



ECONOMIC INSTRUMENTS FOR SUSTAINABLE DEVELOPMENT

Economic efficiency, environmental protection and workplace safety are three key policy areas of sustainable development. This leaflet summarises recent research undertaken by the European Foundation for the Improvement of Living and Working Conditions into the use of economic instruments in environmental and health and safety policies at both country and sectoral levels. The research analysed existing and prospective EIs in EU Member States and evaluated their effectiveness in both the external environment and the workplace.

Key findings

- There is plenty of scope for an increased use of economic instruments in almost all EU countries. The challenge is to determine from existing applications where they work best.
- The use of economic instruments has become widespread in environmental policy. For example, it is now common to relate the cost of sewerage services to the volume and pollutant content of waste water.
- Regulations tend to dominate in health and safety policy. The main economic instrument consists of linking the insurance premium to performance and giving premiums/discounts for good health and safety planning.
- The application of economic instruments in the workplace poses practical problems: for example, on-site inspection and monitoring can prove costly.
- The use of voluntary instruments serves as a useful alternative to regulations, especially when the goals are clearly defined and agreed by all actors.
- The level of integration between health and safety and environmental policy is generally low.
- There is a need for greater coordination between health and safety and environment authorities, in order to reduce the risk of conflict and to minimise the cost of compliance.
- The cost of learning about the environment and health and safety is proportionately greater for SMEs than for larger firms. Informal local networks can reduce the costs of disseminating good practice.
- Initiatives in either the environmental or health and safety fields can have a zero or positive effect on the other field.



EUROPEAN FOUNDATION
for the Improvement of Living and Working Conditions

Introduction

The Foundation research analysed existing and prospective 'economic instruments' (EIs) in EU Member States in order to evaluate their effectiveness in both the external environment and in health and safety and to assess the prospects for their integration into these domains. A variety of research methods were used: policy review, telephone interviews, case studies and workshops with companies in order to measure impacts on the ground. The surveys investigated the relative importance of regulations and economic instruments and explored the type of initiatives undertaken by firms to meet environmental and health and safety (EHS) goals. Box 1 below gives an overview of the methodologies used in the different research phases and shows the countries and sectors involved. Phase 1 additionally considered employment issues while Phases 2 and 3 paid special attention to SMEs.

Nature and extent of economic instruments

Environmental and health and safety measures constitute two types of non-market costs that occur in industry. Government intervention to reduce these costs seldom look at the two issues in an integrated fashion. Economic instruments are commonly viewed as a 'low cost' means of encouraging firms to change their behaviour. European EHS policy in the 1970s was characterised by the imposition of measures to direct certain levels of performance. This approach is known as 'regulation' or 'command and control'. Rather than firms being allowed to weigh up for themselves the costs and benefits of

instigating a change, they are coerced into a particular action. Non-compliance results in penalties, usually in the form of legal action and/or fines for correction.

Since the 1980s and 1990s, there has been a substantial rise in the use of EIs. An alternative to coercion, these put in place a structure of incentives which encourage firms to change their behaviour in a particular way rather than laying down strictures. It is up to each firm to examine the changes in costs and benefits as a result of the introduction of the EI and for the firm to modify its behaviour accordingly. Under most circumstances, the cost to the economy of making the change is lower than under command and control. For instance, if the policy goal is to reduce emissions of CO₂ by 10%, the regulatory option would be for every firm to reduce its emissions by 10% irrespective of cost. The EI option would be for firms to trade this obligation so firms that can reduce emissions cheaply would make a greater proportional contribution than firms with no low-cost options. This means that the same environmental outcome is brought about at a lower economic cost.

In reality the situation is more complex. Regulatory policy is more discriminating than suggested above, with the regulator balancing costs against benefits while EIs themselves are not cost-free. There are resources and costs involved in the learning and participation procedures, as well as in monitoring and verifying the trading mechanisms.

Box 1 Phases of the research

	Research institute	Countries	Research method
Phase 1	Environment Institute, University College Dublin	Germany Ireland	National-level EHS policy overview Workshops for firms from each of the following sectors: <ul style="list-style-type: none">• Dairy• Textile• Chemicals• Construction
Phase 2	Istituto di Economia delle Fonti di Energia e dell'Ambiente, Università Commerciale L. Bocconi, Milan	Denmark France Italy Portugal	National-level EHS policy overview Two national case studies using literature search, web-search and interviews
Phase 3	Empresa de Análise Prevenção e Segurança (EAPS), Lisbon	Denmark Germany France Ireland Italy Portugal	Integration of Phases 1 and 2 and general literature review Telephone questionnaire of Portuguese metallurgy and tourism industries

The Foundation research extended the definition of EI to include actions undertaken by firms on a purely voluntary basis (i.e. no government intervention to change market signals), education campaigns (i.e. no need for firms to balance costs and benefits), and where the pricing policy on insurance was used to assign liability (i.e. differential pricing is undertaken for commercial rather than social gain).

