Table 2.1 **Environment staff**, selected agencies, 1997-2002

	1997	1998	1999	2000	2001	2002
SEPA	422	461	484	485	476	482
Chemicals Inspectorate	140	140	124	122	135	138
Radiation Protection Institute	112	116	107	109	103	105
County administrative boards (environmental protection and nature conservation)	539	580	685	747	803	895

Source: Ministry of the Environment.

3. Economic Instruments

Sweden continues to use economic instruments on a wide scale in implementing its environmental policy. During the review period, several new instruments were introduced (e.g. municipal waste charges, landfill tax, gravel tax, annual excavation charge, airplane emission landing charge, oil transport duty, road user charge), several old ones were modified to better internalise environmental externalities, and levels of taxes and charges were raised. With almost 70 market-based instruments, Sweden probably has *more economic instruments in use than any other country*. Attempts have been made to estimate the effects of the major instruments; about 20 instruments have undergone comprehensive impact analysis so far, and a further 20 have been studied to some extent.

Water users in Sweden pay a *combined water supply, sewerage and waste water treatment charge*, which varies greatly by municipality. Industries discharging into

the public sewer system pay a charge linked to the pollution content of the effluent. An annual *county district user charge*, fixed by the regional Environmental Court, funds repairs of damage resulting from water use. Water charges do not seem to be based on the extent of externalities or aimed at encouraging environment-friendly behaviour. Other water-related economic instruments are the *fishing charges* and *oil spill pollution fines* (Chapter 3). The latter are considered effective in discouraging small oil spills; they have actually been used only in a small share of total oil spills.

Waste management policy is based on a strict waste hierarchy approach, favouring reuse and recycling over incineration, which in turn is favoured over landfilling. To meet a national target of halving the amount of waste landfilled by 2005 from 1994 levels, landfilling has been banned for combustible waste (as from 1 January 2002) and will be banned for organic waste (2005). The *landfill tax* has been raised significantly since its introduction in 2000. Obligatory composting and a tax on incineration are being considered. Other economic instruments in waste policy include mandatory *deposit-refund systems* for aluminium and plastic beverage containers and voluntary ones for glass bottles. A fee is applied to batteries containing mercury, cadmium or lead; the extent to which it has contributed to the decline in sales of such batteries is unclear. A planned tax on non-recycled waste was postponed in 1998 because of uncertainty about its compatibility with EU regulations. Producer responsibility has been introduced for several product groups to stimulate recycling; the government recycling targets for some categories (e.g. cardboard and glass) have been reached while others (e.g. for plastic and metal) have not.

Municipal waste charges, fixed so that waste management is self-financing, vary significantly. Many municipalities require households to separate compostable and combustible waste, and others charge more for unsorted waste to stimulate separation at source. In 2000, charges ranged from SEK 800 to SEK 3 800 a tonne and averaged SEK 1 400 per household. After rising 30% between 1999 and 2001, the charges are likely to increase further as a result of new regulations and greater transport distances. Given the diversity of local situations, the current policy of imposing uniform waste management targets on all municipalities might be reconsidered. In general, more attention should be paid to analysing policies' cost-effectiveness and evaluating the effects of various measures.

The *sulphur tax* accounted for an estimated 30% of the reduction in Sweden's SO_2 emissions between 1989 and 1995. The tax has accelerated the shift from heavy to light fuel oil and from oil to other fuel. It has also provided an incentive to use lower-sulphur fuel. However, the tax would need to be raised considerably to internalise all external costs associated with sulphur emissions; in addition, the many

exemptions (e.g. for transport by water and for refineries) should perhaps be removed and the firms involved compensated via reductions in other taxes, employers' social contributions or the like.

The *NO_x charge* is believed to have contributed not only to a reduction in NO_x emissions but also to an increase in energy efficiency, since the charge is refunded in proportion to the amount of energy generated and in inverse proportion to emissions. Since the latest revision of the charge in 1997, the number of plants paying it has risen by 6%, as the minimum capacity limit has been progressively lowered. SEPA estimates that the charge has generally had a greater effect on emission reduction than plant-specific permit conditions have had, especially for larger plants. Administrative costs represent about 0.7% of the total charged.

Opinions differ as to whether the *tax on natural gravel* has had any effect on use. The tax has had an impact on prices, but it is possible that the scarcity of the resource has been a greater factor over the long term. Abstraction of natural gravel was declining even before the tax was introduced.

