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<p>Economic Growth and the Environment: Some Implications for Economic Policy Making</p>

**Communication from the Commission to the European Parliament and
Council**

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1. Introduction and Summary

The relation between Economic Growth and the Environment is a crucial one when studying the prosperity of the Member States of the European Community. Prosperity, or well-being in a broad sense, does not exclusively depend on economic welfare as conventionally measured, but also on the clean air we breathe and the health of the natural environment upon which we rely for many services. We used to take these for granted. Now, as our development becomes more intensive, pressures on the environment are becoming increasingly strong. Therefore, policies should aim at development patterns that respect the environment and can be sustained over time. In recognition of its key importance to the prosperity of the citizens of Europe, this principle of sustainable growth respecting the environment has been enshrined in the Treaty of the European Community as amended by the Treaty on European Union (Article 2) which entered into force in November, 1993. Similarly, Article 130r of the Treaty requires that environmental protection requirements must be integrated into the definition and implementation of other Community policies. This is also fully in line with the commitments made by the Member States and the Community at the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, June 1992).

Consequently, the question arises which implications this new Community objective has for policy making in Europe.

The Commission has tentatively analysed the consequences of the principle of environmentally sustainable development for economic and fiscal policy making and wishes to present some first conclusions for discussion in this Communication. These points should be seen in the context of the Fifth Environmental Action Programme (COM (92) 23) and the White Paper on Growth, Competitiveness and Employment (COM (93) 700) which contain some building blocks for a strategy aimed at sustainable development in Europe. Obviously, sustainable development comprises a large number of facets which go well beyond the environmental aspects which are the focus of this Communication.

1. *The stylised empirical facts of history show that there is no simple linear relationship between economic growth and pressure on the environment. While it is true that the emissions of some pollutants broadly grow in line with economic activity, there are many types of pressure on the environment that actually decrease as economies prosper. Clearly, this suggests that economic growth and environmentally sustainable development are not mutually exclusive. On the contrary, a case can even be made for arguing that, in the longer run, one is unlikely to be achievable without the other.*

2. *However, it is essential to point out that there is nothing automatic about such a move towards environmentally sustainable development. Although it is true that economic growth by itself generates additional resources that can be devoted to pollution abatement and environmental protection, much of this will only materialise if an appropriate policy framework is put in place.*

3. *Environmental policy making is presently changing course, aiming at sustainability by integrating environmental considerations in production and consumption processes in various sectors as of the early design stages of products. A stronger reliance on market based instruments is key to the success of this policy as both environmental effectiveness and cost-effectiveness require that economic agents are given the right signals.*

4. Furthermore, an important advantage of this market-based approach is that it leaves it to individual economic agents to find the most promising solutions to environmental problems. Such a strategy could also contribute to deregulation and reducing bureaucratic interference that sometimes impedes the functioning of the market mechanism while preserving or even improving environmental quality.

5. There is substantial evidence to suggest that, amongst the market-based policy instruments, corrective environmental taxes and charges will prove to be one of the more effective policy responses in a relatively large number of cases. This provides a formidable challenge to tax authorities, who will be charged with solving the many technical issues that arise in this field.

6. The need to integrate environmental protection requirements into other policies suggests, in the case of economic and fiscal policies that possible undesirable environmental implications of existing tax and incentive schemes should be identified, and where appropriate, corrected.

7. At the same time, it seems that a review of existing tax and social security schemes is needed for broader economic and employment reasons (e.g. in view of the contribution these systems might make to existing inflexibilities on goods and labour markets). The coincidence between this situation and the need to introduce corrective taxes for environmental reasons should be exploited with a view to realising possible synergies. An analysis of the circumstances under which these synergies might arise would thus be particularly useful.

8. It is of major importance to give economic agents time to adjust to the new sustainable growth requirements. Hence, policy changes should be phased in gradually and predictably to limit adjustment costs.

9. Although specific groups of consumers and producers might have difficulties in making the transition to sustainable development, it seems that account can be taken of most potential problems in the design of sound instruments for sustainable growth.

10. Arriving at a broad agreement between public authorities, employers and employees on policies for environmentally sustainable economic growth would allow to maximise the economic and environmental benefits of this strategy.

The present Communication focuses on economic policy making and the challenges that await economic and fiscal authorities in this context. Clearly the need to integrate environmental considerations in other areas, implies that action will also have to be taken at a sectoral level. However, the present Communication does not deal with individual sectoral policies nor the regional implications as these require a detailed analysis on a case by case basis.

The Commission invites the Council and the European Parliament as well as the Social and Economic Committee and the Committee of the Regions to analyse the links between economic growth and the environment and to debate the main implications for economic policy making.