Types of economic instruments

The different classes of EI are set out in Box 2 below.

Box 2 Types of economic instruments and other incentives

- Charge or tax
- Tradable permit
- Deposit-refund
- Subsidy on activity to be encouraged, insurance premium reduction
- Assignment of liability
- Voluntary agreements
- Graduation of premiums and granting of bonuses

Charges or taxes are levied either directly on the activity that policy makers wish to see reduced (e.g. emissions of waste water) or on a surrogate product whose consumption is associated with an activity to be discouraged (e.g. lead content of road fuels).

Tradable permits involve creating a quantitative restriction on an activity (e.g. emissions of sulphur) and allowing firms to trade these restrictions among one another to ensure that compliance occurs at the least cost to the economy as a whole. *Deposit-refund* schemes require firms or households to pay a deposit when they purchase certain specific goods (eg. glass bottles, gas cylinders, batteries). Thereafter they must return the goods at the end of their useful life to the shop, outlet or other collecting agency in order to recoup the deposit. *Subsidies* are a common means of encouraging benign activities and have the effect of reducing the cost of carrying out a socially responsible activity. These may take the form of capital subsidies, low-interest or interest-free loans or discounts on taxes. An example might be government subsidies on insurance premiums for firms with good health and safety records.

Assignment of liability comprises measures to help people obtain compensation for environmental or health and safety misconduct. Examples include creating right-to-know information on the conduct of firms (for instance the US-Toxic Release Inventory) or setting aside performance bonds to cover the costs of cleaning-up operations. *Voluntary agreements* cover a range of non-statutory undertakings by firms (often mediated by trade associations) to report performance, undertake improvements to practices, raise awareness and publicise best practice.

Insurance schemes have applied *graduation of premiums* and *bonuses* for low claims for many years as an incentive to good health and safety practice.

In practice, policy makers often use variations on the above instruments or more than one instrument at a time. For instance, a voluntary agreement might be encouraged by a very obvious hint that a statutory tax or regulation will be brought in if solid progress is not made. The selection and design of the EI needs to take account of distribution impacts. The 'polluter pays' principle suggests that emitters of polluters should pay for the pollution they cause. This is certainly the case with taxes and charges. On the other hand, subsidies place the cost on the public purse and tradable permits impact either on the polluter (allocation of permits by auction) or on new entrants (allocation on 'grandfathering'). Voluntary agreements typically only require firms to undertake zero-cost ('win-win') options.

Interaction between environmental and health and safety issues

Sometimes there is no obvious link between environmental and health and safety issues. Health and safety concerns arising from physical exertion, for example, tend to be highly localised and rarely extend outside one's personal experience or the immediate vicinity. Similarly, many environmental matters such as emissions of greenhouse gases are more global in their impact, with no direct association with health and safety. On the other hand, issues such as radiation and exposure to toxic substances are common concerns for both fields.

The research identified several areas of interaction between health and safety and the external environment. *Conflicts* could arise when a) the two compete for scarce capital, b) when measures to enhance health and safety give rise to a deterioration in the external environment. An example of this might be ventilation or air conditioning to improve internal conditions, which causes an increase in power usage. *Complementarities* arise when an initiative to enhance the external environment also improves worker safety. For instance, reduced use of pesticides (via a pesticide tax, perhaps) lessens both toxic effects on the external environment and worker exposure. In some cases, there is simply no interaction between the two policy spheres. For instance, it is hard to see how measures to reduce the risk of muscular strain among typists could have an effect on the environment. However, while there may be no direct link between the two policies, there could be an indirect impact: for example, health and safety concerns could give rise to changes in behaviour that might contribute to an increase in energy or water use.

EIs in the environment and health and safety fields

The use of EI in the environmental field is still in its early stages, whereas in health and safety it has a long tradition dating back to 1870. However, it

is fair to say that much of the conceptual and practical work on developing EIIs has occurred in the environmental field. It is difficult to imagine how some instruments such as tradable permits could be transferred to the health and safety area. Box 3 shows the extent to which the various types of EIIs are implemented in the countries under review.