The cost-effectiveness and efficiency of these economic instruments have been studied only to a limited extent. In most cases, the taxes are too low to cover environmental externalities fully and to significantly affect behaviour. Some inefficiencies stem from exemptions, notably to the CO_2 and energy taxes. "Bads" such as noise could be charged for more extensively. Overall, broader evaluation is needed on the *effects of different instruments in "policy packages"* that typically consist of a mix of information, economic, regulatory and voluntary instruments. A special challenge concerns liability and financing related to remediation of contaminated sites (Box 3.1).

5. The Role of Industry

Major industrial branches in Sweden include iron and steel, motor vehicles, transport equipment, forestry products, food processing, chemicals, and electrical and

electronic equipment. While long-established industries based on iron and wood still play an important role, services, engineering and high- technology sectors have been growing rapidly. Swedish companies often promote environmental management and other environmental initiatives, increasingly seen as *competitive assets*.

Swedish *eco-industry* is particularly strong in areas characterised by strict regulation and incentives and rapid development of technology and management methods: e.g. water, waste water and waste management and technology. Exporting companies in these areas are expanding, assisted in some cases through the Swedish Environmental Technology Network and Swedish Trade Council. Enterprises primarily producing environmental goods and services accounted for 1-3% of employees, turnover, exports and operating profit in Sweden in 1999.

5.1 Environmental management and initiatives

Sweden has the world's *largest number of companies with ISO 14001 certification per unit of GDP*, with 2 730 companies registered as of late 2002. In January 2004, 122 companies were certified under EMAS (only two of which registered in 2003). While 31% of firms declare that they have set some form of environmental goals, almost half (mostly smaller enterprises) have no formal environmental management system (EMS). Firms have indicated regret that there is no "reward" for adopting an EMS, such as simplified permit procedures or reporting requirements. Environmental reporting has spread substantially. The Swedish Association of Environmental Managers has about 300 member organisations, including municipalities and county administrations.

In 2000 the Confederation of Swedish Enterprise presented a "Vision for Sustainable Industrial Development in the year 2025". The Swedish Business Development Agency (known internationally by its Swedish acronym, NUTEK) proposed in 2003 that a national centre for environment-driven business development and *environmental technology export* should be established. Swedish industry has developed an environmental product declaration programme, primarily used in business-to-business commerce.

The use of *voluntary agreements* (Table 2.6) increased somewhat during the review period but is *not a key feature* of Swedish environmental policy. In most cases, such agreements are used in combination with other instruments. They have mainly served as a substitute for, or in preparation of, legislation on a specific environmental issue. Only rarely have voluntary agreements set more ambitious objectives than those stipulated in legislation. The effectiveness and efficiency of the voluntary agreements have never been thoroughly assessed. Dialogues between government

and business on promoting *sustainable development* exist in i) the building and property sector, involving 20 companies and three municipalities; and ii) the food retail sector, covering future logistics and sales channels and involving 16 companies.

Table 2.6 **Voluntary environmental agreements**

Transport	1994	Environmental quality classes for lead in petrol
	1996	Pollution from shipping
	1997	Environmental quality classes for petrol
	1997	Decontamination of petrol stations
Industrial processes, including soil decontamination	1992	Remedial treatment of mining waste in Falun
	1993	Clean-up of Lake Järnsjön
	2004	Energy efficiency in industry
Industrial products, waste, recycling	1993	Chemical controls, including processes (various agreements)
	1994	Recycling (packaging, tyres, recycled paper, PET bottles)
	1995	Construction materials
	1996	Recycling of NiCd batteries
	1998	Recycling of office paper
		PCBs in buildings
Water and sewage	1994	Sludge, including use in agriculture
Agriculture	1995	Pesticides
		Watercourse system co-operation (various agreements)
Forestry	1998	Conservation of natural forests

Source: SEPA.

5.2 *Influencing product and production processes*

Information instruments such as eco-labelling are well developed in Sweden. In 2004, 625 products and shops in 61 product groups carried the *Nordic Swan eco-label*. Almost 90% of Swedes know what the label means. Work is under way to better co-ordinate the Nordic Swan and EU flower labels. The Bra Miljöval ("good environmental choice") eco-label of the Swedish Society for Nature Conservation has been granted to 625 products so far. Some 3 900 products from a total cultivated area of 187 000 hectares have received the KRAV label for *organic agriculture*. More than half of Sweden's *productive forest area* is certified by either the Forest Stewardship Council (over 10 million ha) or the Programme for the Endorsement of Forest

Certification Schemes (3.8 million ha). Some environmental NGOs criticise the latter, which is particularly popular among private forest owners.

