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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

Towards a Thematic Strategy on the Sustainable Use of Natural Resources

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EXECUTIVE SUMMARY

This Communication is a first step towards the Thematic Strategy on the Sustainable Use of Natural Resources (Resources Strategy), called for in the EU's Sixth Environment Action Programme. It aims to launch a debate on a framework for using resources which supports the objectives of the Lisbon strategy and the EU's sustainable development strategy. After analysing the environmental issues associated with the use of natural resources, it outlines the main features that a future strategy should comprise, building on existing policies. Although it sets out basic ideas on how the EU should target its efforts to reduce the environmental impacts of resource use, it does not actually propose specific measures to this end. This will be done in the final strategy to be presented in 2004.

Natural resources provide the basis for the three pillars of sustainable development, economic, social and environmental. However, physical reserves can become depleted and scarce, and this can then undermine future economic and social development. Moreover, the way in which resources are used can reduce the quality of the environment to an extent that can threaten ecosystems and the quality of human life.

At present the environmental impacts of using non-renewable resources like metals, minerals and fossil fuels are of greater concern than their possible scarcity. With fossil fuels for example, it is the greenhouse gases from their use that are a pressing problem today rather than the risk of reserves running out. With renewable resources like fish, clean water and land the picture is different because of loss of biodiversity and habitats. The Resources Strategy should therefore focus on reducing environmental impacts, thus enabling growing economies to use resources efficiently, from both an economic and an environmental point of view. This de-linking – commonly called decoupling - of impacts from growth is the overarching goal to which this strategy will contribute. It will be necessary to ensure that policies that influence directly or indirectly the use of resources strike a balance between the economic, environmental and social pillars of sustainable development.

Implementing new policies and adapting existing ones in order to achieve the necessary decoupling of resource-related environmental impacts from economic growth will be a long-term process. Businesses, consumers and institutions need time to develop and adopt production and consumption patterns with lower impacts. They will also need public policies with clear long-term objectives in order to plan investment and innovate. For this reason the time scale for the strategy is 25 years.

The relations between resource use and environmental impact are only partially known at present. Furthermore they change with time, for example, as a result of technical or social developments. Differences in regional conditions and use patterns need also to be considered. In addition, environmental impacts related to the use of different resources vary widely. So, initially the strategy has to determine which resources at any given time are of biggest concern, e.g. the resources with the greatest potential for environmental improvement, taking into account technological possibilities and socio-economic aspects. To perform the functions described above, and to take account of continuously evolving patterns of environmental impacts of resource use, the strategy will comprise three strategic elements that will apply continuously throughout its life:

Knowledge gathering

The entire life-cycle of resources, from their extraction, through their use in the production of goods and services and the subsequent use phase, to the waste phase, gives rise to environmental impacts. Any given raw material can take numerous different pathways through the economy. Aluminium, for example, can be transformed into goods as diverse as window-frames, aircraft bodies and beverage cans, and these all interact in very different ways with the environment.

Knowledge about these pathways and impacts is presently dispersed between many actors, and significant gaps exist. The Resources Strategy has to ensure that knowledge is readily available to decision-makers and that gaps are being filled.

Policy assessment

The use of natural resources is influenced by numerous environmental policies, including for example strategies on the marine environment, soil protection, biodiversity and the urban environment, as well as climate change policy, the water framework directive and many others. In addition, many non-environmental policies strongly influence resource use – sometimes unintentionally. Examples include fiscal, transport, agricultural and energy policies. However, there is currently no mechanism for assessing how far policy-choices in these different areas are compatible with the overall aim of decoupling economic growth from the impacts of resource use. The Resources Strategy will make these assessments, raise awareness of potential trade-offs, and suggest alternatives wherever possible.

Policy integration

To bring the strategy to life, concrete actions will need to be taken on the basis of the information generated by the previous two strategic elements. This will involve political judgements on the relative importance of different impacts and environmental targets, taking into account wider sustainable development considerations and identifying measures with the greatest potential for environmental improvement of resource use. The Resources Strategy will therefore work towards increasing the integration of resource-related environmental issues into other policies that influence the environmental impacts of the use of natural resources, in particular under the Cardiff Process.

Following publication of this document, the Commission will, in an open and collaborative process involving the Community institutions and stakeholders, develop a comprehensive strategy to be proposed in 2004.

1. GENERAL INTRODUCTION

Natural resources include both the raw materials necessary for most human activities and the different environmental media, such as air, water and soil, which sustain life on our planet. Careful management of the use of these resources is a basis for sustainable development. This has been recognised internationally, most recently at the Johannesburg World Summit on Sustainable Development (WSSD), where it was agreed that, "protecting and managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development."[1]

In March 2000, the European Council agreed an ambitious objective to make the EU "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion." A Gross Domestic Product (GDP) growth rate of 3% is deemed necessary to fulfil the Lisbon agenda.[2] Since resource productivity is improving, less resources will be required per unit of GDP in the future. However, since resource productivity improvements do not easily outweigh economic growth there is a risk that associated impacts on the environment will still increase. Protecting and managing our resources base can therefore not rely on resource productivity improvements alone. That is why there have been calls for "delinking economic growth and environmental degradation…", as in the WSSD plan of implementation,[3] and, at EU level, in the Sixth Community Environment Action Programme (Sixth EAP),[4] which sets "decoupling between environmental pressures and economic growth" as one of its objectives, aiming among others "at a general improvement of the environment" and "restoring and developing the functioning of natural systems".

Using natural resources in a sustainable way means:

(a) ensuring the availability of supplies; and

(b) managing the environmental impact of their use.

In this context the Community has already tackled a number of environmental issues. Traditionally, these have focussed on point sources of environmental impact in the very early and very late phases in the life cycle of resource use. More recently, attention has also turned to diffuse sources of environmental impact resulting from use of products. Developing a general co-ordinated approach for tackling the environmental impacts of using natural resources, materials and products, the Community is launching three closely interrelated initiatives along the lines set out in the EU's Sixth Environment Action Programme:

– a strategy on the sustainable use of natural resources;

– a strategy on the prevention and recycling of waste;

– an integrated product policy to address the environmental impact of products.

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1 http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm, paragraph 2.

2 Commission Recommendation for the 2002 Broad Guidelines of the Economic Policies of the Member States and the Community, COM(2002) 191 final of 24.4.2002.

3 WSSD called for "delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources." http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm, paragraph 14.

4 Decision N° 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme, [2002] OJ L 242/1.

The Resources Strategy will focus on understanding and mapping the links between the use of resources and their environmental impacts in order to identify where action is needed. The Integrated Product Policy (IPP) provides a toolkit of instruments that can be applied to reduce the environmental impact of a product throughout its life cycle[5]. The two initiatives are therefore complementary. The Waste Prevention and Recycling Strategy takes the waste phase as its starting point[6]. It should, over time, focus on areas linked to the priority issues identified by the Resources Strategy. Parallel implementation of the three initiatives will allow frequent feedback between them and thus help to gradually improve the overall approach through an iterative learning process. Tackling the environmental issues of resources and products simultaneously at different stages of their life-cycles will also improve understanding of trade-offs: how measures adopted to reduce environmental impact at one stage can increase impact at another stage. Clearly, a coherent approach needs to ensure that reduction of environmental impact is assessed over the entire life-cycle.

Given the expected overall increase of resource use, the overarching environmental goal of a Resources Strategy should be to reduce the negative impact of resource use on the environment, i.e. on air, water, soil and living organisms. For this it is necessary to identify the resource usage with the greatest potential for environmental improvement. The strategy therefore has to provide a knowledge base by "mapping the hot spots" of resource-related impact and then assessing the options for improvement. In assessing these options the likely socio-economic effects will be taken into account. The options are likely to fall into one of three categories:

– using resources with more eco-efficient technology;

– changing the patterns of consumption;

– using less of a given resource if there are cost-efficient and feasible means to do so.

"Mapping of hot spots" requires good understanding of the entire life cycle of a resource. The Resources Strategy will therefore investigate the pathways of individual natural resources, from their extraction to their multiple uses for products of many kinds and other purposes, and back into the environment as either pollutants or waste. This should help identify and assess the points along these pathways where policy initiatives would be most effective and appropriate in reducing environmental impact.

