NATUR VÅRDS VERKET

Economic Instruments for the Environment

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We have resolved to hand on an ecologically sustainable society to future generations, a society in which the major environmental problems have been solved. Fifteen environmental objectives have been established as benchmarks for all environment-related development in Sweden. The environment is a concern for everyone. In many cases voluntary efforts are not sufficient, however, because it will take too long to attain our objectives. Various environmental instruments have therefore been introduced to encourage people to change their behaviour and lifestyle, thereby speeding up the transition towards sustainable development.

The tasks of the Swedish EPA include proposing the use of various environmental instruments. This in turn involves proposing, analysing and assessing economic instruments, but the Agency also uses legislation, information and communication, as well as spatial planning.

TYPES OF INSTRUMENT

Instruments vary in terms of their purpose and impact. A combination of instruments is usually required. Besides economic instruments, there are three types of instrument used to encourage people to adopt more environmentally sound behaviour:
• legal instruments (laws, rules, ordinances and regulations);
• informative instruments (awareness raising, knowledge transfer, best practice)
• spatial planning (general means of incorporating sustainable development issues when planning building construction, road, rail and air transport, and other infrastructure).

LEGAL INSTRUMENTS

Laws, rules and regulations are legal instruments of environmental policy. The Swedish Environmental Code entered into force in 1999. It is the legislative framework designed to promote sustainable development and to modernise Swedish environmental laws in keeping with the developments of recent decades. The Code is based on a number of fundamental principles permeating international environmental protection and resource management. These include the "precautionary" principle, the "polluter pays" principle, the "product choice" principle and principles governing resource management, natural cycles and appropriate siting of industrial (and other) operations and remedial measures.

Like other EU member states, Sweden is subject to EU legislation and is obliged to incorporate EU regulations and directives in its national legislation. Sweden is also a contracting party to some 40 international conventions and agreements on environmental protection and resource management.

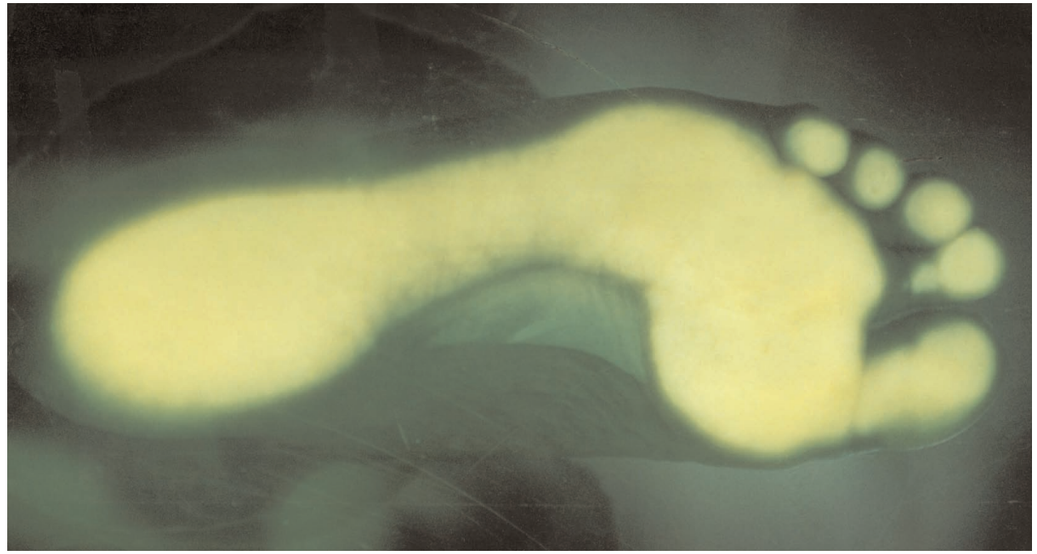
Some of these are regional, covering parts of Europe; others are global. An international convention becomes legally binding on a state once it has ratified the agreement and it has entered into force. Ratification means incorporating the decisions laid down in the convention in national legislation by amending or adjusting national laws and policy so as to meet the objective of the convention. However, aside from international pressure, there are no actual sanctions if a country fails to honour its commitments.