Product policy has received considerable attention. A 2000 government strategy aims to reduce adverse impacts on human health and the environment arising from the production, use and disposal of products. Sweden has adopted the concept of integrated product policy, which aims to encourage a life-cycle approach by i) engaging all relevant actors to apply, combine and improve the efficiency of instruments such as EMS, eco-labelling, eco-design, green procurement and producer take-back and recycling responsibility; and ii) supplementing and supporting other strategies, such as those on climate and chemicals.

Procurement policy can have a significant impact on products. Sweden promotes energy-efficient products, for example, through competitive technology procurement. The government is examining the possibility of requiring that social and environmental considerations be taken into account in all public procurement. Many of the government agencies whose activities have a considerable impact on the environment already use tools such as life-cycle assessment in procurement decisions. The government-appointed Committee for Ecologically Sustainable Procurement developed an Internet-based tool to help all agencies, as well as municipalities and county councils, in the greening of procurement; it is being refined by the Swedish Environmental Management Council.

Since 1999, more than 20 000 companies have been required to include environmental impact information (e.g. on emissions to air and water and use of manufactured chemicals) in their *annual reports*. The 2000 Public Pension Funds Act requires the *National Pension Funds* to draw up a *business plan* describing how environmental and ethical considerations are to be taken into account in investment activities without detracting from the fundamental objectives of fund management. Each fund's annual report must show how such considerations influenced the fund's management. In addition, Sweden counted 34 *environmental and/or ethical investment funds* in 2002, the third largest number among EU countries.

A commission appointed to investigate the environmental and socio-economic effects of *producer responsibility* supported the concept in its December 2001 report, concluding that the producer responsibility system in Sweden helped reduce quantities of waste going to landfill and of hazardous chemicals used, made material and energy use more resource-efficient, and, together with the deposit-refund system on beverage containers, helped reduce litter. The commission suggested there could be advantages in a voluntary approach to further extending producer responsibility.

Box 3.1 **Contaminated sites: liability and public funding**

The Environmental Code authorises supervisory authorities (i.e. those responsible for inspection and enforcement) to determine *clean-up liability* and require a person or persons responsible for damage to the environment or human health to take remedial measures (only for activities undertaken since 30 June 1969). The extent of the liability is assessed on the basis of what is deemed reasonable. Where an operator cannot be found or cannot reasonably be required to bear the remediation costs, the property owner may be made liable, provided he was or should have been aware of the contamination. The Environmental Code introduced an *environmental clean-up fund* to cover costs of cleaning up damage from an environmentally hazardous activity when the responsible party has been identified but is unable to pay. SEK 152 million was allocated for this purpose in 2001, rising to SEK 550 million annually by 2005. A county administrative board may declare an area an environmental risk area if restricting land use is deemed necessary to protect human health or the environment.

Old spoil heaps and tailings at *abandoned mines* are a significant long-term source of *heavy metals* in the Swedish water environment. Several lakes and watercourses close to mines have been seriously contaminated. As the *mine waste* slowly weathers over the centuries to come, the risk of leaching will gradually increase. At some sites, mine waste has been covered with soil to arrest weathering and decrease the leaching of metals into surrounding waters.

SEPA is making an inventory of contaminated sites and estimates there are *38 000 contaminated or supposedly contaminated sites* in Sweden, of which 30 000 have been identified. About one-fourth of all sites are believed to entail "very great risk" or "great risk", based on evaluations of contamination level, chemical hazard, transport of contaminants in soil, human sensitivity and conservation value. The inventory is supposed to be completed by 2005, including regional remediation programmes and priority lists. By that time, remediation is to have been initiated on 100 high-risk sites and completed on at least 50 of them. As of 2003, work had started on about 30 of the highest-priority sites. The target of 100 is unlikely to be met on deadline.

It is estimated that more than half of all the contaminated sites will either be orphan sites or will prove to involve activities undertaken before 1969. Since no more than "reasonable" remediation can be required of responsible parties, the state will probably have to bear a significant portion of clean-up costs, even where liability can be clearly established.

The government has spent about SEK 1 billion so far on remediation, a relatively modest sum compared to that spent in many other OECD countries. Cleaning up all priority sites is expected to cost an additional SEK 25 billion. SEPA has made funds available for municipal studies and remediation of contaminated sites.