2. Stylised facts of economic growth and the environment: lessons from the past

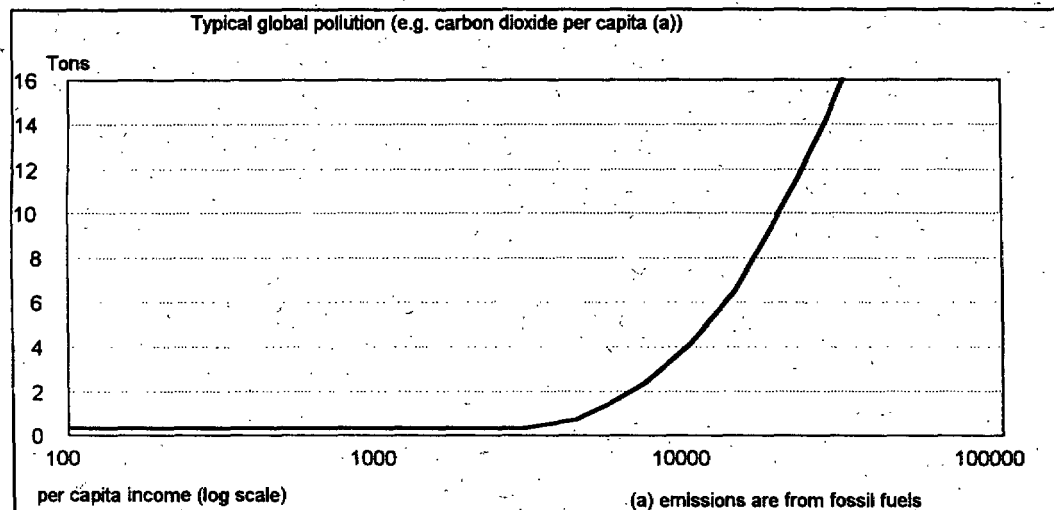
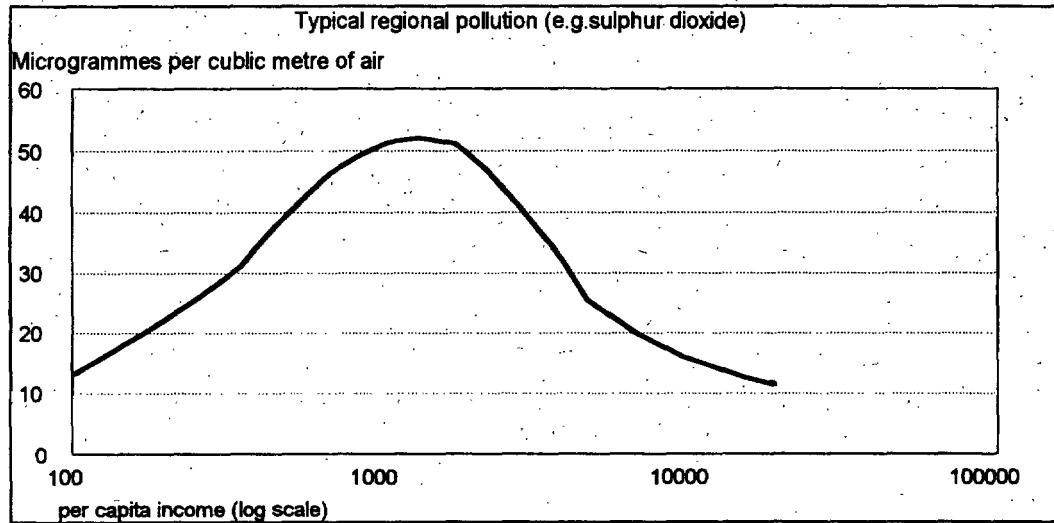
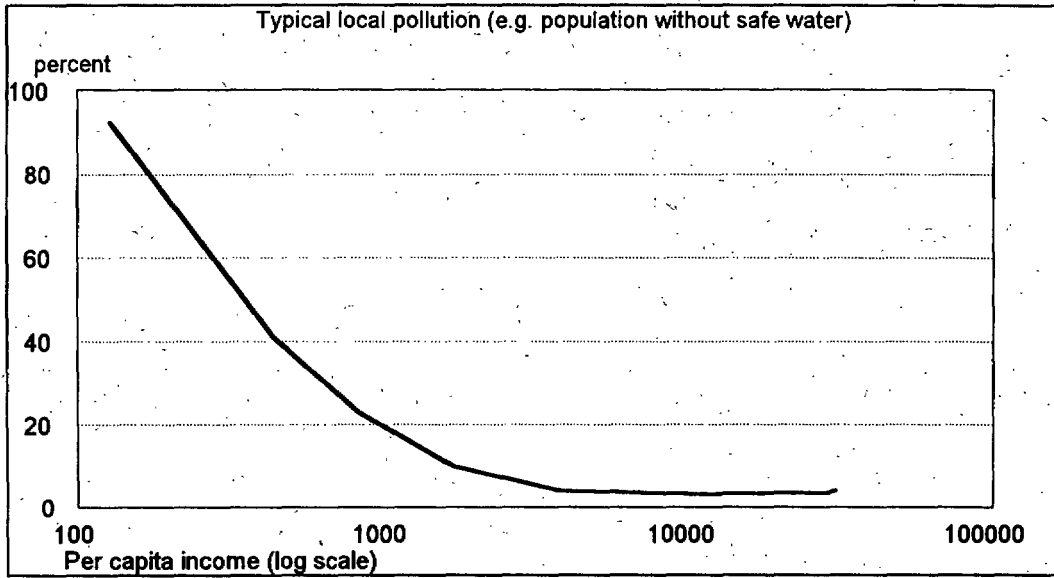
It is sometimes argued that economic growth and improved environmental quality are incompatible as economic expansion entails increased use of natural resources leading to further environmental degradation. However, it seems that this "Malthusian" view is seriously biased as it only takes account of one of the links between environment and economic growth. In reality, however, there are three mechanisms that jointly determine the environmental impact of economic growth:

- First, it is true that economic growth entails increased pressures on the environment if there are no changes in the way the economy operates. Under such circumstances, an expansion of economic activities is likely to lead to decreases in environmental quality via a *scale effect*.
- Secondly, however, the *composition* of economic activity changes with the various stages of economic development. When economic growth takes off, economies move out of agriculture and into manufacturing, thereby increasing the resource and pollution intensity per unit of production. As income levels grow even higher, service activities increase their share in the economy. Because services are generally characterised by low pollution levels per unit of production this slows down pollution. It is clear that the European Community is in the third phase.
- Thirdly, *technology* changes as economies expand and this is likely to reduce pollution per unit of product. This is partly because in market economies the drive to produce at low costs puts a premium on energy efficiency and on reducing material intensity.