Box 3 Occurrence of EIIs in the fields of environment and health and safety

	Environment	Health and safety*
<i>Charge or tax</i>	All countries	France (for SMEs)
<i>Tradable permit</i>	Germany	None
<i>Deposit-refund</i>	Denmark	None
<i>Subsidy</i>	Common	Denmark, France
<i>Assignment of liability</i>	Infrequent	None
<i>Voluntary agreement</i>	Common	Common

* if insurance premium reductions are included, this list would include Denmark, Portugal and France

The research found that voluntary agreements are the most common type of EI. In the health and safety field, where the application of EIIs is still rare, it is usual for insurance companies (or the government where the workplace schemes are under public management, such as in France) to vary the premiums charged to employers according to their assessment of the risk of accident. This assessment of risk is usually linked to the sector, possibly to historical claims records and can be based on health and safety practices at the firm. This type of commercially motivated price differentiation is not always defined as an EI, but it can serve as an incentive for firms to improve behaviour if the differentiation in pricing is structured appropriately.

The commonest reported voluntary instrument in the environmental field was accreditation to ISO14001 and EMAS (Environmental Management and Audit Scheme) standards. These systems involve external verification and imply a commitment to improving environmental standards. By identifying and remedying unnecessary expenditures on wasteful activities such as excessive energy and water use, they can save costs for the firm and its public profile is thereby enhanced.

EHS initiatives at sectoral level (Phase 1)

Dairy industry

The research found that the main environmental concerns were effluent, discharges to air (especially milk powder) and the production of waste packaging. The German dairy industry was subject to economic instruments in the form of waste water

charges linked to their pollutant content. The main environmental driver was command and control regulations. Both firms investigated were conscious of the EMAS standard and the Irish firm had received accreditation. Health and safety and environmental considerations tended to act synergistically: improving hygiene, noise abatement, leakage control of gas and ammonia all had effects on both policy areas. The EMAS scheme encouraged the Irish company to analyse and detect cost savings. The German company found that the energy and water charges incited them to find ways to save on energy and water. In addition, they were able to charge a 10-20% price premium on the output because of its environmental quality mark.

Textiles

Environmental issues in this sector related to the use of toxic chemicals, production of waste water, noise and air pollution. The Irish company had implemented EMAS and was using this to improve their management of existing processes. The German company, which was in the process of implementing EMAS, was subject to charges on the volume and level of pollutant loading in the waste water. There were no other EIIs in place in Germany and none in Ireland. Both companies felt that environmental action had a positive effect on health and safety, for instance in reducing the use of hazardous or odorous substances. The impact on competitiveness was also positive through better customer awareness and a possible reduction in days lost through accidents.

Chemicals

The chemicals industry found there was a strong and positive link between health and safety and environmental issues. Procedures to reduce accidental emissions were found to have a positive impact on both the workplace and external environment. Management systems to improve efficiency were also seen to improve both areas (for instance, a greater focus on reduction of energy consumption). It was commonly felt that regulation increases the costs faced by the sector and that there are few opportunities to recoup them. The Irish company used bonus systems to encourage health and safety standards within the company: this money may be recouped through reduced down-time.

Construction

Environmental issues are new in the construction industry. Lack of landfill capacity and the new packaging waste minimisation standards are the main concerns. Health and safety measures are more advanced. Due to the industry's fragmentary nature, it is difficult to monitor and enforce standards. There are no EIIs in operation in the companies under investigation. Measures to re-use construction wastes can be hazardous, as can the safe disposal of some materials (e.g. asbestos).

EHS initiatives at country level (Phase 2)

Denmark

In the environmental area, there has been a shift from strict command and control towards an increased use of market-based economic and fiscal instruments. Green taxes exist on the following: electricity/coal, petrol/diesel, lead batteries, sulphur emissions, certain chlorinated solvents, pesticides, registration tax on vans and a waste tax. In 1997 a wastewater tax on households and industry was imposed. Energy taxes have been introduced, but in order to allow energy-intensive firms to remain globally competitive, these firms are allowed to pay at a reduced rate in exchange for agreeing to exercise voluntary restraint in their energy use. In some cases, proceeds from the tax is used to subsidise clean technologies.

The Danes make extensive use of voluntary agreements to reduce emissions and recycle materials. As well as the energy tax described above, voluntary agreements exist between government and trade associations which cover PVC, nickel-cadmium batteries, lead accumulators, packaging materials and household use of detergent. The interaction between taxes and voluntary agreements in the context of nickel cadmium (NiCd) batteries is illustrated below.