There is a strong link here with IPP. Being an open-ended process where every subsequent product generation should be more sustainable than the previous one, IPP will have a clear effect in driving the sustainable use of natural resources. However, being a process-oriented initiative it is not suitable for defining specific impact-related targets. These are policy decisions to be taken in the wider context of sustainable development, and here the Resources Strategy will provide important input.

Links between the Resources Strategy and waste prevention/recycling are equally important: prevention and recycling reduce environmental impact from the extraction of primary raw materials and from the transformation of primary raw materials in production processes. Waste management is therefore part of the life-cycle of resources use and constitutes an integral part of its management.

The Resources Strategy intends to provide the scientific knowledge needed for assessing environmental problems and setting impact-related targets, also on the basis of results from

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5 Integrated Product Policy, COM(2003)302 final of 18.06.2003.

6 Towards a thematic strategy on the prevention and recycling of waste, COM(2003)301 final of 27.05.2003

Community funded research. At present there is no generally accepted single indicator of the environmental impact of resource use, so "pressure" indicators like energy use or generation of waste have sometimes been used as proxies. However, the relationship between pressure and environmental impact is not always linear and considerable research needs to be done to improve our understanding of this subject. The strategy will contribute to this.

The aim of the strategy is to develop a framework and measures that allow resources to be used in a sustainable way without further harming the environment, while achieving the objectives of the Lisbon strategy. Building on existing policies within the broader context of the EU's sustainable development strategy it will, together with the two other initiatives, provide the environmental elements of an overall strategic approach to the sustainable management of natural resources, while giving equal attention to socio-economic aspects. It will not, however, attempt to implement specific initiatives in environmental areas that are already covered by well-established policies.

The present Communication represents the first step in drawing up the Resources Strategy. It examines the problem with resource use and how it fits into the overall context of sustainable development (Section 3). It then, in Section 4, reviews our knowledge of resource use and environmental degradation before moving on, in Section 5, to a review of existing environmental and non-environmental policies that affect resource use. Sections 6 and 7 then outline a possible way forward for the thematic strategy itself.

2. DEFINITIONS

2.1. Natural resources

These include:

(a) **raw materials** such as minerals (including fossil energy carriers and metal ores) and biomass. Fossil energy carriers, metal ores and other minerals (e.g. gypsum, china clay) are non-renewable in the sense that they can not be replenished within a human timeframe. Their stocks are finite and are diminishing because of the use by human activities. In contrast, biomass is in principle renewable within the human timeframe. It includes quickly renewable resources, such as for example agricultural crops and slowly renewable resources, such as timber[7]. However, these biological resources used as raw materials can be exhausted if they are overexploited.[8] This is an acute threat to certain commercially fished marine species, for example.

(b) **environmental media** such as air, water and soil. These resources sustain life and produce biological resources. In contrast with raw materials it is their declining quality that causes concern. It is not a question of how much there is, but what state they are in. For example, the total quantities of air and water on earth do not change within human time scales, but because of pollution their quality is often poor. Moreover, the biological diversity of environmental resources is of vital importance.

(c) **flow resources** such as wind, geothermal, tidal and solar energy. These resources cannot be depleted, but require other resources to exploit them. For example, energy, materials and space are needed to build wind turbines or solar cells.

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[7] The meaning of "renewable resources" is different from "renewable energy resources" as defined in Directive(2001)77final of 27.10.2001.

[8] The term "Biological Resources" is defined under the UN Convention on Biological Diversity (CBD).

(d) **space**, as it is obvious that physical space is required to produce or sustain all the above-mentioned resources. Land-use for human settlements, infrastructure, industry, mineral extraction, agriculture and forestry are some examples.

2.2. Resource productivity

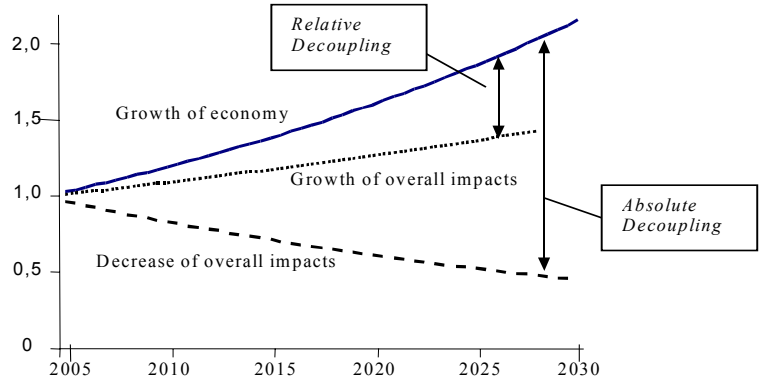
Resource efficiency or resource productivity can be defined as the *efficiency* with which we use energy and materials throughout the economy, i.e. the value added per unit of resource input. This means that resource productivity is defined analogously to labour productivity: the value added per unit of human resource. An example of resource productivity calculation on a national level is dividing the total economic activity of a country (expressed in GDP) by the total energy use (e.g. in toe) or total material-use (tons). The reverse of this quotient, i.e. energy use divided by economic activity, is also used and is called the energy intensity of the economy. If the energy (or material) intensity of the economy decreases, dematerialization is said to occur. The given definition of resource efficiency deals solely with the use to which resources are put. This implies that it does not consider the way resources are extracted or harvested (*upstream* of the economic activity) nor how they are disposed to air, water and soil (*downstream* of the economic activity). In order to fully understand the environmental implications of resource use, it is necessary to include both upstream and downstream activities (including the use of infrastructure, transport, dispersive losses, etc.).

2.3. Decoupling

Decoupling refers to de-linking one parameter from another. There are two sets of parameters that are relevant in this Communication: economic growth versus resource use and economic growth versus environmental impacts. Decoupling resource use from economic growth can mean two things: 1) the economy grows faster than resource use , while the absolute quantity of resource input is still increasing; 2) the economy grows, while total resource input remains stable or decreases. These different degrees of de-linking are commonly referred to as *relative* and *absolute* decoupling respectively. Similarly, decoupling of environmental impact from economic growth means that the economy grows at a faster rate than environmental impact (relative decoupling) or while environmental impact stabilises or decreases in absolute terms (absolute decoupling). Box 1 illustrates the latter.

Box 1

Absolute and relative decoupling of environmental impact from economic growth.



The upper growth line represents economic growth. The middle (dotted) line shows an annual growth of environmental impacts related to resource use. The lower (dashed) line shows a decrease in environmental impact.

3. SUSTAINABILITY AND THE USE OF NATURAL RESOURCES

3.1. Three pillars: economic growth, social progress and environmental quality

The most commonly used definition of the term sustainable development is found in the 1987 report, *Our Common Future,* by the World Commission on Environment and Development (known as the Brundtland Commission). This defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Achieving this in practice requires that economic growth, social progress and improving environmental quality go together. These three pillars can not be developed in isolation since they are strongly interdependent. Economic growth can provide the additional financial resources for improving the quality of the environment and reinforcing social cohesion. Social policy underpins economic performance and helps citizens to take up their responsibility. Environmental policy contributes to preserving the natural resource base of the economy and to enhanced quality of life.

There are many examples to show that environmental progress can go hand in hand with economic growth. Environmental policies together with market demand help foster the European eco-industry. In 1999 it accounted for € 183 billion and had one third of the world eco-market. It is an important future-oriented industry for the EU.[9] The potential of the eco-industry will be strengthened after enlargement, as export to and from the Acceding Countries is expected to be more dynamic than between current Member States.

Sustainable development can occur without impeding progress. However, co-operation between the policy areas that cover the three pillars is necessary. A good example may be the concerted attempts of many actors to bring hydrogen-powered fuel cells to the market. The EU envisages investing 600 million Euro over four years on research in this field and developed a five step plan to push fuel cell use.[10] The US and Japan are also planning major programmes to build up a hydrogen infrastructure and promote advanced automobile technologies. Japan expects to sell around 5 million fuel-cell vehicles by 2020[11]. This development could be the first step in a transition to a new energy supply infra structure, which can offer supply security, environmental soundness and many new jobs.