However, what is more important, as economies grow richer, the latent desire for clean air and water is translated into *policy*. This is because the willingness to pay for environmental quality grows with income. These policies affect technology, both by stimulating certain options and by imposing others. Furthermore, as these policies favour clean activities and penalise pollution-intensive branches (by mandating abatement efforts which raise the cost of production) the sectoral composition of the economy is also affected. Consumers may also directly affect this trend by increasing their demand for environmentally friendly products.

These latter aspects, changes in composition and technology, have led to the directly inverse or inverted U shaped relations we find in empirical data for the relation between many categories of environmental pollution and economic growth (see illustration in Figure 1). As economic growth in poor countries takes off, the strain on the environment grows rapidly. However, once a certain income level is reached, growth not only tends to raise citizens' preferences for a clean environment, but also provides the financial resources for taking effective policy action.

Figure 1 A stylised view of the relation between economic growth and the environment - lessons from the past



Source: based on World Bank, World Development Report 1992

It is because, among other things, in cities like Paris and Stockholm measures have been taken to curb the use of leaded petrol, and standards have been imposed on emissions from heating installations and combustion plants etc., that the air is so much cleaner than in New Delhi or Mexico City, where such measures have not been introduced to a similar extent. It is worth noting that some of these policies (e.g. limiting emissions from passenger cars and large combustion plants) have been introduced at the Community level. Furthermore, as discussed above, environmental policies might also affect the sectoral composition of the economy. Hence, environmental policies allow the latent desire for a cleaner environment to be realised as economic growth generates the necessary means, both by altering the composition of production and the technologies used.

However, there is no room for complacency as there are a number of environmental problems that have deteriorated over the past decades. This is particularly true for global environmental problems such as diminished biodiversity and global warming (see bottom panel of figure 1). These problems are relatively complex to solve in view of the strong international dimension attached to them. Hence, there are major challenges awaiting our societies in making the transition to environmentally sustainable development in the coming decades.

Analysis suggests that the abatement efforts undertaken to improve the quality of the environment have not been so costly as to harm traditional economic growth significantly. This is not to say that abatement has been for free: in fact, the joint impact of various environmental measures is estimated to have led to environmental expenditures of between 1 and 2% of GDP in highly developed countries such as the Member States of the Community. However, these costs represent only a fraction of cumulated growth over the past decades during which these policies were phased in. To a large extent these costs should be seen as the price society has been willing to pay for the provision of environmental quality which has strongly contributed to the well being of the citizens of the Community.

In the longer run, sustainability is a pre-requisite for prosperity to grow. It is clear that when pollution reduces the productivity of the land and the workforce (e.g. via health hazards) as well as other factors of production, the economy slowly grinds to a halt and prosperity declines.

Thus, in the long run, economic growth and environmentally sustainable development must go hand in hand; instead of being mutually exclusive, one is actually not possible without the other.

When inspecting the, admittedly incomplete, empirical evidence available on the relation between economic development and environmental quality it is indeed striking to see how often the basic patterns of the top two panels of Figure 1 are found. They are encountered for concentrations of suspended particulate matter, sulphur dioxide, nitrogen dioxide, lead and other heavy metals and a number of other forms of pollution.

These patterns seem especially strong for local forms of pollution (e.g. suspended particulate matter), whereas it is not (yet) found in the empirical data on some of the global environmental issues, such as global warming (see bottom panel of Figure 1). This suggests that as countries become richer they first clean up the most pressing environmental problems that pose direct health hazards and fall exclusively under their national sovereignty. Only at a somewhat later stage do they turn to regional and global environmental threats which are more complex to solve. This is, to a large extent, due to the great number of countries and strong spillovers involved, which complicates the formulation of effective policies. Clearly, in this area there are major challenges to be faced in the coming decades.

Hence, it is essential to point out that there is nothing automatic about the fact that many forms of pollution seem to decrease as economies grow as described above. It is only because policy action is taken that pollution is brought down. Thus, although economic growth by itself generates the means for pollution abatement and, thus, the possibility to improve the quality of the environment, this will only happen if an essential prerequisite is met: a sound policy framework.

3. Setting an appropriate framework for environmental policies: prices and integration

Environmental policy making is changing course, aiming at sustainability ...

The necessity to develop a sound framework for environmental policies arises both from the requirement to deter environmentally unsustainable development and because ill-devised policies are likely to be unnecessarily costly. They would impair economic growth and, hence, in the longer run, undermine the support for developing effective environmental policies. Obviously, devising such a framework also implies that the potential benefits and costs of action or lack of action are taken into account.

One of the priorities in this context is to develop reliable statistical tools to define effective and efficient environmental and economic policies. The establishment of a system of environmental pressure indicators and indices could be an important first step. However, as such indicators do not permit a full assessment of all costs and benefits of policy action, the long term objective should be to create a system of integrated environmental/economic accounts. Such integrated accounts raise a number of difficult methodological and evaluation issues. For this reason, the development of satellite accounts to the existing national accounts could be an operational medium term approach.