Sweden has applied a wide range of agri-environmental policy instruments since the late 1980s. Regulation has been used to control density of pigs and cattle, impose good manure management practices and compel farmers to plant green cover in autumn and winter. Financial incentives under the Swedish implementation programme for EU agri-environmental regulation 1257/99/EC support investment in manure management and compensate for the loss of production caused by the *growing of catch crops*, planting of riparian zones and establishment of wetlands and ponds. Financial disincentives in the form of *taxes on pesticides and the nitrogen and cadmium content of fertiliser* discourage unnecessary use of commercial inputs. Other instruments include voluntary approaches, extension programmes and information campaigns (e.g. Focus on Nutrients), and research and development. Sweden has designated the coastal areas of the Baltic Sea as vulnerable zones under the EU nitrate directive. Largely as a response to European Commission pressure in 2002 and 2003, Sweden designated more inland areas as vulnerable zones. The zones are all within the catchment areas of four big lakes (Mälaren, Hjälmaren, Vänern and Vättern) or drain directly to the Baltic. Sweden also designated lakes Mälaren and Hjälmaren under the directive. The European Commission has no further such claims on Sweden and the case was closed in December 2003. An action programme for the most recently designated areas comes into force in 2004 and 2005.

Most indicators tracking *agricultural inputs show declining trends*: application of phosphorous fertiliser has decreased by as much as 70% since the mid-1970s; application of nitrogenous fertiliser decreased by 37% in the last ten years (Figure 3.3); cadmium input from phosphorus-based fertilisers declined from 1.4 grams per hectare to 0.07 over 1985-2002. Although pesticide use has not shown the same downward trend since the mid-1990s (partly as a result of the growing use of glyphosate herbicides on green cover planted to reduce nitrogen leaching), the Chemicals Inspectorate states that the *risk to the environment* from the use of plant protection products has fallen by 65% since the mid-1980s.

The reduction in nutrient inputs has led to a *decline of nutrient losses to the environment*, albeit not in the same proportion. Phosphorus losses from farmland to water are thought to have fallen by 19% over 1995-2000. Some model calculations suggest that nitrogen leaching from the root zone of agricultural soil decreased by just over 25% in 1985-99, whereas other figures indicate no clear reduction during 1995-2000. Ammonia emissions from agriculture declined by 17% for 1995-2001. While these results are largely positive, they are not enough to meet the targets of the "Zero Eutrophication" EQO. It remains an open question whether additional measures now being taken (such as the building of new wetlands as nutrient sinks) or still being considered will make up the difference, or whether the EQO can be achieved only through a more fundamental reform of agriculture.

6. Expenditure and Water Charges

6.1 Expenditure and financing

Water-related *pollution abatement and control (PAC)* expenditure amounted to SEK 7.1 billion in 2000 for households and small industry, and SEK 2.7 billion in 2002 for industry (of which SEK 1.3 billion was for investment). This suggests that total water-related PAC expenditure is of the order of 0.43% of GDP. Total expenditure on public water supply amounted to SEK 6.0 billion in 2000.

Concerning financing, Swedish law requires municipalities to *recover the full cost of providing municipal water services* through taxes or charges. There are no financial transfers from central government for this purpose. In practice, 99% of costs are recovered through charges. Municipalities set charges on the basis of the benefit derived rather than on the cost of providing the service, suggesting there may be some cross-subsidies between household and small industrial users, though it is not clear in what direction. There is no differentiation of charges on social grounds (e.g. ability to pay).

Central government funding is made available for the protection and restoration of water bodies, as follows:

- *liming acidified water bodies*: SEPA provides 85% of the circa SEK 185 million annual cost under a ten-year National Plan for Liming Surface Waters adopted in 1999.
- *agri-environmental grants*: the Board of Agriculture annually provides SEK 3 billion (including EU contribution) for such measures as establishment and maintenance of wetlands and ponds in the agricultural landscape.
- *fish protection*: the National Board of Fisheries gives financial assistance for measures with long-term effects, such as projects to promote natural reproduction or give long-term protection to particularly valuable species and populations. Biological restoration of limed waters involves supplementing liming with measures to re-establish animal species, such as habitat management, building of fish passes, removal of barriers to migration and restocking.
- *cultural environment grants:* the National Heritage Board provides grants for the conservation and maintenance of buildings (e.g. restoration of old water mills).
- *local investment programmes*: these help municipalities in projects involving local companies and organisations, and can include support for investments that enhance the ecological sustainability of aquatic environments.