3.2. Policy responses

In principle, there are two ways in which the use of natural resources can hamper sustainable development. First, natural resource use depletes physical reserves and can therefore make them scarce. This scarcity could then undermine the ability of future generations to access the resources necessary for future economic and social development. Secondly, natural resource use can result in environmental impacts that reduce the quality of the natural environment (such as the atmosphere, bodies of water, soil) in a way that threatens eco-systems or the quality of human life.

It is important to distinguish between these two potential problems, because they require different policy responses. If scarcity of a natural resource is a problem, its availability to the current generation might need to be limited. This would require setting targets to reduce the current and future use of natural resources. However, if we focus on reducing the environmental impacts of resource use, the appropriate policy response would be to ensure that resource use does not lead to unacceptable environmental degradation. This response would include the

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9 ECOTEC Ltd, 2002, Analysis of the EU Eco-industries, their employment and export potential.

10 http://europa.eu.int/comm/research/energy/pdf/hlg_summary_vision_report_en.pdf

11 Eamonn Bates Issue Tracker, July 2003.

promotion of clean technologies and more eco-friendly consumer products. Although in certain cases, e.g. through more recycling or more resource-efficient design, this could reduce the quantity of resources used, this would be a consequence rather than an explicit objective of the policy. In section 4.1 it will be shown that, with the exception of a limited number of renewable resources, such as fish, tropical timber, and biodiversity, scarcity is not the main issue.

3.3. Resource use and environmental impacts

The entire life-cycle of resources, from their extraction to their final disposal as waste, gives rise to environmental impacts. The use of resources can unlock toxic materials and affect the quality of the land around us. After use, materials are often returned to the ground in a much more chemically or physically active state than before. The use of many renewable resources, from their production to final disposal also exerts numerous pressures and may lead to loss of bio-diversity and degradation of the environment. In addition, the burning of energy-bearing materials releases carbon dioxide, which contributes to global climate change. On the other hand some renewable resources have the potential and the capacity to give environmental benefits, for example using wood may contribute to climate change mitigation due to carbon storage. Where economic growth increases the volume of materials displaced and the use of land, it should be ensured that the related impact on the environment does not increase to a degree that would undermine the capacity of the environment to produce resources. Failure to address these issues could lead to our "moving beyond the carrying capacity of the environment", as stated in the Sixth EAP.

At the same time it is clear that taking resource use as a proxy for environmental impacts is not the way to proceed. Developing knowledge about the relationship between resource use and environmental impacts is therefore a prerequisite for the Resources Strategy. Recent research has shown that it is possible to identify those materials and resources whose use have the biggest environmental impact.[12]

4. WHAT IS THE CURRENT SITUATION?

4.1. Resource use and scarcity

4.1.1. Non-renewable resources

Calls for reduced consumption of non-renewable natural resources are based on concerns that the resources required to sustain future economic growth or social development will not be available. Such calls focus mainly on minerals, metals and fossil fuels, as it is undeniable that their total physical stocks are finite.

(a) Reserves of fossil fuels and mineral resources

The known world reserves of fossil fuels are very large and keep growing.[13] Given the total tonnage of proven coal reserves, the present rate of coal mining could continue for over 200 years. Proven oil reserves have increased by about 45 billion barrels since the last survey by the World Energy Council, despite the production of some 75 billion barrels of oil and natural gas. In other words, the increase in proven reserves has outweighed consumption in recent years.

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[12] Weighting Materials: Not just a Matter of Weight. CML (Leiden, 2003).

[13] www.worldenergy.org

For metals the prospects are similar. For most metal ores known reserves equal several decades of today's production (Box 2).[14] Although several decades may not seem enough to ensure long-term security of supply, it must be kept in mind that at any given time, reliably known reserves are only a fraction of total physical reserves. The reason for this is that less effort is made at geological exploration as long as there are sufficient proven reserves.

Two other factors explain why reserves of non-renewable resources tend not to decline:

– efficiency improvements: process improvements mean that a greater proportion of the resources present in reserves can be extracted. In addition, innovation means that we can make more out of a tonne of steel today than we could one century ago. This means resources are used at a slower rate than past or current consumption patterns would suggest. Moreover, improvements in exploration and extraction techniques mean that today we can exploit reserves which were previously unknown or not considered viable.

– recycling: some materials can be recycled to a very high degree, e.g. aluminium. Each tonne of aluminium recycled saves many tonnes of primary raw material, such as bauxite, and sometimes fossil energy. Again, increasing recycling rates mean that some resources are used at a slower rate than past or current consumption patterns would suggest.

Box 2

Examples of metal reserves

For economic reasons mining companies tend to reduce exploration efforts once they have established reserves for the next 20-40 years, but this is not indicative of any geological shortage.

	Production 1999 (10^3 *tonnes*)		World Reserves	Reserves/Production (years)
	World	*EU-15*	(10^3 *tonnes*)	
Iron	535000	13000	71,000,000	133
Zinc	8040	560	190,000	24
Lead	3020	201	64,000	21
Copper	12600	182	340,000	27
Nickel	1120	17	49,000	44
Tin	198	3	9,600	49
Silver	18	0.5	280	16

The existence of these mechanisms does not mean that concerns about scarcity can be rejected. It just means that they must be treated with caution and with due consideration for the specific conditions of any particular resource. Moreover, it shows that the fact that a given resource is finite does not automatically imply that this resource will become scarce. Indeed, as some resources can be substituted for others or even made redundant through the use of new technologies, there is no reason why we should use a given resource forever and thus exhaust its entire physical reserve.

(b) Technological and scientific progress in the use of mineral resources

[14] Report to DG Environment by Simonds and COWI (2001).

There are many examples of innovation which have led to one resource being substituted for another. There have been marked changes in production and consumption patterns during the course of the twentieth century. In general, historical experience suggests that patterns of resources use change because alternatives become available, not because they become physically scarce.[15]

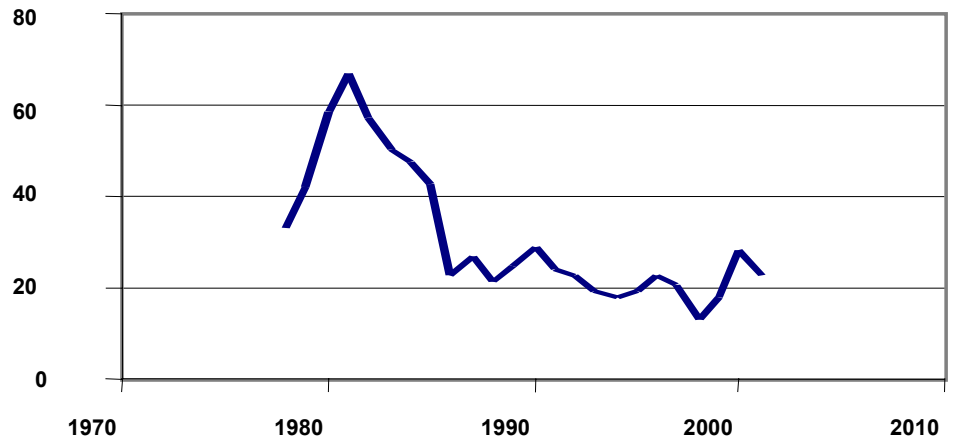
Progress in our understanding of health impacts and eco-toxicity is another important reason why the use of many mineral resources is decreasing: for example, asbestos, radium, uranium, lead, mercury and cadmium are being used at restricted levels for toxicity reasons, even though there is no shortage of reserves.

(c) Mineral resources price trends

In a functioning market, scarcity should lead to rising prices as long as demand persists. According to this indicator there are no signs of the imminent scarcity of non-renewable resources. Despite increasing consumption, metal and energy prices have decreased in constant terms over the last decades. Crude oil prices, for example, have followed a general downward trend ever since the oil crises (Box 3).[16] However, the expected medium term increase in world oil demand may influence this trend.

Box 3

Crude oil prices since 1975 in constant US $ (year 2000).