... and giving more attention to considerations of cost-effectiveness.

The need for an efficient policy framework is all the more pressing as cost-differences across various possible policy strategies might be larger than before. Whereas in the early days of environmental policy making, significant environmental improvements were achievable at relatively low costs, nearly irrespective of the policy instrument used, it seems clear that at present, especially in areas where progress has been most significant, costs might rise steeply if instruments are not selected carefully. This is because, after having initially exploited the straightforward and low cost abatement opportunities, the costs of further improvements are likely to be more substantial.

Key in this new approach is "integration", ...

Traditionally, environmental policy has relied heavily on mandating certain technologies and banning others. Often these mandatory technological changes were add-ons ("end-of-pipe") to existing technologies. Although this "command and control" policy has undoubtedly generated significant benefits in certain areas in the past, there is growing recognition that a new approach is needed so that environmental considerations are integrated into the design of products and production processes in various sectors. Hence, integration requires a broadening of the set of policy instruments, an objective that has been taken up by the European Community's Fifth Environmental Action Programme. The use of a policy mix of legislative measures and market-related instruments, including voluntary agreements, has also been stressed in the Commission's Communication on Industrial Competitiveness and Protection of the Environment (SEC(92) 1986) and the Council Resolution concerning the relationship between industrial competitiveness and environmental protection (Official Journal C 331, 16.12.1992). Integration would affect all products and production processes, thereby opening a whole range of, currently unexploited, opportunities for environmental improvement, and in addition, for technological and product development. It is clear that such an integrated approach has the potential to significantly bring down abatement costs. It will at the same time create 'first mover' advantages on substantial markets for environmental protection technologies, goods and services.

It should be stressed that this integrated approach is still likely to contain regulatory intervention in some cases. For example, where the environmental problems have major direct health risks (e.g. toxic waste) and/or where economic instruments are likely to fail because of incomplete markets or other reasons, there will also be in the future the need for traditional types of environmental regulation. The objective of integration rather is to devise the appropriate mix of different types of environmental policy instruments geared to the specificities of the environmental problem at hand.

Hence, the question of how to arrive at the required integration of environmental considerations is of great importance. It seems that one aspect is crucial: giving economic agents the right signals.

... which is strongly linked to a greater reliance on market based instruments ...

In our economies, economic decisions are to a large extent taken on the basis of price signals. As consumers adjust their purchase decisions to price changes and companies determine product design, technological development and the organisation of their production processes to a large degree in function of market prices, it is essential that these prices correctly reflect the full costs and benefits to individuals and to society.

By ensuring that prices reflect underlying scarcities, governments can give consumers as well as industries incentives to limit the environmental consequences of their behaviour. The principal advantage of this approach is that the right signals are given affecting the broad spectrum of private decision making. Hence, instead of mandating specific technologies, this policy integrates the environment into everyday decision-making and leaves it to individual agents to find the most promising solutions to environmental problems without compromising their international competitiveness. By drawing upon the full knowledge base of society rather than upon the technical know-how of a limited number of regulators, such a strategy is often likely to generate least cost solutions. Furthermore, as environmental improvements are rewarded, a powerful incentive is given to develop clean technologies and production processes. This, in turn, might trigger further improvements in technology via a trickle-down effect and bolster the position on international markets.

... and, hence, contributes towards deregulation and improved flexibility ...

Another important characteristic of this policy strategy is that it could, when carefully designed, contribute to limiting or even rolling back the layer of detailed regulations that, according to the emerging consensus in this area, has had a negative effect on the dynamism of European industries. Hence, it ties in nicely with the need to deregulate markets in our economies, where and to the extent that this is needed, while preserving, or even improving, environmental quality. Although all forms of environmental policy intervention are bound to represent some regulatory burden, market-based policy instruments often imply a lower cost of regulation than the traditional "command and control" approach. This does not deny that there are obviously cases where a regulatory approach will remain necessary and appropriate. Thus substituting a set of broad market signals aiming at environmentally sustainable development for detailed technical regulations might contribute to improving the business climate in Europe. Clearly, this is likely to require a different role for some regulatory bodies, who would now be called upon to develop and monitor market based environmental policy instruments.

By stimulating innovation and inventiveness, this renewed, more decentralised and market based approach presents itself as the natural strategy towards which to reorient our environmental policies for the coming decades, during which our economies will be required to make the transition to sustainability.

This strategy is, moreover, fully in line with the Polluter Pays Principle that has been adopted by both the OECD and the European Community (Treaty article 130 r (2)). In essence, this principle states that those using the environment in production or consumption should pay the full costs – i.e. including the environmental costs – this activity implies. As the environment is shared by all, policy action is needed to confront polluters with these costs. This, in turn, means that governments should make an effort to confront economic agents with those costs not covered by current market prices (the so-called external environmental costs). Among other things, this requires that efforts to quantify these external costs should be stepped up.

In practice, internalisation of external environmental costs has progressively been pursued through emission limits, fiscal instruments, voluntary agreements, civil liability, etc., which charge the polluting activities with some part of the cost to society. Such measures are compatible with a market based approach, as the decisions are left with the participants in the markets, while the framework is set to reflect environmental requirements. Which instrument or combinations of instruments to choose, is primarily a question of economic efficiency in achieving energy and environmental policy objectives.