6.2 *Water charges and economic instruments*

Municipal water charges have increased somewhat in recent years: the weighted average of the total (fixed plus variable) charge combining water supply, sewerage and waste water treatment services rose from SEK 21.17 to SEK 25.15 per cubic metre (current prices, including VAT) between 2000 and 2003. In 2003, the fixed charge averaged some SEK 10.86 per cubic metre for households, and the weighted average of the variable charge amounted to SEK 14.29 per cubic metre. In addition, a one-off connection charge applies. Charges for industries discharging into the public sewer system vary with the pollution content of the effluent.

Sweden has adopted *three economic instruments in the field of water management*:

- *county district user charges* aimed at financing remediation of damage resulting from water use. Anyone holding an environmental permit for water-related activities, such as hydropower generation or water withdrawal, must pay an annual charge fixed by the county Environmental Court. For example, hydropower installations pay on the basis of kWh of installed capacity.
- *fishing* charges. If a licensed activity has a clear impact on fish life, the county Environmental Court may impose this charge as a contribution to research into fish conservation.
- oil spill pollution *fines*, whose level depends on ship tonnage and the size of the oil spill. Revenue amounted to SEK 625 000 in 2000. The fines were increased in 2002. Enforcement needs strengthening.

The Swedish *pollution permitting system* is one of the few in the OECD based on a case-by-case negotiated approach rather than branch-specific ordinances. The former has the advantage of flexibility and adaptation to local circumstances, while the latter is more transparent and provides a level playing field for industry. As practised in Sweden, the case-by-case approach provides a fair degree of uniformity, as all decisions are based on the same information about best available technology. Larger enterprises appear satisfied with this long-standing practice (recently confirmed in the Environmental Code), but the transaction costs of obtaining a permit are relatively greater for smaller firms, many of which would prefer standard, branch-related permits.

3. Policy Responses

Together with laws such as the Forestry Act, the Environmental Code contains the main legislative elements governing nature protection in Sweden. SEPA plays a key role in fostering implementation of policies for nature conservation and biodiversity. The National Forestry Board, the Board of Agriculture, the National Board of Fisheries, the National Heritage Board and the National Board of Housing, Building and Planning also have responsibilities in the protection of nature, biodiversity and cultural heritage. *County administrative boards* and ten *regional forestry boards* exercise overall responsibility at regional level. The role of *municipalities* has been strengthened; they directly influence nature conservation and biodiversity through physical planning and the designation and management of protected areas, as well as projects in the local investment programmes of 1998-2002.

Sweden gave higher priority to nature conservation in the review period, in line with the recommendation of the 1996 EPR, and has clearly translated this priority into funding. *National funding* for nature conservation doubled from SEK 704 million in 1994-95 to SEK 1.4 million in 2004. While no quantitative estimates of funding by local authorities and county councils are available, the *local investment programmes* (Chapters 5 and 6) covering nature conservation have contributed to local funding. The government's recent decision to allocate SEK 300 million for local nature protection measures in 2002-04 will assure the continuity of local conservation efforts. Central government funding for the establishment of forest protection areas reached about SEK 600 million in 2001. Moreover, forest owners may be compensated for opportunity costs as a result of requirements to set aside 500 000 hectares of productive forest and to increase the share of broadleaved trees and dead hardwood being left in forests. The Environmental and Rural Development Programme represents a further major contribution (about SEK 750 million a year) to agri-environmental measures. In addition, increased funds have been allocated to biodiversity research in recent years.

Responsibilities for setting up targets derived from the EQOs and for implementing and evaluating policies are assigned to public agencies, private companies and other organisations in various sectors, notably agriculture, fishing, forestry, energy, transport, tourism, development co-operation and cultural heritage.

Box 4.2 **Nature protection at local level**

Increasing public health problems related to inactivity and the disappearance of natural areas around urban agglomerations have led the government to pay more attention to nature protection at local level. About 13% of the nature reserves designated between 1991 and 2001 were declared at local level, though efforts vary greatly by municipality. Some 30% of the country's municipalities have drawn up special *nature conservation programmes*. The fact that municipalities own most of the land in urban areas gives them a good opportunity to establish protected areas.

National government support for nature protection and biodiversity preservation amounted to SEK 317 million a year or about 6% of total financing in the *local investment programmes*. At least 50% of financing for an individual project had to come from sources other than the central government. It was not easy for local actors to develop good nature protection projects that would also meet the other programme criteria. This difficulty stemmed partly from a lack of any real tradition of nature protection work within municipalities and partly from trouble with quantification of environmental impacts, which was a selection criterion for nature protection measures. In partial replacement of local investment programme financing, the government is making SEK 300 million available in 2004-06 for municipal nature protection projects aimed at combining biodiversity protection with promotion of human health and well-being.