4.1.2. Renewable resources

While there is little evidence that scarcity of non-renewable resources is a serious threat to sustainable development, there is a growing consensus that a number of renewable resources are becoming scarce. Examples of this include fisheries and freshwater.[17]

Although these resources can be renewed or replenished, current consumption outstrips their capacity to regenerate. On the other hand, timber in the EU is being harvested such that the total cut per year is only 50% of the net annual increment, leading to an increasing stock. While some renewable resources could, in principle, be substituted by others, scarcity of renewable resources would, in itself, constitute an environmental impact, such as the loss of biodiversity due to the

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15 Partial substitution of coal in domestic heating and industrial power generation is a common example, notwithstanding that coal maintains to be one of the most important carriers of primary energy.

16 http://www-cta.ornl.gov/data/Chapter5.html

17 However, the dynamics of resource use for fish and water are very different. Scarcity of fish is due mainly to over-fishing while scarcity of fresh water is due mainly to pollution.

extinction of certain species or the loss of habitats. This is a fundamental difference with non-renewable resources.

4.1.3. Security of supplies

Despite sufficient world reserves, the availability of certain resources may become limited for geopolitical reasons. For example, the oil shortage in the 1970s was the result of an economically and politically motivated trade embargo and not of physical scarcity. In the wider context of sustainable development a European Resources Strategy will have to take due account of the possibility that supplies might be interrupted by such events and of the consequences for using natural resources. European energy and transport policies for which security of supply has already been one of the core topics for several decades will play an important role in this respect.[18] It is also important to note that while predictions about global physical scarcity of most non-renewable resources have turned out to be unfounded over the medium term, domestic reserves in the EU are limited. Despite considerable progress made in tapping conventional energy reserves in the EU, their levels remain low and they are expensive to extract. In the future, they are likely to decline sharply, and it is anticipated that in the next 20 to 30 years more than 70% of the EU's energy requirements will have to be covered by imported products. Price developments resulting from an increased world oil demand and their potential influence on the security of supplies will have to be carefully assessed. Security of supply will therefore remain to be an important policy issue. Security of supply does however not seek to minimise import dependence but aims to reduce the risks linked to such dependence.[19] For a wider examination of security of supply issues see "Security of supply – the current situation at European level".[20]

4.2. Trends in resource use

The quantities in which individual resources are used, the products and services into which they are converted and the technologies applied are changing all the time. Certain resources may become obsolete due to technological innovation, natural rubber and natural indigo being two examples, while for others demand may grow, e.g. nickel with the use of stainless steel, of which it is an important component. Resources may also be banned or phased out for health reasons, like asbestos or mercury.

In some economic areas resource use has been subject to active management for a long time, such as OPEC for crude oil, ECSC for coal and steel, the EU Common Fisheries Policy, or land use planning systems. Quite a few countries also aim at a sustainable forest policy. The use of many other resources is influenced in a less visible way for example by fiscal, social and trade policies. Recent data show significant differences in the trends for the resource groups "materials" (including biomass), "energy" and "land". These are discussed below.

(a) Material efficiency is improving

Material flow accounting has shown that in the last twenty years overall consumption per inhabitant remained virtually unchanged in the EU at around 16 tonnes per year.[21] At the same

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18 For example the adopted directives on RES for electricity and energy savings in buildings and the proposed directives on oil and gas stocks.

19 Green Paper "Towards a European strategy for the security of energy supply", COM(2000)769 final, 29.11.2000.

20 Commission Staff Working Paper: Security of supply - The current situation at European Union level. SEC(2002)243.

21 EUROSTAT (2002): "Material use in the European Union 1980-2000: indicators and analysis", Working Papers and studies series, Office for Official Publications of the European Communities.

time the economy grew by 50% over the same period. Today we create over 50% more value per kilogram of material used than in 1980. This means we have significantly improved our material efficiency. In Box 4 the results of material flow studies in the EU 15 are presented, clearly showing that both Domestic Material Consumption (DMC) and material consumption per capita are decoupled from economic growth.

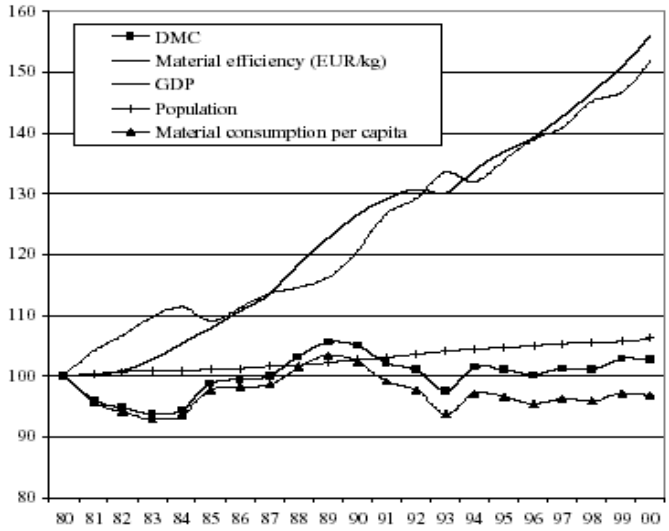
Material flows provide valuable indications of the overall trends in resource use. However, they can not tell us how the materials interact with the environment. Everything else being equal, stabilising material use per capita would not reverse the trend in environmental degradation. However, it can substantially contribute to reducing impacts where less polluting technologies and consumption patterns are applied and the gains are not outweighed by population growth. Nevertheless, in some cases like the progressive sealing of land, impacts keep growing even if material input remains constant.

Identifying changes in flow patterns and their potential interactions with the environment (where and how they impact on the environment) requires a comprehensive collection of data and continuously updated knowledge of material flows. Much work is already being conducted by national, European and international bodies including OECD and the European Commission.[22] However, many material flows need to be examined in much more detail in order to support policy-making. How materials like heavy metals are dispersed from for example short-lived consumer products, housing or infrastructure into the environment also needs to be better understood.

Box 4

Relative decoupling of material use from economic growth

EU-15 material consumption increased by about 3% between 1980 and 2000. The increase was mainly due to increased use of minerals (+5%) and biomass (+6%), whereas the weight of fossil fuels decreased (-5%). Material consumption per inhabitant declined from 16.2 tonnes per capita to 15.6 tonnes per capita (-3%). Development over time implies a strong (relative) decoupling of economic growth and material use (see figure). Overall material efficiency increased by 52%. In 2000, material consumption in the EU was about 5.9 billion tonnes, or about 15.6 tonnes per inhabitant per year. 50% of total materials consumed in 2000 were minerals, 26% biomass and 24% fossil fuels (Eurostat, 2002).



Indices of main indicators for EU-15, 1980-2000 (1980=100), DMC= domestic material consumption (source Eurostat 2002).

[22] For example through EUROSTAT, the EEA and the European Topic Centre for Waste and Material Flows.

(b) Energy consumption continues to rise

Energy is a key resource for our economy. Overall demand is predicted to grow substantially over the coming decades, by 30% for the OECD countries[23] and by 70% for the world as a whole in the next 30 years.[24] For the EU, these increases are smaller than the targeted doubling of the economy over the same period;[25] if efforts are maintained, the decoupling of energy use from economic growth will continue. However, energy consumption will still increase in absolute terms.[26] To understand the potential impact this will have on the environment it is necessary to assess carefully how various energy options influence material flows and their interaction with environmental media. For example, large-scale moves towards biomass as an energy source would have to be assessed in terms of the agricultural area or forest reserves needed and the consequences this would have for natural habitats. In the wider context of sustainable development, the consequences of a biomass energy policy on food production and on the wood market need to be considered. It is necessary to ensure sound knowledge of present use patterns and possible future trends, and to make them available to policy-makers and stakeholders. Otherwise decisions to substitute one energy source by another may shift the environmental burden, e.g. from air to soil, without decreasing the overall impact on the environment.