Among these market based instruments, environmental taxes might play an important role

It is likely that economically sound policy making will, to a greater extent than to date, comprise market based incentives and instruments, geared towards the specific environmental problems at hand. In fact, there is a large variety of market-based instruments such as: deposit-refund systems, tradable permit systems, levies, charges, fiscal incentives, voluntary agreements etc. Even though each of these instruments has its respective merits, there is substantial evidence to suggest that, amongst the instruments from this policy tool kit, environmental taxes and charges will prove to be one of the more effective policy responses in a significant number of cases. This provides a formidable challenge to tax authorities, who will be charged with solving the many technical issues that arise in this field. Notably, care should be taken that the tax system is not unduly complicated. Furthermore, the introduction of this approach might also require a certain culture change in tax administrations.

... although the philosophy behind these taxes differs markedly from conventional taxes.

Traditionally, taxes have mainly been designed to raise revenues. Environmental taxes, on the other hand, aim mainly at changing behaviour, which, if successful, will reduce the proceeds of the new tax. This is related to a principle difference between incentive taxes and conventional revenue raising taxes: whereas the former aim at changing behaviour in order to correct a distortion and are, hence, the more successful the more they lead to a reduction of the environmental externality which constitutes their tax base, the latter are mainly of a revenue raising nature and are, in consequence, not intended to lead to an erosion of their tax base. It has to be noted, however, that obviously, as discussed below, existing taxes have in reality often unintended side effects, and are seldom economically neutral.

Such taxes might bring in substantial tax revenues ...

However, there are a number of environmental externalities that are forecast to grow significantly in the absence of policy action and where low cost abatement possibilities are currently limited. Environmental taxes might well be among the more cost-effective policy instruments to tackle such issues and they will, in such cases, bring in major revenues as a significant part of the tax base is likely to remain. In this respect, they rather resemble some existing taxes, such as taxes on labour. The proposed CO₂/energy tax or taxes related to transport externalities (such as congestion) would be good cases in point. Since these latter might, as a by-product, generate revenues in the order of, possibly, several percent of GDP, the question arises to what use these proceeds should be put. Obviously, this should be decided at the level of individual Member States, taking into account the various specific characteristics of the economies.

... which opens the possibility of reducing other, heavily distortionary taxes.

However, notwithstanding the need to consolidate budgets in several Member States, it seems that, from a purely conceptual point of view, using these revenues to reduce other taxes in the context of a revenue neutral tax reform could, in many instances, be a logical and promising option. Logical because the philosophy underlying the environmental taxes is to change behaviour, not to increase the overall tax burden in the economy. Promising because there is emerging evidence that some existing taxes entail significant distortionary costs, in terms of reduced growth and employment. Cutting such distortionary taxes could, thus, produce economic benefits. In this context it is worth underlining, as did the White Paper on Growth, Competitiveness and Employment, that the very high tax burden on labour - leading to a situation in some Member States in which labour costs to employers correspond to almost twice the after tax take home pay - poses significant problems to the functioning of the labour market, particularly at the bottom end of the pay scale. In this context, it is worth noting that, at present, environmental taxes and taxes linked to environmental problems represent a very small share of total GDP (see Table 1). In fact, while the share of environmentally related taxes in GDP remained practically stable or even decreased in several Member States between 1970 and 1992, the tax burden on labour actually increased by several percentage points.

Table 1 - Statutory Contributions and Charges in the Community 1992
(% of GDP)

	1992
<u>Taxes on consumption</u>	10.86
<u>Taxes on labour</u>	23.44
<u>Taxes on capital</u>	6.98
Total	41.28
of which:	
Revenues from taxes linked to environmental problems:	
- <u>Transport</u>	2.37
vehicle ownership and purchase	0.72
vehicle fuels	1.65
- <u>Energy</u>	0.21
Heating oil	0.04
Natural gas	0.01
Coal	0.00
Electricity	0.08
Others	0.09
- <u>Pollution and others</u>	0.07
(e.g. soil, air, water, noise)	
Sub-total: environment-related	2.65

Source: Eurostat

The introduction of environmental taxes coincides with the need to review existing taxes for other reasons, ...

Thus, although justified in its own right, the usefulness of a wider reliance on environmental taxation coincides with the need arising from quite different reasons to identify possible undesirable side-effects of our existing tax systems. Clearly, within such a review the environmental effects of the existing tax and incentive systems should also be investigated along the employment and growth effects. As these systems have been developed gradually over the past, often under somewhat piece-meal conditions and generally without reference to environmental considerations, there may well be economic, employment and environmental gains to be reaped in such a project. It is clear that as tax systems differ significantly across Member States, this review process would best be undertaken at the level of the individual countries. Nevertheless, there might be similarities, not only with respect to the broad class of taxes that should be reduced (e.g. taxes on labour), but also with respect to the conditions under which such a tax reform would be most successful. Hence, provided these conditions are met, the new orientation in environmental policy making - needed for environmental reasons as well as cost-effectiveness - might entail a second benefit by propping up employment and growth. In particular, this would require a high degree of social consensus on the desirability of this policy which could ensure that wages develop moderately in the wake of the tax shift and the increased attractiveness of employing labour is not eroded by off-setting developments in non-wage incomes. This could be reinforced further by the induced positive effects of a stepped up development of clean technologies and consequently a strengthened position on international markets for these products as a result of the "first mover advantage".

... suggesting that combining these two objectives might lead to synergies, provided certain conditions are met.