INFORMATION AS AN INSTRUMENT

Information is used in environmental policy to influence behaviour and to pave the way for other, compulsory instruments. Although necessary, information is not in itself enough to solve environmental problems; a combination of instruments is usually needed to achieve results. The recipient of information is not forced to do any of the things contained in the information. Even though information might not directly make people change their behaviour, it is still essential to increase knowledge and try to influence attitudes. As a result, people may more readily accept decisions to increase the cost of certain goods or services, or to limit freedom of choice. But it is difficult to determine the extent to which for example a given information campaign has changed behaviour and attitudes.
Information is believed to be more effective when the recipients are involved and can say what kind of information they want and need. Demonstrating best practice is one way of using information to influence behaviour.

SPATIAL PLANNING

The purpose of spatial planning as an environmental instrument is to change factors in our surroundings to improve the conditions and prerequisites for environmentally sound behaviour. According to the Swedish *Good Built Environment* environmental quality objective, by 2010 spatial planning and building should be based on programmes and strategies for planning housing, workplaces, services and cultural facilities in a manner reducing the need for private car use and promoting the use of environmentally sound and resource-efficient modes of transport. This will include improving energy efficiency, making use of renewable energy resources and promoting the development of production facilities for district heating, solar energy, biofuels and wind power. The National Board of Housing, Building and Planning and the Swedish Environmental Protection Agency, have examined methods and tools for planning and incorporating environmental quality objectives in spatial planning.



Economic instruments and environmental quality objectives

Neither companies nor individuals always act consistently or logically to protect the environment. This may be partly due to the lack of pricing of environmental assets and of environmental damage. As a result, the price we pay for goods and services does not reflect the actual cost of consuming them, and so there are insufficient incentives to make environmentally sound choices. In addition, many people feel no responsibility for shared utilities such as air, water or biological diversity and are therefore unlikely ever to change their behaviour of their own accord.

The environment can be priced in many ways as a means of mitigating or preventing environmental impact and damage. We meet a large number of economic instruments in our working life and as private consumers. Environmental economics is not merely theory; it is very much a part of our daily lives.

By putting a price on the environment, we gain a clearer picture of the cost of consuming scarce shared resources. With the help of economic instruments, which influence corporate and personal decisions and behaviour in the short and long term, it is possible to use the mechanisms of the market itself to reduce harmful environmental impact.

The instruments used in Sweden are ultimately intended to achieve the 15 national environmental quality objectives laid down by Parliament. To achieve these objectives, Sweden is pursuing three action strategies for *More efficient energy use and transport, Non-toxic and resource-efficient cyclical systems* (including an integrated product policy) and *Management of land, water and the built environment*. Sweden must also meet its commitments under various environmental conventions, e.g. on climate and biodiversity.

The Swedish environmental quality objectives are ambitious and substantial changes in our patterns of production and consumption will be needed to achieve them. Unless something is done to accelerate developments, we are unlikely to achieve the objectives within a reasonable timeframe.

An economic instrument can act either as a carrot or a stick to steer us towards more environmentally friendly and sustainable actions. Positive economic instruments provide obvious financial benefits in the form of tax relief, refunds, grants and financial support. Market-based instruments and voluntary agreements are also becoming increasingly important as environmental economic instruments.

ENVIRONMENTAL CONDITIONS FOR A MARKET ECONOMY

In a perfect market economy, scarce resources are managed by pricing them and trading in them in such a way that their value is maintained or increased. The product will command a high price if demand is high and supply is limited.

Nobody owns air, water or other environmental and natural assets. They are shared, collective assets belonging to everyone – and to no one. Everyone wants to use them (free of charge), everyone needs them, but no one owns them. Since they do not belong to anyone in particular, these assets cannot be traded or managed according to principles governing scarce resources. The tools needed to prevent assets of this kind from being squandered or destroyed are lacking in a free market.