Sweden so far has seven *foundations for nature protection and recreation*. Such foundations may be regional in scope or aim at protection of a specific habitat. The foundations can acquire financing for their projects (for instance, from EU structural funds) and mobilise actors at local level. The government has proposed making national aid available for establishing such foundations.

Stockholm's *national urban park* is an important recreation area for residents and tourists. Other urban parks have been proposed in the vicinity of the country's largest cities.

3.2 *Forestry*

Forest-related products have represented 13% of Sweden's total export value and *5% of GDP* in recent years. A downward trend for mature forests with a large deciduous element was halted in the mid-1990s, and such forests are expected to expand by some 10% by 2010. However, harvesting practices (e.g. clear-cutting), logging of valuable natural forests, drainage and use of fertiliser and pesticides have put pressures on forest ecosystems. The diversity of forest species such as lichens, fungi and invertebrates has diminished. Insufficient attention is given to preserving dead wood, small habitats, red-listed species and buffer zones along water bodies. Forestry operations often damage elements of the cultural heritage, largely through a lack of knowledge concerning such sites. Forest road building can harm wetlands that represent significant natural or cultural assets.

About 75% of the Swedish forest area is in private *ownership*. The state-owned forest company, Sveaskog, is the largest public owner with 3.5 million hectares. In addition, about 20 state authorities or state enterprises manage some 2.2 million hectares. While state forest management can serve as an example of sustainable forest management for the whole sector, the fragmented character of state forest management may hamper further efficiency gains.

The 1993 *National Forest Policy* established sustainable forest production and environmental protection as two equal, overarching objectives for forestry. These aims were confirmed in the 1998 Forest Policy, which set *environmental objectives for the forest sector* for five years. The "Sustainable Forests" EQO set concrete interim environmental targets for 2010: protecting more productive forest land of high conservation value (+900 000 hectares); increasing the amount of dead hardwood (+40%) and the area of mature highly deciduous forest (+10%) and old forest (+5%) as well as areas regenerated with deciduous forest; avoiding damage to ancient monuments; and initiating action programmes for threatened species in need of targeted measures. The county administrative boards and regional forestry boards have proposed regional targets.

By the end of 2002, *3.97% of productive forest land was protected* as national parks, nature reserves, biotope protection areas or through nature protection agreements (Table 4.2). Most of the new protected forests are in central and southern Sweden, which have generally had the weakest protection. Despite this increase, however, only about 1% of forests outside mountainous regions are protected. Progress in statutory protection has been slow: in the four years to 2002 only 15% of the target for 2010 was protected. Identification of key forest biotopes and other valuable sites remains incomplete. The management of protected areas is still insufficient, though funding for management more than doubled in the review period.

Sveaskog has ambitious environmental targets (notably to set aside 20% of productive forest for protection and for sustainable forest practices) and aims to set a good example for the private forest sector in sustainable forest management. The company seems, however, to have difficulties achieving its environmental targets and combining production objectives with those relating to environmental protection. Increased attention must be paid to ensuring that protection is targeted at the areas with the highest conservation value, especially outside mountainous regions.

Voluntary protection has progressed rapidly: some 810 000 hectares of forest has been set aside voluntarily since 1996, about half of it on land owned by the eight largest forest companies. Much of the voluntary protection involves *forest certification* through the Forest Stewardship Council or the Programme for the Endorsement of Forest Certification Schemes, which together cover more than half of Sweden's productive forest. However, most of the areas set aside voluntarily are in northern Sweden and other mountainous areas, and it is estimated that only one-fourth of them contain key biotopes. A significant share of the protected area lacks documentation, especially on small forest owners' land.

The prospects of meeting the interim targets to *increase the quantity of dead hardwood, mature forest and old-growth forest* seem good, despite the considerable uncertainties involved. The regional forestry boards provide advice programmes promoting forest management that would allow the targets to be met. The National Forestry Board, together with SEPA and the relevant county administrative boards and regional forestry boards, is identifying key ecological landscape areas where

Table 4.2 **Protected forest areas**, 2002

	000 ha	% of productive forest
National Parks and Nature Reserves	872.4[a]	*3.86*[a]
Nature Protection Agreements	16.6	*0.07*
Biotope Protection Areas	8.4	*0.04*
Voluntarily Protected Forests	990.0	*4.38*
Total	1 707.4[b]	*8.87*

a) 2000.
b) Includes long-term and short-term set-asides within certification standards and nature reserves owned by forest companies, about 25% of estimated area with key habitat quality. The degree of permanence cannot be guaranteed.
Source: SEPA; National Forestry Board.