Here it seems that social consensus on the main policy stance would be important as it could avoid unfavourable wage developments that might erode the benefits of reduced taxation on labour. Furthermore, the structural change that environmental growth requires, reinforces the need to enhance the structural adjustment potential of our economies. Removing barriers to the efficient functioning of goods and labour markets is needed in its own right, but is especially important when embarking on a policy of structural change. There is thus clearly a case for exchanging best practice and learning from experiences.

There are four reasons why public authorities responsible for economic and fiscal policies might wish to take a keen interest and even anticipatory role in the debate on environmental taxation.

The first is that, whereas it is clear that in the long run economic growth requires sustainable development, such environmental policies are not for free, especially as the objectives become more ambitious. Selecting cost-effective instruments is thus of utmost importance. As an increased reliance on the use of economic instruments - among which taxes and charges - would in many cases entail lower costs than alternative instruments, avoid bureaucratic rules and could contribute towards deregulation, economic policy makers have an interest in advocating such policies where necessary with a view to maintaining growth and employment.

Secondly, environmental taxes differ from conventional taxes in objective, but will have to be integrated into the tax system for which Economic and Finance Ministers are responsible. They are thus likely to be heavily involved in devising such taxes and implementing them.

Thirdly, in view of the significant revenues some environmental taxes are likely to generate, a unique opportunity will arise concerning the structure of existing tax systems, as has also been recognised in the White Paper on Growth, Competitiveness and Employment. In particular, there seem to be opportunities to reduce the most distorting taxes on labour and, hence, profit, under certain circumstances, from a "double dividend". The conditions under which such a double dividend might be reaped should thus be studied carefully.

Finally, it is likely that an important number of implementation issues will have to be faced which will affect the overall impact of the new policy on society and should, hence, be taken into account by relevant authorities when devising the strategy. These issues are addressed in the next Section.

4. Devising economically efficient environmental policies: implementation issues

There are five key implementation issues of major importance to the success of the policies

When analysing the main implementation issues that have to be addressed in the case of economically sound sustainable growth policies, the following seem of major importance, although the list is certainly not exhaustive:

- the introduction of policies over time
- the role of technology and R&D policies
- international co-ordination and competitiveness
- equity at the international and the national level
- wage formation and monetary policy

The first two refer to the nexus between the time profile of the policies and the generation of the required technology base for sustainable growth. The next two deal principally with the external dimension: the introduction of policies in a world that has become globally interdependent. An important aspect, in this context, is the issue of who bears the transition costs, a subject that is also of relevance at the purely domestic level. Finally, the last subject relates to the reaction of key actors to the policy change and to the important role social consensus can play in optimising the environmental and economic results.

Phasing in policies gradually and predictably to limit adjustment costs

Expectations of future demand patterns and policy requirements are a major driving force of investment and technological development. The expectations entrepreneurs currently have will determine the available technologies of tomorrow. Therefore, it is essential that there is no doubt about the long term policy and market signals, and that it is clear to all that only environmentally sustainable methods of production will stand a chance in the markets of the future. This policy message has to be convincing and credible in order to be effective. Hence, we need coherent long term policy strategies. These will have to be based on comparing the benefits and the costs of the measures to be taken and will have to indicate how the constraints on the use of the environment will be tightened in the future.

Whereas the extent of the required long term transformation should, thus, be beyond any doubt, it is important to give economic agents time to adjust. Policies should thus be phased in gradually and predictably so as to limit adjustment costs. Requiring major changes to be introduced overnight will entail substantial costs, for example, because the current capital stock is not suited to deliver products to the specifications that are required. Thus, we have to couple long term vision with incrementalism in the phasing in of our policies. Rashness is to be avoided as the price to be paid in reduced growth will generate resistance and undermine the credibility of the long term policy stance.

The introduction of coherent R&D and technology policies

From the above discussion the crucial role of R&D and technology should have become clear. As these jointly determine the characteristics of the productive capacity of the economy they determine to what extent long term sustainability goals are achievable and at what price. It is clear that governments have a major role to play in ensuring the transition to a technological paradigm that relies more on man-made capital and is economical with scarce natural resources. On the one hand, they should fund pre-competitive research in these areas, remove market barriers to the introduction of such technologies and assist in demonstration programmes. However, on the other hand, it is

clear that there is only so much governments can do in directly promoting clean technologies. Most will have to be done by the private sector: thence, the importance of the long term policy signals, of which changed relative prices will constitute the cornerstone.

Taking account of global interdependencies

It has to be recognised that the world is increasingly becoming a "global village", both economically and environmentally. These interdependencies constitute a major challenge to the introduction of environmentally sustainable growth policies in areas where the environmental problems are international or even global in nature. Two major environmental policy challenges - global warming and the depletion of the ozone layer - fall into the latter category. In view of the linkages across countries and continents, it is clear that these problems cannot be solved by a single country or regional action only. Their very nature requires international policy co-ordination. This is especially relevant in the case of global climate change where one has to face up to the fact that the currently developed world will consume an increasingly smaller share of global energy use. At the same time we have to recognise that many of these problems have been caused by an excessive use of natural resources by the developed world in the past decades if not centuries.