Environmental costs (what economists call "negative external effects") usually have to be borne by others than those causing the environmental damage. Those affected are not compensated for the loss of common assets. This applies, for example, if emissions or discharges by one company cause the operating conditions for other companies to deteriorate. Another example is where private consumption by some individuals diminishes the standard of living for others. The losers cannot prevent the abuse of the common assets, nor can they be compensated for their loss with assets of an equivalent (environmental) value.

Thus, environmental economists agree on the need to control the free market so as to manage the environmental problems caused by overuse or destruction of common assets. The state steps in as owner of these environmental assets and prices them. Whoever wants to trade in the market has to pay a set price for the commodity, which is no longer available free of charge.

Typical features of an economic instrument that is effective for environmental purposes:
• it achieves the desired objective as quickly as possible;
• it is cost-effective – the relevant environmental quality objective is achieved at the lowest possible cost
• the use of the instrument also promotes technical development and creates a financial incentive for improving production processes and changing patterns of consumption;
• the instrument is simple and inexpensive to administer and monitor.

EXAMPLES OF ECONOMIC INSTRUMENTS USED TO ACHIEVE ENVIRONMENTAL QUALITY OBJECTIVES

Environmental quality objective	Economic instruments involving costs for those concerned	Economic instruments subsidising or reducing costs for those concerned
Reduced Climate Impact	Energy tax Carbon dioxide tax Tax shift (higher taxes on energy and use of private cars) Carbon dioxide differential vehicle tax Road charge for heavy-duty vehicles Rail track charges Electricity certificates Emissions trading	Carbon dioxide differential vehicle tax Exemption from tax on biogas motor fuels Energy system conversion programme Local climate investment programme. Local ecologically sustainable development investment programmes Electricity certificates
Clean Air	Parking fees Environmental classification of petrol and diesel Differential taxation of petrol and diesel	Environmental classification of petrol and diesel Differential taxation of petrol and diesel Subsidised public transport Lower tax on alkylate-blended petrol
Natural Acidification Only	Sulphur tax Nitrogen oxides charge	Funding for liming of lakes and watercourses Environmental differentiation of shipping lane and harbour duties
A Non-Toxic Environment	Pesticides tax Batteries charge Tax on cadmium in artificial fertilizers Producer responsibility for car tyres Producer responsibility for end-of-life electrical and electronic products	Differential taxation of petrol
A Protective Ozone Layer	Environmental sanction charge (fine)	–
A Safe Radiation Environment	Tax on thermal effect of nuclear reactors Charge to fund disposal of certain radioactive waste Funding of future expenditure on spent nuclear fuels	
Zero eutrophication	Tax on nitrogen in artificial fertilizers	Environmental grants for measures to combat nitrogen leaching, and for the creation of protection zones
Good-quality Groundwater	–	–
A Balanced Marine Environment	Water pollution charge	Grants for disposal of oil waste from ships
Flourishing Lakes and Streams	Rural settlements and fisheries charge	Funding for fisheries management
Thriving Wetlands	–	Environmental grants for creation and management of wetlands in agricultural areas
Sustainable Forests	–	Environmental grants for investments to increase the ecological value of forests
A Varied Agricultural Landscape	–	Environmental grants for conservation of grazing pastures and natural hay meadows; valuable habitats and cultural heritage in agricultural areas; endangered breeds of domestic animals; a varied and open agricultural landscape; organic production; environmentally sound cultivation of kidney beans (on the island of Öland) and sugar beet (on the island of Gotland). Investment grants for agricultural, horticultural and reindeer enterprises. Funding for adjustment and development in rural areas
A Magnificent Mountain Landscape	–	Funding for preventive measures and compensation for injuries to reindeer. Funding for preventive measures and compensation for injuries to other animals Grants for management of reindeer enclosures
A Good Built Environment	Tax on natural gravel Landfill tax Municipal waste disposal charges Producer responsibility for packaging, waste paper for recycling, and cars Car-scrapping charge	Grants for measures to reduce radon in private homes Investment grants for ecological building Car-scrapping premium Deposit (refund) system for drink containers (consumer benefit from producer responsibility for packaging) Local climate investment programmes (Klimp)

Exemption from tax on biogas motor fuels is an example of an economic instrument that help achieve the environmental goal *Reduced Climate Impact*.