(c) Space is not being used efficiently

Physical space (land and sea) is also a key resource. Once used for built-up areas or infrastructure, it may be impossible to reclaim. However, such land use is accelerating in Europe. Built-up areas have expanded by 20% during the last two decades, which is much faster than population growth (6%). There are many reasons for this, such as the decentralisation of urban land uses, the demand for bigger houses and out-of-town developments (like supermarkets and leisure centres), and the provision of transport infrastructure. These trends are causing increasing amounts of soil being sealed, leading to losses of bioproductive land and the fragmentation of natural areas in most of Europe.[27] Land should thus be considered as a scarce resource which, partly due to inefficient urban development, is reducing the quality of the environment as a whole.

4.3. Pathways of natural resources through the economy

The life cycle of natural resources used in our economy includes several phases. The first phase consists of extraction, comprising activities like mining, harvesting and fishing. At the very end of the cycle, even if subject to recycling numerous times, resources return to the environment - air, water and soil - as emissions, effluent, and waste. In between these phases, resources are transformed into products of many kinds and other goods that are consumed more or less rapidly or added to the built-up environment. This middle phase of the life cycle links the production of natural resources, for example by mining or agricultural methods, with the environmental impacts by their use. During this phase every resource follows different and often very complex pathways. Phosphorus, for example, may be used in detergents or fertilisers. Only at the end of the life cycle do these paths converge again when the phosphorus returns to the environment, where it can damage rivers, lakes and coastal waters, regardless of whether it was used in detergents or fertilisers.

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23 OECD Environmental Outlook, Paris 2001.

24 World Energy Technology and Climate Policy Outlook – 2003. European Commission, OPOCE Luxembourg 2003.

25 Commission Recommendation for the 2002 Broad Guidelines of the Economic Policies of the Member States and the Community, COM (2002) 191.

26 Environmental Signals 2002, benchmarking the millennium, European Environment Agency.

27 Environmental Signals 2002, benchmarking the millennium, European Environment Agency.

Lead, to take another example, is mined at various locations under very different technical and environmental conditions and then transformed by a multitude of technologies into products as diverse as electric batteries, chemical substances and construction materials. Throughout this life cycle some of the lead re-enters the environment where its toxicity may harm biological systems and human health.

Pollution abatement has traditionally concentrated on the early stages of the life cycle (for example Integrated Pollution Prevention and Control (IPPC) at the industrial manufacturing phase) and at the end (waste policy). Only recently more attention is being given to the intermediate stages, like the use phase of products in Integrated Product Policy (IPP). The Resources Strategy will bridge this gap by relating the environmental impact of resource use at the end of the cycle to the extraction of resources at its very beginning. For this it will need to have a clear picture of the volumes of resource flows and the pathways they take through the economy and back into the environment. This will also provide information about the potential choices which could be made at each step of the life cycle and what its economic, environmental and social impacts would be.

(a) Resources entering the economy

The stream of natural resources entering our economy is generally reasonably well known. Data on domestic production and imports are available from a large variety of sources. They are processed into annual and multi-annual data collections, statistics and trend analyses by a large variety of actors from industry, trade, academia, public authorities and others.

The Resources Strategy will draw on this existing knowledge. However, detailed investigations of the use of individual resources will be needed from time to time in order to support political decision-making and to adjust policies to changing economic and technological circumstances.

(b) Pathways resources take through the economy

Any stream of raw material that enters the economy will soon split into several pathways. Aluminium, for example, will be transformed into goods as diverse as window frames, aircraft bodies and beer cans. Some of these may not return to the environment for many decades because of their long life-expectancy and efficient recycling. Others return to the environment very quickly - it is estimated, for example, that over 100,000 tonnes of aluminium are lost annually in drink cans that are not recycled. These losses need to be replaced with primary aluminium, which takes thirty times more energy to make. Crude oil is another example: apart from being used as fuel, it is converted into hundreds of plastics and many thousands of chemical substances. Although plastic waste may be particularly visible, some of the most damaging environmental impacts may come from very small quantities of oil that are converted into harmful substances acting, for example, as endocrine disrupters.

Knowledge about these pathways is highly dispersed between many actors and significant gaps exist. The Resources Strategy will ensure that the knowledge is readily available to decision-makers, fill any gaps and propose action.

(c) Resources returning to the environment

From the moment we first start to extract a resource we generate emissions, effluents and waste which return to the natural environment. Threshing grain, for example, leaves behind large volumes of straw that eventually has to be returned to nature as CO_2 (incineration) or as bio-mass (composting). During the use phase of many products, more material returns to the environment. For example, several thousand tonnes of zinc are washed into European sewage

waters annually from buildings, infrastructure and consumer goods. Certain resources are even meant to be dispersed, such as the previously mentioned phosphate in fertilisers and detergents.

Pollution abatement policies and waste policy aim at minimising the amounts of dispersive losses to the environment. However, while they have achieved impressive results in reducing the amounts of polluting substances going into the environment, it can be useful to analyse whether the most important material and waste streams have been addressed. By mapping the pathways through all three phases described above the Resources Strategy will provide the links between resource use, economic activity and environmental impact. It can then point out where action is most urgent and has the biggest potential to effectively achieve environmental and economic benefits. The principal options are:

– using more efficient and cleaner technologies.

– changing the pattern of consumption so that some specific resource uses are reduced;

– using less of a resource to protect it and to alleviate impact from its use;

In doing this, the strategy will take into consideration regional differences, technological developments, and changing production and consumption patterns.

4.4. Trends in environmental impacts

Both OECD and EEA report that the growth of our economies outweighs the improvements in resource productivity, resulting in a potential increase of many related environmental impacts[28,29]. OECD's Environmental Outlook indicates that the following issues should be addressed urgently: biodiversity, tropical forest coverage, fish stocks, groundwater quality, urban air quality, climate change and chemicals in the environment. Moreover, surface water quality, forest quality in OECD regions and ozone layer integrity requires further action, the report says. EEA's Environmental Signals 2002 concludes that 'some environmental pressures continue to be closely coupled with development in certain sectors, such as green house gas emissions from transport (and tourism), waste generation, space and territorial degradation, energy and resource consumption from households, and reduction of stocks from fisheries'. In their recently published "Europe's environment: the third assessment", EEA reports that the state of the environment across Europe has improved in several respects over the past decade. However, it warns at the same time that much of the progress is likely to be wiped out by economic growth because governments have yet to make significant strides towards decoupling environmental pressures from economic activity[30].

4.5. Health aspects of resource use

While the use of natural resources is the basis of human well-being, it may also have unwanted impacts on human health during their production, use and disposal. For example, mining entails risks of injury and silicosis if precautionary measures are not implemented. Asbestos has caused cancer in many workers in manufacturing plants and is a recognised health threat during its use

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28 The OECD Environmental Outlook (Paris 2001) looks 20 years ahead using an economy-based assessment of environmental pressures and conditions to 2020.

29 Environmental Signals 2002, benchmarking the millennium, European Environment Agency.

30 EEA, 'Environmental assessment report No 10 was prepared for the 'Environment for Europe' Ministerial Conference being held under the auspices of the UN Economic Commission for Europe in Kiev, Ukraine on 21-23 May 2003.

phase in buildings. In the waste phase of the life-cycle, "Minamata disease", a neurological disorder caused by methylmercury poisoning of the food chain, is a well documented case.[31]

These examples have received considerable political attention and measures have been taken to avoid or reduce these types of environmental health risks. However, this does not mean that all problems are solved. The World Health Organisation (WHO) estimates that diseases are caused by 25 different risk factors, of which a few are environmental (e.g. ambient air, indoor air, lead, water, climate change) [32] and related to the use of resources. WHO estimated that exposure to fine particulate matter in outdoor air leads to about 100 000 deaths (and 725 000 years of life lost) annually in Europe.[33] On the other hand, projected emissions from road transport suggest that emissions of the traditionally regulated pollutants will fall to less than 20% of their 1995 levels by 2020.[34] The Commission has presently developed a Community Strategy for Environment and Health that identifies where initiatives at the European level are most urgent and what action to take.[35]

4.6. Resource management concepts

There are various concepts that address the resource management question from different angles. The number and divergence of these concepts, which all have their specific merits, reveals that there is no clear and unanimous answer or approach to the problem. The various concepts serve a number of functions, such as awareness raising (Ecological Footprint) and material flow accounting (TMR). Moreover, some concepts include targets (e.g. Factor 4), whereas others are process-oriented (Green GNP). This means that the concepts have different angles of view and different scopes, emerge from different schools of thought and imply different perceptions of problems and different solutions. None of them focuses on the impact of resource use. Therefore there is no single concept that can serve as an analytical framework for the Resources Strategy. Nevertheless, the Resources Strategy can build on elements of these concepts.[36]

Furthermore, a group of resource use indicators have been developed in the context of research on impact assessments in Life-Cycle Impact Assessment (LCIA) for various kinds of resources, including biotic and mineral resources, land and soil use, water extraction etc.