Recognising the equity issues that are at stake

Thus, there is clearly an equity issue at stake: we, in developed countries, need the rest of the world to help us solve problems for which we carry a major responsibility. This implies that assistance in introducing environmentally benign technologies in the Third World will have to be provided by the First World. The same can be said about the need for technology transfer. It is also clear that industrialised countries will have to be ready to share the burden these adjustments might pose on these countries, although it should be recognised that some of these changes will, by themselves, generate immediate benefits to the Third World. This suggests that the relevant concept for international equity is incremental costs.

International competitiveness is not a reason to delay sound action, because ...

It is sometimes argued that the international dimension implies that the European Community has to wait for the rest of the world before introducing environmentally sustainable policies. Losses in international competitiveness, it is argued, would make a unilateral policy prohibitively expensive. The Commission has already extensively analysed the relationship between environmental protection and industrial competitiveness in its communication of 1992 and the Council has established its orientations with regard to this subject in its resolution of 1992.

Admittedly, the required structural change can undoubtedly entail costs in terms of - possibly temporarily - reduced international competitiveness for certain branches and sectors. This is particularly true for those sectors that have to compete with a growing number of competitors from new industrialised countries not encountering any environmental-related production costs. However, it is important to point out that in many cases, the impact on competitiveness is likely to be small.

... partly in view of their size, environmental control costs are not a decisive factor, ...

First, it has to be recognised that these costs are likely to be very small for the large majority of branches. Most of the available empirical research has consistently pointed to the limited impact, if any, of tighter environmental policies on international trade flows. Major business location decisions are much more dependent on an adequate provision of infrastructure, the presence of a highly skilled workforce and on labour costs. Incidentally, these three factors have also been identified in the White Paper on Growth, Competitiveness and Employment and are areas where policies are currently being intensified in the Community.

... waiting would undermine the competitiveness of a rapidly growing sector, and ...

Secondly, as discussed in Section 2, growth and environmental improvement are positively correlated as citizens' preferences for environmental quality translate to demand for this service in growing economies. Not meeting this demand, that will also emerge in other economies at a later stage, can only be a self-defeating strategy. This would imply losing the technological lead that places us in such an attractive position for the international markets for clean technologies, new products and production processes of the future. The world-wide market for environmental goods and services already amounted to some \$200 billion in 1990 and is estimated to grow by 50% to the year 2000. It is clear that only industries that face these environmental challenges on their home markets are likely to be successful in competing on international markets that will be heavily contested by the Community's main competitors.

In this context, a further point is that the Community's environment policy has gone beyond the limited field of pollution control, *per se*. The drive towards sustainable use of natural resources brings about pressures in the fields of R & D, energy efficiency, waste management (including avoidance, recycling, reuse and recovery) and green products that has implications across a very wide range of industries and services. This wider aspect points to the potential for greater competitiveness, new products and markets and more employment opportunities.

... smart environmental policies can help vulnerable sectors make the transition

Thirdly, the above view disregards the fact that, in cases where there might be a problem of international competitiveness that should be addressed, there are numerous accompanying policies that can be taken to offset this effect. Here one can think of temporary special treatment of heavily affected branches, border tax adjustments etc. If well-devised, environmental policy need not entail major permanent losses in competitiveness, even in sectors that might potentially be heavily affected.

We should not confound the interest of specific branches with the overall economic interest of our economies

However, it should be underlined again that the claim that there is a problem of international competitiveness should be carefully investigated with a view to long term developments and should not be confounded with understandable but self-defeating resistance to what in the long term are unavoidable adjustments to sustainable growth requirements. The fact that often those who will have to adjust are more vocal than those who will gain from such an adjustment should not be mistaken for a justified reason to abstain from introducing the required policy measures. It is, therefore, necessary to ensure a fair representation of all interest groups in the public debate.

Domestic equity issues might arise ...

It ought to be underlined that, as in the international case, there might be equity issues at the domestic level that have to be addressed. In particular, there is a concern that low income households might suffer significant losses when tighter environmental policies are introduced, e.g. to limit energy use. This is certainly a justifiable concern, although it should be pointed out that the scarce available evidence suggests that there need not be a major equity problem in many cases. However, it is likely that the situation differs across Member States as there are also strong differences in the level and structure of energy consumption across the Community. Nevertheless, it should be pointed out that well devised policies already contain elements that can counteract potential problems in this field. Phasing in gradually and predictably, for example, gives people time to adjust and will, hence, contribute significantly to limiting the burden. To the extent the policies are based on the introduction of environmental taxation, there will be revenues, part of which could be used to offset undesirable effects on the income distribution. This is not to deny the possible existence of equity issues following the introduction of sustainable growth policies, but simply to underline that there are various response strategies that would seem to be capable of minimising adverse impacts.

... but can be solved, without endangering sustainable growth

It should, once more, be reiterated that in the long run it would be unacceptable to postpone the required transition on the basis of such equity arguments, not only because low income households generally suffer more from environmental degradation (as they are less able to afford protection), but also because the economic losses that will occur in the longer run are likely to undermine the ability of governments to fund a wide range of programmes, from which the low income households profit relatively strongly.