TYPES OF ECONOMIC INSTRUMENT

Costs for individuals and companies

Taxes and charges are traditional levies. They entail extra cost for a specific activity or for an individual, and make environmentally unfriendly production or consumption more costly. The terms "tax" and "charge" are often confused. A tax is general income for the national treasury - tax revenues go to the state. Money paid as charges should be earmarked for a specific purpose and should, in one form or another, be reimbursed to the payers. There is a considerable difference between viewing a levy as general revenue for the state or as a payment that will be refunded to the payer. Another major difference is that only the legislature (Parliament) can impose or adjust taxes. An environmental charge can be decided by the Government or by public authorities.

Environmental taxes and charges are used to steer resource use in the desired direction. The idea is to have the cost reflected in the price, to influence the choices made by consumers and producers (direct influence). If tax collected is used to finance environmental efforts, such as information or collection or recycling systems, it is a case of indirect influence.

Most of the environmental taxes and charges in Sweden are levied on the energy and transport sectors. These include an energy tax, a carbon dioxide tax on fuels, a sulphur tax, and an energy tax levied on consumption of electrical power. There are also fuel taxes, vehicle taxes and road charges.

Tax relief, allowances and subsidies for companies and individuals

- Tax relief (lower taxes, tax allowances).
- Tax exemption (no tax at all).
- Deposits and refunds.
- State or municipal subsidies (funding and support).

The purpose of using environmental taxes and charges is to encourage more environmentally friendly behaviour. Many other taxes and subsidies of various kinds (funding or support) have also been introduced to encourage companies and individuals to make the "right" choices with regard to production, operations and consumption. Encouragement may be in the form of state or municipal investment support (for buildings, equipment, structures and systems). Support and subsidies may also be available for work to prevent environmental deterioration or to restore landscapes or habitats (eg, nature conservation, measures to reduce nitrogen leaching, liming of acidified waters).

Transition programmes and investment grants are other forms of support to ease the transition to a more sustainable society. Examples of this in Sweden are the transition programme for energy systems, local climate investment programmes (KLIMP) and local investment programmes for sustainable development (LIP), as well as investment grants for green building.

Where there are lower or no taxes, the price of the environmentally sounder product or service will be lower or at least no higher than the price of the equivalent more environmentally harmful product or service. For example, Sweden levies no carbon dioxide tax on combustion of biofuels, nor is there any tax on biomass motor fuels. Similarly, the tax on alkylate-blended petrol for boat engines is lower than that on regular fuels.

Deposit and refund systems are rarely used as economic instruments in Sweden. However, a deposit is refunded when drink containers (plastic bottles and aluminium cans) are returned to the store. There is also a premium for scrapping automobiles (a charge on purchase, a premium when the vehicle is scrapped). The drink container deposit and the car-scrapping premium are part of the Swedish producer responsibility system.

The use of subsidies can fail, however, and may actually lead to increasing environmental problems. Consequently, the removal or change of environmentally damaging subsidies is also a way of encouraging more environmentally friendly behaviour.

Market-based economic instruments – charges with a potential profit

- Emissions trading.
- Electricity certificates (green certificates).

Emissions trading is one way for EU countries to fulfil the commitment made by the union as a whole to reduce emissions of greenhouse gases in line with the Kyoto Protocol of the Convention on Climate Change. Initially, trade will take place during the period 2005 – 2007 and will only apply to carbon dioxide emissions from energy plants and energy-intensive industrial plants such as oil refineries, coke ovens, iron and steel works, and factories making cement, glass, lime, brick, ceramics, pulp and paper.

The idea of emissions trading is to reduce emissions in as cost-effective a manner as possible. Hence, emissions are regulated with the help of market trade. A "ceiling" is set for the maximum carbon dioxide emissions allowed from one or a number of plants. Each plant is allotted a certain number of emission rights, each one conferring the right to emit one tonne of carbon dioxide. If a given plant emits more than it is allowed, additional allowances must be purchased from another plant with a surplus of allowances. Companies with high costs for emission reduction will purchase allowances from companies that can reduce their emissions at a lower cost. Companies emitting less than they are allowed to can save allowances for later or sell them to other companies.