Case study of nickel cadmium batteries in Denmark

Inappropriate disposal of nickel cadmium (NiCd) batteries is a major source of cadmium in the environment. The increased use of rechargeable batteries (which use NiCd cells) exacerbates this negative impact. Danish municipalities had provided facilities for the separate safe disposal of batteries for some time. However only about 20% of batteries were disposed of through this route. In 1991 an agreement was reached between the government and the Association for the Collection of Rechargeable Batteries which introduced a fee on new batteries and obliged retailers to establish a system for the collection of used batteries. The number of batteries recovered rose to 35%. Only about half the retailers installed collection boxes. In 1995 a new eco-tax on NiCd batteries was introduced which raised the price of the NiCd batteries to a third the cost of alternative batteries. Part of the proceeds of this tax was returned to collectors of used batteries who are paid \$17.6/kg for used batteries. The change in policy resulted in a substantial switch to the less polluting nickel-hydride and lithium based batteries.

In Denmark workforce safety is carried out through regulations. All firms employing more than five staff have to maintain a safety committee. The Danish government provides funding to SMEs to improve the working environment. The 'Better Working Life and Economic Growth' programme with a budget of DKK 15 million is designed to improve both worker

safety and competitiveness. Other schemes provide a further DKK 100 million of support for firms. Mandatory insurance premiums depend on the trade and level of damages commonly awarded.

Denmark is more advanced in integrating environment issues with health and safety than most countries, having formal cooperation between the authorities responsible for both areas. In July 1993, the Working Environment Act was amended so that safety organisations at company level could process external environmental problems when they are directly related to the company. In addition, proposed legislation relating to environmental risks is sent to environmental authorities and working environment services to allow them to consider potential areas of joint responsibility. The implementation of cleaner technologies is also a joint responsibility of both of these bodies.

However, at the local level there remain problems in integrating ESH issues as a result of the current division of responsibilities, the local authorities having responsibility for the external environment while the government controls the working environment regulator. As a result, and because these issues have a lower status than productivity, efficiency and product quality, managerial integration of the two areas is currently limited to a few large companies. An interesting development is a cooperation project between the social partners in the industrial sector, whereby collective agreements state that all changes in work organisation and technology need to be discussed jointly prior to implementation.

France

France has made use of economic instruments longer than most countries. The principle of the 'polluter pays' principle has been enshrined in French water management for over three decades. France's six water agencies impose charges on the use and pollution of water. The taxes are based on the volume of usage and quantity of emissions and they are used to subsidise investments in projects to reduce water pollution. Solid waste is managed by regulation: the guiding principle is that eliminated waste should not damage the environment. Both households and industry are charged for the removal of waste. Air emissions are regulated in a similar fashion.

France has proposed rationalising environmental taxation in an integrated legal framework in 2000. A number of subsidies are available, worth up to half the value of the investment in environmental improvement. There are eight environmental agreements in force in France at present, focused on CO₂, energy conservation, end-of-life vehicles, packaging and recycling issues. Environmental agreements have often been used in advance of formal legislation.

Initiatives in the French quarrying industry
Quarrying in France produces 350 million tonnes of waste material every year. About half is derived from river basins and half from rock formations. The industry has one of the poorest records in terms of occupational risks, due to the dense materials, explosives, dust, noise and heavy machinery used on site. The low profitability of the sector means that know-how and investment on health and safety issues is low. Quarries are charged more than four times the rate of premium applied to vineyards under the national insurance scheme. Quarries are exempt from general health and safety rules and regulations arise from the mining code. To encourage improvements, up to 70% of the costs of health and safety related worker training, information and equipment are subsidised.

In terms of health and safety, France's command and control policies contain standards for hygiene, health, safety and fire prevention. In addition to these mandatory standards, there is a compulsory occupational sickness insurance system (CNAM): premiums can be discounted by up to 25% for employers of less than 200 staff who take special measures to protect the health and safety of employees. Premiums are based on occupational risk rather than on sector. However the difference in the premium between sectors is regarded as too small to create an incentive to change behaviour. Special loan and assistance schemes are in place for employers keen to reduce the threat of accidents at work.

For historical reasons, there is a clear separation of environmental and health and safety policies. Health and safety policy was developed at the turn of the 20th century, whereas most environmental legislation dates back to the 1960s. Few companies currently have an integrated management approach to EHS issues.

Italy

Italian environmental policy has tended to rely on command and control measures. An exception to this general rule is the so-called Merli law which allows the charge for water extraction and sewerage fees to be related to their pollution potential. Sewerage fees are based on the chemical and biological oxygen demand of the outflows. Subsidies exist to help finance environmental R&D and also to promote EMAS and the eco-labelling of goods. By November 1998, 40 voluntary agreements had been signed between regional and central government on the one hand and companies and trade associations on the other.