green forest management plans would constitute the basis for multiple use of forest land. In 2000, such plans covered about 600 000 hectares of private land. Large forest companies generally apply ecological landscape planning and green accounting. The government forest management organisation uses an *ISO 14001 certified environmental management system.*

In 2001, the *central government spent* some SEK 600 million on forest protection under the Environmental Code. In 2002, it allocated SEK 665 million to increase protection in non-mountainous areas (e.g. in the south): SEK 500 million to establish nature reserves and SEK 165 million to set up biotope protection areas and conservation agreements. SEPA and the National Forestry Board estimate that some SEK 1.4 billion a year will be needed for forest protection in 2003-10, including compensation payments and capacity building in forest reserve designation and management for county administrative boards.

3.3 Agriculture

Since EU accession in 1995, Swedish agriculture has undergone significant *structural changes*. Between 1996 and 1999 the number of farms dropped by 11%, from 90 488 to 80 199, and the number of farms of more than 100 hectares increased by 10%, from 4 697 to 5 181. This has entailed some negative trends for biological diversity and cultural heritage, but overall these trends now seem to have at least slowed, and there are cases of improvement.

The *Swedish Environmental and Rural Development Programme for 2000-06*, based on the EU Rural Development Regulation (1257/99), is the centrepiece of policies integrating environmental concerns with agricultural policy. The Board of Agriculture is responsible for the general implementation while the county administrative boards manage the programme at their level. Measures under the programme are financed jointly by the Swedish government and the EU. The emphasis is on compensatory payments to farmers for measures such as preservation and restoration of pastures and meadows; preservation of valuable natural and cultural environments in the agricultural landscape and reindeer herding areas; protection of threatened breeds of domestic animals; reduction of nitrogen leakage; restoration and creation of wetlands; and environmentally sound production methods. For 2000-06, SEK 14.7 billion is being allocated for sustainable development in rural areas, including SEK 9.6 billion for environmental support per se. More than half of all farmers receive agri-environmental support.

Support payments have helped *reverse the declining trend of meadow and pasture land in most of the country*. The area of grazing land has increased in coastal

and archipelago areas since 1995, especially in remote areas. While quantitative targets are being met, the quality of the measures is uncertain, partly because a broader landscape perspective is lacking and sometimes because of outright management errors. Better information is needed to orient measures to the most valuable features and types of pasture. Payments may not be sufficient to retain farming in areas where there is pressure from such social and demographic factors as isolation, long distances to services and lack of alternative employment for other family members.

The disappearance of *small-scale habitats on farmland* and *culturally significant landscape features* seems to have halted; such habitats and features are increasingly covered by agri-environmental measures and protected under the Environmental Code. Progress varies widely by region, however.

Sweden has a target of expanding the area under *organic farming* to 20% of the total arable area by 2005 (from 16% in 2002); by 2002 it had already met its target of increasing the share of organic dairy and beef cattle and lamb production to 10% of total production. Support for organic farming amounted to SEK 462 million in 2002. The government has decided to significantly increase support for marketing and research on organic production.

Integration of economic objectives into environmental policy

In any country, there may be tension between sustainable development aspirations, which tend to be generally defined, and more specific environmental aspirations. Sweden's Environmental Code states, for example, that *environmental quality standards* shall specify levels of pollution or other disturbance to which humans or the environment can be subjected without any risk of significant or substantial detriment. This is a highly ambitious aspiration, which in practice the standards probably do not meet. Indeed, some actors in society may see environmental objectives as being balanced against other dimensions of sustainable development (i.e. economic growth and social objectives), which leads to environmental quality standards being set more as pragmatic "bottom lines".

2.3 *Market-based integration*

In its spring 2003 budget statement, the government declared: "One key task for environmental policy is to establish a system in which the party responsible for environmental impact is also made to bear the cost to the general economy". Sweden has used economic instruments to integrate environmental concerns into policy in a way that materially influences development and thus advances sustainability. It was among the first countries to introduce a significant CO_2 tax (1991), and it now has a wide variety of economic instruments. In 2002, environment-related taxes generated SEK 68 billion, or 5.8% of total tax revenue (Table 5.2). The tax reform known as the "green tax shift" is another component of this policy (Box 5.2).