The aim of electricity certificates is to increase the proportion of electricity generated in Sweden from renewable energy sources (solar, wind, hydropower and biofuels). It usually costs more to produce electricity from renewable sources than from fossil fuels. Plants producing electricity from renewable energy sources used to receive state grants, but 2003 saw the introduction of a system based on quotas and trade in electricity certificates. Producers receive certificates for electricity produced from renewable energy sources and consumers must purchase a certain number of certificates in relation to their annual consumption. The mandatory quota of certificates that consumers must purchase will increase annually until the year 2010. The revenue received by the producer from sale of certificates is intended to cover the additional cost of production. The lower the production cost, the larger the profit for the producer. The aim is to produce electricity from renewable energy sources more efficiently. The more efficient production is in the long run, the better electricity from renewable sources will be able to compete with traditional electricity production.

Promoting sustainable development

The use of economic instruments is very much on the international agenda. Agenda 21 (1992) urges the nations of the world to increase their use of economic instruments to promote sustainable development. A decade later, the Plan of Implementation adopted by the World Summit on Sustainable Development stated that action should be taken at all levels to "continue to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the costs of pollution, with due regard to the public interest and without distorting international trade and investment". The OECD, too, has advised member states to increase the use of environmental taxes and charges. As part of the European Union environmental policy, the need to use economic instruments is emphasised in the Sixth Community Environmental Action Programme, and the European Parliament has requested the possible introduction of environmental taxes at community level.

INTERNATIONAL

Agenda 21, the global action programme for sustainable development (adopted by the 1992 UN Conference on Environment and Development), Chapter 4 on changing consumption patterns, says on "moving towards environmentally sound pricing" that "without the stimulus of prices and market signals that make clear to producers and consumers the environmental costs of the consumption of energy, materials and natural resources and the generation of wastes, significant changes in consumption and production patterns seem unlikely to occur in the near future". Some progress has been made in the use of "appropriate economic instruments to influence consumer behaviour. These instruments include environmental charges and taxes, deposit/refund systems, etc. This process should be encouraged in the light of country-specific conditions". The section on integrating environment and development in decision-making stresses that an effective legal and regulatory framework needs to be provided, although most of the recommendations concern the need to use economic instruments. As for new forms of funding efforts for sustainable development, countries should identify new ways of raising money to pursue sustainable development, including the use of economic and fiscal instruments and the possibility of trade in permits. A decade later, the Plan of Implementation adopted by the World Summit on Sustainable Development once again emphasised the need for economic instruments.

Under the **OECD** (Organisation for Economic Co-operation and Development) sustainable development strategy, sustainable development is the overall goal of the OECD and its members. Economic instruments should be used to a larger extent and environmental costs should be internalised in the price of natural resources. The OECD Environmental Performance Review of Sweden (2004) notes that Sweden's achievements over the past decade include an increased use of economic instruments and that Sweden is therefore seen as a world leader in the field. However, the OECD considers the level of taxation to be too low to exert sufficient influence. The shift towards green taxes is also considered interesting, but again the OECD notes that several of the taxes are too low for the purpose.

Regarding the means of pursuing the aims and objectives of **the European Union,** the Sixth EU Environmental Action Programme emphasises the need for the "promotion of sustainable production and consumption patterns by effective implementation of the principles to internalise the negative as well as the positive impacts on the environment through the use of a blend of instruments, including market based and economic instruments". This includes "encouraging reforms of subsidies that have considerable negative effects on the environment and are incompatible with sustainable development, inter alia, by establishing, by the mid-term review, a list of criteria allowing such environmentally negative subsidies to be recorded, with a view to gradually eliminating them". EU member states should also analyse "the environmental efficiency of tradable environmental permits as a generic instrument and of emissions trading with a view to promoting and implementing their use where feasible". However, despite a commendable desire to make use of economic instruments, the EU as a whole has not yet been very successful in this respect.