Social consensus would allow the economic and environmental benefits to be maximised

Finally, the key role a broad social consensus can play in ensuring a smooth transition to sustainable growth has to be underlined. Although, in principle, this holds true for any environmental policy affecting the general price level, it seems to be of particular relevance in the case of environmental tax reform where the introduction of indirect (incentive) taxes might carry inflationary risks if wages do not develop moderately. If, for example, the revenues from a newly introduced environmental tax were used for lowering personal income taxes, claims for nominal increases in gross wages should be moderated accordingly. Clearly, when such a policy is credible and well explained there is no need for excessive wage pressure, as the reduction in labour taxation contributes towards offsetting possible reductions in purchasing power (from, for example, higher energy prices). Thus, wage earners should not use the occasion of a government revenue neutral environmental tax reform for trying to increase their purchasing power at the expense of companies. In the absence of the threat of a tax-induced wage-price spiral, monetary authorities will not be tempted to raise interest rates to anticipate surges in inflation, but will accommodate the once-off tax-induced increase in the general price level. Hence, a broad social agreement between government, employers, employees and monetary authorities on the principles of the strategy matters greatly for the economic results. If the social consensus can be extended to incorporate the idea that the improved environmental quality itself constitutes a substantial benefit, then some - temporary - losses in purchasing power would probably even be acceptable, which could contribute to boosting sustainable growth in the medium and long run.

5. Conclusions on the policy agenda for environmentally sustainable growth

When addressing the issue of economic growth and environment, a reassuring lesson we can draw from the past is that these key ingredients to the well-being of the citizens of the Community are compatible, provided the right policy framework is put in place.

However, it is becoming increasingly clear that we will have to rely more on integrating environmental considerations in policy making in all sectors of the economy. Integration promises to be both more environmentally effective and to allow sustainability to be reached at low costs, thereby opening the possibility of prolonged sustainable growth. In market economies like ours, relative prices play a major role in determining investment, research and consumption decisions. Adjusting these prices by means of using economic instruments, such as, for example, environmental taxes, thus, seems to be the natural way forward to this policy of integration. This might well lead to further economic benefits as it allows existing systems of taxes and statutory charges to be reviewed. Reducing other taxes that depress our economic performance could constitute a promising option. In view of their responsibility for ensuring a sound economic development and managing an efficient tax system, it is clear that economic and fiscal authorities, together with other relevant actors, have a major role to play in the development of this new policy strategy. Furthermore, the linkages between this strategy and wage and structural adjustment policies go to the heart of economic and fiscal policies in Europe. The box on the next page contains some concrete policy conclusions that those responsible for economic and fiscal policies might draw from the discussion on sustainable growth.

Clearly, in view of the need to integrate environmental objectives in all sectors of society, relevant policy makers will have to define, in collaboration with the social partners and other public authorities, cost effective environmental policies for those areas for which they carry the main responsibility. Such a broad and coherent cross sectoral approach should rely heavily on establishing clear links between market-based policy instrument and environmental problems. This, in turn, will reinforce the credibility and the acceptance of fiscal measures, where these are appropriate.

In general, when introducing this policy change predictability and gradualism are key as they allow agents to adjust at least cost and provide the breathing space for the development of clean technologies. As the availability of such technologies is a precondition to sustainable growth, this is of fundamental importance and there are important challenges for well-devised R&D and technology policies. The availability of these technologies will also be the key to success on the global markets of the future. This, as well as for reasons of international competitiveness, is why the transition to a pathway of environmentally sustainable growth should not be postponed. Although the importance of short and medium term adjustment to some consumers and producers should not be underrated, it seems that account can be taken of most issues in the design of sound instruments for sustainable growth.

Economic policies for environmentally sustainable growth

There are a number of concrete policy steps that authorities could take in order to further the development of economically efficient policies that contribute to environmentally sustainable growth. Among these, the following would seem to be particularly noteworthy:

1. Transforming the idea of sustainable development into a more tangible and measurable concept. Clearly, there is a need for improved statistics in this field, in order to assist policy makers in devising sound policies and in evaluating them. The development of environmental pressure indicators and indices, satellite accounts to existing national accounts and, in the long run, of integrated economic/environmental national accounts - announced in the Fifth Environmental Action Programme - should thus receive clear support.
2. Economic policy makers should ensure that the integration of environmental policies in other policy areas, where appropriate, relies as much as possible on the market mechanism, as this often enables solutions that are least cost to the economy to be found. Furthermore, such a strategy could contribute to deregulation and reducing bureaucratic interference which sometimes stifles the functioning of the market mechanism. Active support for this new approach would thus seem required.
3. The objective of "integration" suggests that a review of the environmental implications of existing tax and incentive schemes is warranted. In this context, and in addition to other well-known economic arguments, incentives to environmentally unsustainable activities should be closely inspected and suppressed, where appropriate.
4. The introduction of environmental taxation is likely to constitute an important element of the new "integration" approach. In view of their different nature, such taxes raise a number of design and implementation issues. Economic and fiscal authorities are responsible for the tax system and they would, hence, be in a good position to jointly analyse the main issues at stake with a view to devising efficient environmental taxes.
5. It seems that, on the one hand, an adaptation of existing tax and social security schemes is desirable for economic and employment reasons (e.g. in view of the contribution these systems might make to inflexibilities on goods and labour markets). On the other hand, the new "environmental integration" strategy, will, in a number of cases, probably entail the introduction of taxes correcting for environmental externalities, which could raise significant revenues. This coincidence should be exploited with a view to realising synergies. For example, if indirect labour costs are especially harmful to employment at the bottom end of the labour market, it could be considered to reduce labour taxation in this segment. Financing might come partly from environmental taxes that have to be introduced anyway for reasons of sustainable growth. It seems that, under certain circumstances, both environmental and economic benefits can be realised. Although these circumstances might be country specific to some extent, it would seem particularly worthwhile to learn from mutual experience and to jointly analyse the main opportunities.

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