4.7. Summary

– with the exception of certain renewable resources, predictions about global scarcity have turned out to be unfounded;

– we have achieved decoupling of materials use and economic growth, notably in many sectors of EU industry, but some environmental impacts of materials use continue to increase.

– although energy efficiency is likely to improve over the next 30 years (by 1% annually in a "business as usual" scenario), due to economic growth, overall energy use is still likely to rise with possibly associated further impacts;

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31 http://www.nimd.go.jp/english/index.html

32 http://www.who.int/peh/burden/globalestim.htm

33 World health report 2002, Geneva, World Health Organisation 2002, http://www.who.int/whr/en/

34 A review of the Auto-oil II Programme, COM (2000)626 (05.10.2000).

35 A European Environment and Health Strategy, COM(2003)338, 11.06.2003.

36 'Analysis of Selected Concepts on Resource Management, A study to support the development of a thematic strategy on the Sustainable use of Resources', COWI, March 2002, is available on the web.

– soil sealing continues to increase, leading to loss of bioproductive land and increase of built-up land at a faster rate than our population is expanding;

– the extraction and use (e.g. through combustion) of resources may sometimes have adverse effects on human health, despite continuous progress being made in this respect;

– the environmental focus of a resources strategy should be on reducing the environmental impacts of resource use. In the wider context of sustainable development a European Resources Strategy also needs to take into account the issues of economic scarcity and security of supply.

– using resources can cause environmental pressures at any stage of the life-cycle. The links between the extraction of resources and the environmental impacts their use and disposal may cause are often complex and not sufficiently understood;

– although elements of many of the resource management concepts can be used in the Resources Strategy, no single one is suitable to serve as a basis for the whole strategy.

5. WHAT POLICIES ON NATURAL RESOURCES ALREADY EXIST?

5.1. Introduction

The Resources Strategy is breaking new ground as the EU has no overall policy at present to address the environmental impacts of resource use and the Commission is not aware of any comprehensive national policies that address this area either.[37] On the other hand, the OECD has done substantial work. Their "Environmental Strategy for the First Decade of the 21st Century",[38] sets, among other things, the goal of decoupling environmental pressures from economic growth. They have also done work on environmental indicators. The Resources Strategy will build on this and other work, including existing strategies and policies that are resource-related, such as the Thematic Strategy on the Marine Environment,[39] the Thematic Strategy for Soil Protection,[40] the Biodiversity Strategy[41] and the forthcoming Strategy on the Urban Environment.

The Resources Strategy will complement environmental policies which address the status of environmental media. Its point of departure is the beginning of the life-cycle of resources (i.e. mining, harvesting, etc.). From there it tracks resources through the economy, identifies the most serious environmental impacts related to their use and develops solutions. At this point it links in with the other strategies and policies mentioned above. The Resources Strategy may therefore be seen as the base of a pyramid of environmental policies, the top of the pyramid being concern for human health and bio-diversity.

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37 None of the Member States have developed a resource strategy yet. This also means that none of them has adopted one of the resource management concepts. There are, however, national policies that address individual issues. For instance, the UK funds a programme to encourage more efficient use of raw materials (Envirowise). In order to have a clearer picture of national policies that influences resource use, the Commission intends to finalise a review of policy measures by Autumn 2003.

38 Environmental Strategy for the First Decade of the 21st Century, OECD May 16, 2001.

39 Towards a strategy to protect and conserve the marine environment COM (2002) 539 (02.10.2002).

40 Towards a Thematic Strategy for Soil Protection COM (2002) 179 (16.04.2002).

41 Biodiversity Strategy, COM (1998) 42 (04/02/1998) and Biodiversity Action Plan for the Conservation of Natural Resources, COM(2001)162 final, Volume II, 27.3.2001.

5.2. Policies for environmental media

Generally, policies on soil, water and air all have the environmental quality of their particular medium as their starting point, with the measures required being determined by the existing knowledge of the problems. For example, in the field of water protection, the fact that a water body does not meet "good quality" requires certain measures to be taken[42]. As for soil, the fact that desertification is increasing and organic matter is decreasing means that measures are likely to be necessary to redress this.

Such policies, including also those on biodiversity, are necessary to provide targeted responses to particular problems because it is not feasible to look at all environmental problems together in any degree of detail, something that was implicitly recognised in the Sixth EAP with the call for Thematic Strategies. However, when dealing with resource use, which affects the whole environment, it is best not to separate out the different environmental media from one another. That approach is followed in the Resources Strategy.

5.3. Policies that influence the use of resources and their environmental impact

In addition to the environmental policies that address the state of particular environmental media, there are many others that affect the use of resources - sometimes unintentionally. These include:

- **economic policy**, where the drive for strong economic growth means that resources have to be used to support it;
- **fiscal policy**, where the traditional focus on taxing human resources (e.g. through national insurance contributions) rather than resource use has favoured increasing labour productivity over resource productivity;
- **agricultural policy**, where the objectives of the Common Agricultural Policy are widening beyond agricultural productivity to include among other goals, the integration of environmental concerns for a sustainable use of water and soil;
- **fisheries policy,** where the Common Fisheries Policy aims to provide for coherent measures concerning the conservation, management and exploitation of living aquatic resources. This includes limiting the environmental impact of fishing in consistence with other Community policies, in particular with environmental, social, regional, development, health, and consumer protection policies.[43]
- **energy policy**, where one aim is to ensure safe energy supply; **transport policy**, where the use of land for transport infrastructure can, for example, lead to habitat fragmentation.

However, these policies also contain instruments that can reduce undesired environmental impact. The price mechanisms of functioning resource markets, for example, can efficiently discourage negative environmental impacts of resource use by stimulating substitution or technological innovation. The key therefore is to integrate concern about use of resources and the consequent impacts into these policies in a co-ordinated way. An example of this kind of approach is the Biodiversity Action Plan which defines policy instruments and actions with the

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42 Several aspects of the sustainable use of water resources are covered by the Water Framework Directive; Directive 2000/60/EC.

43 Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy.

aim of achieving a sustainable management (conservation and use) of natural resources (although in the context of the Biodiversity Action Plan 'natural resources' means wild plant and animal species and their related ecosystems and habitats). In addition, the sectoral action plans of the Biodiversity Strategy contribute to integrating biodiversity concerns into different policy areas. The recent reform of the EU's Common Agricultural Policy is another example of strengthened integration of environmental concerns in a sectoral policy area. In addition, a large number of international conventions address the use of resources and the related environmental impacts. Their contributions to an overall European approach will need to be elaborated in detail when working out the final strategy. Further, integrating environmental aspects of resources policies in education and information policies can help to encourage citizens and stakeholder groups to take on responsible consumption patterns. The Resources Strategy will emphasise the importance of integration of environmental concerns into other policies that affect environmental impacts of natural resources use but it will not attempt to implement specific initiatives in areas that are already covered by well-established policies, including the previously mentioned international agreements.