In cooperation with the European Commission, the OECD and **the European Environment Agency** have developed a database on the use of market-based instruments for environmental policy and natural resource management. It includes data on environmentally-related taxes, fees and charges, environmentally-motivated subsidies, tradable permit systems, and deposit-refund systems in all EEA member states. It also includes examples of voluntary agreements in the field of environmental economics.

From selective taxes to management by objectives

Environmental economic instruments in Sweden have been practically synonymous with taxes and charges since the 1970s. The bulk of Swedish environmental taxes and charges have been levied on the energy and transport sectors.

The tax burden is shifting, however, from selective taxes to market-based environmental instruments, allowing the market a freer rein. The principle governing market-based instruments (e.g. electricity certificates and emissions trading) is the same as for many recent EC Directives. A specific objective is set for all parties to achieve, but it is up to the actors in the market to decide how to go about accomplishing the goal. In a free market, actors will select the most cost-effective ways of implementing necessary measures. There will also be incentives for manufacturers to develop new technologies or new production processes that may prove profitable in the long term.

Paying more for the environment and less for employment

Green tax reform is another environmental economic instrument. Shifting the tax burden means that higher revenues from environmental taxes are used to offset a reduction in taxes on labour (or other distorting taxes). The effect of a green tax reform is not to increase taxes overall, but to redistribute tax revenues within a given framework, and to use taxation more specifically as an instrument of environmental control. The purpose of redistributing money is to promote environmentally sound activities and choices. Higher environmental taxes will result in a better environment (environmental benefit). In addition, they may benefit society by reducing unemployment (efficiency benefit).

The Swedish Government plans a green tax reform of SEK 30 billion between 2001 and 2010, based on what needs to be accomplished to achieve the national environmental quality objectives and the action strategies. Initially, most of the green tax increases targeted the energy sector (electricity and heating), but the main focus is now on carbon dioxide emissions from transport. The Swedish Environmental Protection Agency has stressed that a substantial proportion of this shift towards green taxes should be linked to the action strategies for *More efficient energy use and transport*. In practice this means raising taxes on fuel and imposing a mileage tax on heavy-duty trucks.

There is a growing need to focus on the environmental impact of a product throughout its life cycle. Hence, economic instruments targeting the production process could be a future role for green taxes. In the future, taxes and charges might also be used as economic instruments to reduce the use of dangerous substances and chemicals.

Signs of a better environment?

The use of economic instruments has generally been an effective means of implementing Swedish environmental policy. Most of the environmental taxes and charges have had the intended effect, and in several cases they have also contributed to technical development. The tax on sulphur has helped Sweden to fulfil its emission targets for sulphur. The nitrogen oxides charge has sharply reduced emissions from solid fuel combustion plants. Differentiation of the tax on petrol and diesel has brought about a rapid changeover to more environmentally friendly fuels.

There may be a conflict between the various reasons for introducing environmental taxes in the traditional sense. It must be decided whether the main reason is to maintain a stable, long-term source of tax revenue for the state, or whether environmental taxes are to be used as a way of influencing patterns of consumption so as to reduce environmental impact. If an environmental tax has a marked effect on behaviour, it will counteract the revenue purpose – the more effectively the tax changes patterns of consumption, the less "mistakes" will be made by the consumers and the lower the overall tax revenues will be.

What, then, are the signs of a better environment as a result of using economic instruments? Since it is difficult to measure the actual effects of individual instruments, there is no simple answer to this question. In many cases, however, people experience the effects of environmental economic instruments as beneficial to themselves as individuals. Tax relief, refunds and various grants and subsidies have given people a reason to change their own behaviour and also to maintain their new habits. By changing their own behaviour, they can also avoid environmental taxes and thereby reduce their expenses.

The Swedish Environmental Protection Agency (EPA) is a central environmental authority under the Swedish Government. The task of the Swedish EPA is to develop, implement and monitor achievement of environmental protection and policy. This includes proposing the use of various environmental instruments. This in turn involves proposing, analysing and assessing economic instruments, but the Agency also uses legislation, information and communication, as well as spatial planning. However, this brochure focuses on economic instruments used as tools of Swedish environmental policy.

Read more about the work on economic instruments at the Swedish EPA's website www.naturvardsverket.se

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