x, VOC and PM10 emissions	European Environment Agency
3) Transport	Freight and Passenger Transport	European Commission (DG ENTR, Eurostat)
4) Waste	Waste generated from daily household and commercial activities	OECD
5) Material Use	Direct Material Input, Total Material Requirement	EEA / Wuppertal Institute

Indicator Domain	Indicator	Data Source
B. Integration Indicators		
1) Innovation and environmental innovation	Patent applications in the environmental sector	European Patent Office
2) Competitiveness and resource efficiency	Water used and waste generated by industry per unit of value added in the industry sector	European Environment Agency
3) Entrepreneurship and environmental services	Number of start-ups offering new environmental services	Data is currently not available. Short-term availability of the indicator is limited because the category 'new environmental services' does not correspond to a standard industrial activity (e.g. NACE code). A qualitative assessment could be envisaged.
4) Market access and environmental technology	Trade balance in environmental technology	Eurostat
5) Knowledge economy and resource efficiency	Knowledge based sectors as share of gross domestic product	Eurostat
6) Innovation and employment	Jobs created in the ICT sector	
C.1 Process Indicators – Business		
1) Environmental management	Number of EMAS and ISO 14001 registered environmental management systems	EMAS Competent Body, ISO 14001 Information Center
2) Social reporting	Firms publishing data about social aspects of the enterprise	Data is currently not available. There are, however, online databases of corporate social reports, which could provide the basis of a qualitative assessment (e.g. the Corporate Register at www.corporate-register.com).
3) Product labelling	Manufacturing companies producing one or more products awarded with the EU Eco-Label	European Commission and Competent Bodies in the Member States
C.2 Process Indicators – Policy		
1) Environmental assessment of policies	Policies, programmes and plans for which a Strategic Environmental Assessment has been undertaken at the planning stage	DG Enterprise
2) Public expenditure	Share of expenditure considered under criteria which include social and environmental issues	Data is currently not available, but a qualitative assessment could be carried out.
3) Market access for green products	Products or services purchased by the organisation as part of its procurement, which are recognised as being socially or environmentally advantageous	Data is currently not available. Data collection would also require a clear definition of 'recognised as being socially or environmentally advantageous'. A qualitative assessment can, however, be carried out.

Appendix 3: Stakeholders involved in the study

NAME	ORGANISATION
Ugo Pretato	ANPA – Environmental Protection Agency Italy
Daniel Mittler	BUND
Trine S. Jensen	Danish Environmental Research Institute
Ken Warwick	Deparment of Trade and Industry, Economics and Statistics Directorate, UK
Maureen O'Sullivan	Department of Enterprise, Trade and Employment, Environment Unit, Ireland
Michael Massey	Department of Trade and Industry, Environment Directorate, UK
Frank Hoenerbach	Environment Agency, German
Annelies de Ruiter	European Commission, DG Enterprise
Pedro Henriques	European Commission, DG Enterprise
Jesusmaria Irigoyen	European Commission, DG Enterprise
George Lemonidis	European Commission, DG Enterprise
Renate Psenicka	European Commission, DG Enterprise
Gerard Aubree	European Commission, DG Environment
Helen Donoghue	European Commission, DG Environment
Eric Degerbeck	European Commission, DG Internal Market
Michel De Meerleer	European Commission, DG Internal Market
Michel Cornaert	European Commission, DG Research
August Götzfried	Eurostat
Bernard Langevin	Eurostat
Rosemary Montgomery	Eurostat
Inger Öhman	Eurostat
Natacha Zuinen	Federal Planning Office, Belgium
Lee Schipper	International Energy Agency
Frits von Meijenfeldt	Ministry of Economic Affairs, Division of Environmental Affairs, Netherlands
Christine Horn	Ministry of Economic Affairs, Germany
Florette Tiemersma	Ministry of Economic Affairs, Netherlands
Alexander Grablowitz	Ministry of Education and Research, Germany
Estela Gallego	Ministry of Industry and Energy, Spain
Maria Sandqvist	Ministry of Industry, Employment and Communication, Sweden
Jean-François Louen	Ministry of Industry, France
Alain Pesson	Ministry of Industry, France
Giuseppe Puglisi	Ministry of Industry, Italy
May Munch Andersen	Ministry of Trade and Industry, Denmark
Mirja Kosonen	Ministry of Trade and Industry, Energy Department, Finland
Graham Vickery	OECD
Fabio Iraldo	Universita' Commerciale L. Bocconi
Hugo Kuijjer	VROM, Directorate of Industry and Consumer Policy, Division of Industry, Netherlands