5.4. Policies that can help to reduce the impact of resource use

As well as policies, like the ones discussed in Chapter 5.2, that tackle environmental pressures directly, there are also a number, either existing or under development, that can help reduce these pressures. These include:

- the **Cardiff Integration Process** – this seeks to increase integration of environmental issues into other policy areas. The integration of resource concerns as underlined in Chapter 5.3 would be one of these issues;

- **Research and Innovation Programmes**[44] - parts of these attempt to find new environmental technologies and new approaches to production and consumption patterns that will help to alleviate the environmental impacts of resource use. Other programmes work towards a better understanding of the impact of resources use, in particular with respect to taking account of externalities;

- the **Environmental Technologies Action Plan**[45] will attempt to dismantle the barriers to the application of new environmental technologies;

- the **Integrated Product Policy** – which aims to reduce the environmental impact – and hence the way in which resources are used – of products and services throughout their life-cycles;

- the new European **Chemicals Policy –** which will aim for a more sustainable use of chemicals, and thereby reduce their impact on the environment.

- **Education and information** on environmental resources policies.

5.5. A coherent approach to environmental impacts of resource use

While all the policies discussed in the previous chapters affect the use of resources, they have to be applied coherently. The Resources Strategy will facilitate this by taking a holistic view of how policy measures on the environmental impacts of the use of resources interrelate.

Examples of potentially diverging objectives within environmental policy:

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44 for example the EU's RTD Framework Programmes and the LIFE programme.

45 COM(2003)131.

– using bio-mass, including forest products, to produce energy can be an effective way of reducing greenhouse gas emissions, but must be managed in a way that avoids negative environmental impacts on land use and bio-diversity and avoids market distortions;

– the banning of CFCs under the Montreal Protocol led to the use of alternatives, which do not react with the ozone layer but have very high greenhouse gas potentials;

– the adoption of the urban waste water directive has led to a significant improvement of the waste water discharged into water courses. However, the disposal of the resulting sewage sludge can in itself have a significant environmental impact if not managed properly.

Examples of potentially diverging objectives between environmental policy and other policies:

– subsidies to coal mining may be regarded as falling within the social pillar of sustainable development, but must be managed in a way that does not create barriers to the introduction of new environmental technologies and renewable energy sources. Consideration should also be given to ways of achieving such social objectives in ways that would be more economically efficient and less environmentally harmful;

– reducing fishing quotas helps protect bio-diversity, but careful consideration has to be given to short and long term employment impacts in the fishing industry.

Balancing different objectives is a key element for sustainable development, so policy choices need to be supported by a proper understanding of potential trade-offs. Environmental assessments[46] and internal Commission procedures such as extended impact assessments[47] are increasingly used to assess policy options. However, there is currently no mechanism to relate policy-choices to the overall aim of decoupling economic growth from the environmental impacts of resource use. The Resources Strategy aims at giving decision-makers the means to make these assessments.

6. WHAT NEEDS TO BE DONE?

6.1. Introduction

The aim of the Resources Strategy is to develop a Community approach that will provide policy makers and other stakeholders in the relevant policy areas with the necessary framework and information for:

– identifying and assessing the impacts of resource use on the various environment media (air, water, soil), on bio-diversity and on human health;

– addressing scarcity where relevant;

– preparing and reviewing policies that influence resource use and its associated environmental impacts.

This should also help the Commission to examine and define which measures might be necessary to enhance the coherence of existing policies in promoting a balanced approach to policy assessment, integrating economic, social and environmental objectives with regard to the

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46 Directives 85/337/EEC and 2001/42/EC.

47 COM 2002/276 Communication on Impact Assessment.

use of natural resources. The long term goal of this approach is to achieve a reduction of the environmental impact of resource use and the use of scarce resources, in accordance with the aims of a general improvement in the environment, restoring and developing the functioning of natural systems and sustainable development of the EU as a whole.

6.2. Core elements of a future thematic strategy

(a) Knowledge gathering

To support policy decisions on the prioritisation of resource-related environmental problems, a sound understanding of the links between resources use and the associated impacts at each stage of the life cycle is needed. Without this, impacts that are highly visible, for example lead mining, may attract disproportionate attention when compared with impacts that appear to be more subtle or only make themselves apparent after a certain length of time, such as dispersal of lead from leaded car fuel.

Such a knowledge base will need to include information on data like material flows, the state of ecosystems, land use and marine resources. Many bodies exist, both at the national and EU level, which could contribute the necessary knowledge if asked the right questions. The Resources Strategy will initiate and monitor work on the knowledge base needed for the development and implementation of action. This can then feed into the policy-making process, which will need to decide which impacts to focus on and to decide which options are most appropriate, while maintaining economic growth.

In this context it is important to note that in a knowledge society, education and information of citizens and other stakeholders about the knowledge gathered will help to support the implementation of environmental policies in the field of resources use.

(b) Policy assessment

Any policy to reduce environmental impacts, such as by shifting the demand pattern, or using more eco-efficient technologies, is likely to have impacts on other policy areas or on technologies. Therefore it is necessary to undertake an assessment of the likely impacts on the environment (both inside and outside the EU) of any such policy measure. This assessment will examine whether the likely environmental effects are compatible with the objective of the Resources Strategy. In this assessment the likely socio-economic effects will be taken into account. By doing this it will make policy-makers and other stakeholders aware of potential trade-offs – with other environmental and non-environmental policies - and stimulate the development, where possible, of alternative measures.

(c) Policy integration

Concrete actions will need to be taken on the basis of the information generated by the previous two activities. This will require political decisions to be made that take into account the role of natural resources within the wider context of sustainable development. For example, while it is generally acknowledged that there is a need to get the prices right[48] there has often been only very limited progress in this direction.[49] Likewise, from an environmental perspective, further

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[48] For example, in the Conclusions of the Gothenburg European Summit in 2001.

[49] For example, the overall share of revenue from environmental taxes in total revenue from taxes and social contributions in EU Member States is between 5 and 10 % (Environmental Signals 2002, *Benchmarking the millennium*, European Environment Agency, p. 125) and the six years delay to reach a political agreement on the Commission's proposal for a directive on taxation of energy products, which was presented in 1997 (COM(97)30 of 12.3.1997).

progress towards the elimination of environmentally negative subsidies could be made. The "policy integration" element of the future strategy will assist in addressing key issues while considering all aspects of sustainable development. This element will also meet the need for permanent monitoring of progress so that any initiatives of the strategy can be reassessed and revised if necessary.

6.3. Work under way

According to the Sixth Environmental Action Programme, the Resources Strategy should include five elements, or tasks.

Task 1: An estimate of materials and waste streams in the Community, including imports and exports, for example by using material flow analysis

Work on the quantification of material and waste streams in Europe is already being conducted by the Commission (EUROSTAT), the European Environment Agency and the European Topic Centre for Waste and Material Flows. The Commission has recently reported on material flows in Europe[50] and has published the results of a wider analysis of this subject in direct response to the request of the Sixth EAP[51]. Furthermore, it has launched the development of a methodology for assessing the patterns of use of individual resources.[52] The objective is to understand the relationship between the use of selected resources and the environmental impacts created at various stages in their life cycles. Depending on the results, further work on a wider range of resources and the refining of such a methodology may be carried out. These activities serve the immediate purpose of collecting data on specific material streams and related environmental impacts. However, in the longer term, they will serve to prepare the "knowledge gathering" required for the thematic strategy itself.

Task 2: A review of the efficiency of policy measures and the impact of subsidies relating to natural resources and waste

The Commission has begun to prepare an overview of commonly used policy measures and how they affect the use of resources in EU Member States and Acceding and Candidate Countries.[53] This will be followed-up in the second half of 2003 by a more detailed investigation in connection with Task 3 below. The results may also help to point out trade-offs between environmental concerns and other areas of sustainable development involved in selecting different policy measures. As an immediate result these investigations will help to define concrete tasks for the work programme that will be proposed for the Thematic Strategy. In the longer term they should be seen as pilot projects in preparation of the proposed strategic "policy assessment".

Task 3: Establishment of goals and targets for resource efficiency and the diminished use of resources, de-coupling the link between economic growth and negative environmental impacts

This encompasses the overall objective of the future Resource Strategy which is to de-couple the negative environmental impacts of resource use from economic growth, so it can not be a one-off activity.

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50 Material use in the European Union 1980 – 2000: Indicators and analysis. EUROSTAT, 2002.