Italian health and safety policy is dominated by command and control measures. Occupational accidents and illness insurance is mandatory for employers. Premiums are based on complex formulas taking into account the statistical records over the preceding three years of accidents for over 3 330 classes of employer. This is a clear example of direct economic incentives operating for health and safety. Annual premiums can be adjusted by as much as 20% for health and safety reasons. Adjustments of up to a further 15% can be made for the company's record on accident prevention. In 1997 a programme entitled 'Industry, Trade and Services for Enterprises' made subsidies available to SMEs to improve the working environment.

There are low levels of managerial integration of EHS issues, apart from a number of experimental examples. One example from Liguria involves local industry trade associations, local government, local agencies for environmental protection and the accident insurance public body, INAIL.

Initiatives in the ceramics sector in the Italian district of Sassuolo-Scandiano

About 80% of Italian tile production is carried out in 188 firms operating in the 50 km² district of Sassuolo-Scandiano. In the 1960s environmental and health concerns were raised about the use of lead in the glaze, the dispersal of silica powder and indoor noise. This situation has improved since then through a mixture of regulation, which occurs in an incremental, almost experimental way, sometimes with the close cooperation of the firms. The firms themselves established a cooperative and flexible network which spread good practice. Concrete measures included building a distinct water supply separate from drinking water wells, establishing an air quality monitoring system, acting as a first mover in terms of acceptable thresholds for air pollutants and drawing up a manual for accident prevention.

Portugal

Portugal has recently introduced measures which create positive environmental incentives. Charges for water consumption are levied to recover the costs of supply. Similarly, sewerage treatment charges go towards financing infrastructure provision. Companies are charged a fixed amount for waste disposal. There is an air transport tax on larger and newer planes, and motor fuels and other energy products are also taxed. Differential rates of tax are imposed on the sulphur and lead content of fuel oil and petrol respectively. The Portuguese government has introduced programmes and financial incentives to support part of the investment in environmental initiatives. These are restricted to particular sectors and geared towards the introduction of clean

technologies, recycling waste, industrial processes for noise reduction and the elimination of polluting effluents, liquids and gases. Since 1984, about ten voluntary agreements have been reached.

Good practice criteria

Phase 3 of the Foundation research involved field work into firms that displayed good practice. Box 4 describes some of the criteria that can be used to detect good practice.

Box 4 Criteria for identifying good practice

- Criterion 1** Whether the legislative and regulatory framework provides formal recognition of the issues and problems addressed.
- Criterion 2** Whether policies and/or sectoral strategies at local or regional level are potentially transferable or can be implemented elsewhere.
- Criterion 3** Whether institutional frameworks and decision-making processes assign clear roles and responsibilities to different actors such as central/local government, the private sector and representative bodies.

Source: UN Conference on Human Settlements (Habitat II, 1996).

When trying to understand the level of commitment to EHS made by firms, consideration needs to be given to the form of involvement and the phase of involvement. The different forms of involvement can be through internal staff, external staff or participation in a network. Alternatively, the firm can choose to remain uninvolved. The phase of

involvement covers the design of instruments and the implementation phases.

One of the main findings in the survey which was carried out among 600 firms in the metallurgy and tourism sectors was that firms with the best in-house EHS practice were also those which tended to participate in the development and formulation of these policies.

The survey yielded a number of other interesting findings. About half of the firms in the two sectors showed a pro-active attitude in managing water and waste charges. About 40% relied on in-house expertise, 2% on buying in expertise and 6% were involved in some type of network. Firms that relied on their own staff tended to be the most pro-active.

Political context

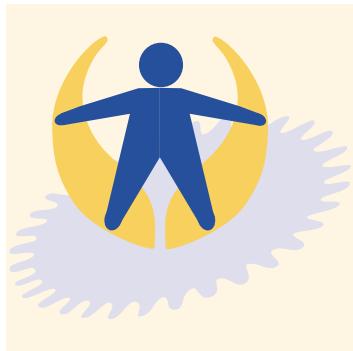
The EU endorses the use of economic instruments in the field of environmental protection. The Fifth Environmental Action Programme states: 'In order to get prices right and to create market-based incentives for environmentally friendly economic behaviour, the use of economic and fiscal instruments will have to constitute an increasingly important part of the overall approach.'

Although there are genuine legal and moral difficulties in applying the principles of placing values on health and safety concerns, the Foundation research shows that the insurance industry can use its pricing policy to create incentives to reward good behaviour.

There is a degree of overlap in the application of health and safety and environmental protection within firms and this suggests that consideration needs to be given as to whether economic incentives can act for both policy concerns in an all-inclusive way.

This leaflet was prepared by ECOTEC Research and Consulting.

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