51 Resource use in European Countries. European Commission, December 2002. http://www.europa.eu.int/comm/environment/natres/index.htm

52 Resources – a dynamic view. European Commission, in progress.

53 Public-private interface. European Commission, in progress.

The Commission will launch this task by further assessing the resource efficiencies of individual countries, building on the results of recent analyses mentioned under Tasks 1 and 2 above. It will investigate the reasons for any differences found and their implications for the state of the environment. For this the Commission has initiated work to clarify how benchmarking between countries could help to establish goals and targets. The most problematic findings as well as best practice will then be investigated through follow-up studies so that a first set of resource specific targets will be available towards the end of 2004. In the long term this type of benchmarking should become one of the routine tasks of the Resource Strategy's "knowledge gathering".

Task 4: Promotion of extraction and production methods and techniques to encourage eco-efficiency and the sustainable use of raw materials, energy, water and other resources

and

Task 5: Development and implementation of a broad range of instruments including research, technology transfer, market-based and economic instruments, programmes of best practice and indicators of resource efficiency

Community environment, research and innovation policies contribute to this task, for example through the IPPC Directive, the Environmental Technology Action Plan, the Community Research and Development Framework Programmes and the LIFE programme. They contribute to developing more knowledge based and less resource intensive products and processes and can become key factors to support transformation of resource use patterns in the European industry. International technology and environmental partnerships, like those mentioned in Chapter 6.5 of this Communication, will also contribute to these tasks. Furthermore, new community policies, such as the Integrated Product Policy, the Thematic Strategy on Prevention and Recycling of Waste and the EU follow-up to the 10-year Framework of Programmes decided at the World Summit for Sustainable Development in Johannesburg will help by fostering technology transfer and economic instruments. The strategy will also look at the use of market-based and economic instruments, including optimal use of fiscal instruments to create incentives for sustainable resource use.

Indicators of resource efficiency are being considered in the context of the European Union's Sustainable Development Strategy and of the Johannesburg commitments.[54] With the build-up of knowledge the Resource Strategy will attempt to go beyond quantitative efficiency and pressure indicators and define its specific needs for indicators of aggregated environmental impact . The Commission will work on their development in co-operation with the EEA and other institutions. This activity will have close links to the indicator-related work of the Integrated Product Policy and Community recycling and waste policies. However, large parts of Tasks 4 and 5 require the integration of the environmental aspects of resources management into other policy areas. The Resource Strategy should contribute to this integration by providing data, proposing actions and ensuring that they are properly considered. In order to do this effectively, the three strategic core elements described in Chapter 6.2 need to be operational on a permanent basis.

In parallel to these tasks, information should be made available in order to communicate environmental policy messages regarding the use of natural resources effectively to European citizens. Member States should be asked to provide adequate information and education on these policies. Suitable ways of achieving this, including for example programmes for education,

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54 COM(2002)524 final of 20.09.2002: Report from the Commission to the Council: Analysis of the open list of environment-related headline indicators looks at the feasibility of producing such indicators.

training and diffusion in the European Research Area, can be explored in detail when developing the full strategy.

6.4. Time-scale

Consideration also needs to be given to the appropriate time scale for achieving the strategy's objectives. There is general consensus that the full implementation of new policies and the adaptation of existing concepts will require a long time period. The World Bank, for example, advocates a long-term perspective for natural resources management as it "is almost always related to long-term problems". For the Resources Strategy, the Commission believes that 25 years is most appropriate because:

– achieving the necessary decoupling of the environmental impacts of resource use from economic growth and the necessary further improvements in resource efficiency will require a significant change in production and consumption patterns and in the way we manage our natural resources, and institutional changes too. This can not be done overnight;

– there are already policies that address the short and medium term, but they lack an overall framework for shaping future policies. For example, the Kyoto objective to reduce CO_2 emissions by 8% by 2008-2012, when compared with the 1990 level, has to be related to the long-term objective to stabilise CO_2 concentrations in the atmosphere, which may require a reduction of more than 50%. The Fifth EAP even mentioned a "long term target of 70% cut".

– businesses need public policies with clear long-term objectives in order to plan investments and innovate**.**

6.5. Enlargement and the international dimension

As a result of its forthcoming enlargement, EU support for environmental protection will increase threefold through structural and rural development instruments, plus the transitional institution building facility. The Acceding Countries' priorities will be to build up their economies and infrastructure. The Resources Strategy will take these needs into account while, at the same time, guiding these countries away from unsustainable paths of resource use and resource intensity.

The EU's approach to resources management is also likely to play a major role in other neighbouring regions, such as Eastern Europe beyond the Acceding Countries and Central Asia. EU legislation is likely to become the principal means of international law-making for most countries in the region. This approximation of legal frameworks will affect the management of natural resources through environmental policies, as well as through possibilities for strengthened economic links that will have implications for many other policy areas.

Clearly a European resources strategy has to take full account of these developments. The strategy will have to explore how it can contribute to the European Commission's goal of pursuing concrete and differentiated environmental objectives with neighbouring countries, for example, in bilateral mechanisms or sub-regional co-operations like the EU Northern Dimension, the Danube-Black Sea Task Force and the Regional Environmental Reconstruction Programme in the Balkans.

The strategy should also take account of the new dynamic of EU participation in international co-operation in the environmental field following enlargement, as well as the impact on the

various organisations involved, and should strive to develop synergy and complementary actions, where these provide added value.

In addition to the above, the EU's Resources Strategy has to take account of Europe's interdependent trade relationship with many other regions outside Europe and its global trade and development policies. Resources flow over the whole world and are subject of extensive trading. For example, the EU is one of the world's greatest users of metals while less than 5% of the world mining production comes from its own territory. Other examples include the dependence of parts of the European livestock industry on imported cattle feed, as well as large imports of seafood products and commodities that are often produced in non-sustainable ways in countries outside the EU. Moreover, although in the EU the total forest area is rather stable or even expanding, deforestation in developing countries for export purposes is continuing. At the same time the desire to subordinate such trade flows to principles of sustainable development raises difficult questions of extra-territoriality and development of the world trading system rules. An EU resources strategy should therefore be set in a global context, as many solutions (and measures to stimulate their implementation) will only be coherent and effective if developed and implemented taking account of global considerations including the international division of labour. A life-cycle approach to the sustainable use of natural resources should cover the entire supply chain.

While natural resources provide significant sources of income for many countries, there exist also important links between poverty and the use of natural resources in developing countries, both as a side effect of unsustainable resource use along the entire value chain as well as through their economic dependence (and therefore their vulnerability) on natural resources. Also, purchasing policies at least cost, which frequently do not include the long-term sustainable costs of resource use may lead to unsustainable use of soils, forests and oceans, and should in some way be addressed in the appropriate policy areas.

Clarifying the role of these equity issues in a European Resources Strategy, including the unequal division of resource use, will demand substantial work in the process of developing the final strategy.

7. FUTURE DEVELOPMENT OF THE RESOURCES STRATEGY

This Communication confirms that the aim of the future Thematic Strategy on the Sustainable Use of Natural Resources is to develop a framework and measures that allow resources to be used in an environmentally sustainable way, while achieving the objectives of the Lisbon strategy. The strategy will build on existing EU policies, as well as on national policies and the various sector policies that influence the ways resources are used.

The publication of this document marks the first step in the development of the Resources Strategy. With this as a starting point, the strategy will be developed in an open and collaborative process involving the Community institutions and public and private stakeholders. An Advisory Forum, chaired by the European Commission, will be established to steer the policy development process. Working Groups will be established to address specific resources or key issues and analyse them from the three – environmental, economic and social- perspectives of sustainable development. The European Commission will invite different services and stakeholders to chair and co-chair these working groups.

On the basis of the analyses developed in this Communication, other thematic strategies and the outcome of the consultation process that will follow the adoption of this Communication, the Commission will in 2004 propose a comprehensive Community strategy on the sustainable use of natural resources. Furthermore, stakeholders are invited to look at the Commissions web page

on the Resources Strategy (http://www.europa.eu.int/comm/environment/natres/index.htm). Comments and input to the development of the strategy can be submitted to the e-mail address mentioned on the web page.

The Commission requests the Council and the European Parliament to endorse the approach outlined in this Communication.