Table 5.2 **Revenue from selected environment-related taxes, and energy and vehicle taxes**

(SEK billion in current prices)

	2000	2002
Energy tax	38.3	37.2
Petrol	19.3	17.2
Electricity	11.3	14.0
Other	7.7	6.0
Carbon dioxide tax	12.0	19.9
on petrol	4.6	7.9
other	7.4	12.0
Sulphur tax	0.1	0.2
Special tax on electricity	1.7	1.8
Motor vehicle tax	7.0	7.5
Tax on natural gravel	0.1	0.1
Tax on fertiliser and pesticides	0.4	0.4
Tax on waste	1.1	0.9
Total revenue	60.7	67.9

Source: Ministry of Finance.

Box 5.2 **Green tax shift**

The 2000 spring finance bill introduced an environmental tax reform called the *green tax shift*: a reallocation of taxes from labour to environmentally harmful activities, notably energy production and use. It is estimated that the green tax shift in the 2001, 2002 and 2003 budget bills amounted to EUR 0.8 billion. Several taxes, including those on CO_2, energy, electricity, landfill and gravel, were increased while others were decreased, especially the basic income tax threshold and employers' social contributions. In a further EUR 0.2 billion shift proposed for 2004, the CO_2 tax is to be raised again, by 18%, to around EUR 90 per tonne of CO_2. Energy and CO_2 taxes, in particular, influence the *energy and transport* sectors (Section 3). The overall goal is a green tax shift of EUR 3 billion for 2001-10.

Some *evaluations* of the effectiveness of tax instruments in achieving environmental objectives have been made in Sweden, but more are needed. Taxes often take time to have an impact, as long-term elasticity may be higher than short-term responses. One evaluation suggests that the mix of instruments in use in 2001 to address GHG emissions (including the CO_2 tax) will reduce emissions by 15-20% by 2010 from what they would otherwise have been. A study of the green tax shift's distributional effects indicates that its average net impact has amounted to less than 1% of disposable income in all social groups (Chapter 6).

As well as advancing environmental objectives, the green tax shift aims to increase *employment*. Lowering tax rates on labour and increasing the income tax threshold can be expected to have medium-term benefits for employment, though the short-term effects may well be small.

Other market-based instruments

Although Swedish environmental policies favour extensive use of economic instruments, the potential for further progress remains. Sweden could make even more use of such instruments; moreover, of the many it now uses, some are too low and others are weakened by exemptions, and overall their effectiveness has not been analysed sufficiently.

Sweden has a range of energy and transport taxes relating to the environment (Table 5.3). Current discussions about a possible tax on *incinerated waste* include consideration of a link with the energy tax. Changes to the *energy tax* are planned: the exemption on electricity for industry will be removed, and in July 2004 the rate on electricity will be raised to the minimum specified in the EU energy tax directive, in conjunction with a new Swedish law on voluntary energy efficiency improvements. *Taxes and charges on products* such as batteries could be adjusted to increase policy effectiveness, and "bads" such as noise could be charged for more comprehensively.

Inefficient exemptions in charging regimes include the waiver of fairway dues for ships operated by public agencies or used within one county and the sulphur tax exemptions for water transport and for fuel used in fuel production (e.g. at refineries) and industrial processes. The *rate of some taxes may be too low* to provide sufficient incentive to change behaviour. Since the marginal cost of abatement in certain cases (e.g. nitrates and acid precursors) is much higher in Sweden than elsewhere in the region, cost-effectiveness in a national context may not always be the best criterion; *cost-effectiveness at regional level* should be considered in such cases.

Environmentally harmful subsidies

In a recent evaluation of *environmentally harmful subsidies*, the principal finding was that potentially harmful direct subsidies to the primary sector (agriculture, forestry, fishing and hunting) in the late 1990s exceeded the environmental taxes paid by the sector. Large subsidies also went to the housing and construction industry in the form of interest reductions.

Reforms to the EU Common Agricultural Policy can have important environmental results in Sweden, as elsewhere. Agri-environmental subsidies and cross-compliance mechanisms are steps in the right direction. More market-based price signals at EU level for farm production would reduce production-related agricultural support and might prove beneficial for the environment.

Minor subsidies with environmentally harmful effects include *tax relief for commuting to work* when annual expenses exceed SEK 7 000. Aimed at improving labour market flexibility, the subsidy also increases road travel and CO_2 emissions.

Another example is a *product transport subsidy* paid largely for mining, quarrying and manufacturing operations in sparsely populated areas. It is intended to encourage rural area processing but is also likely to increase transport and emissions.

3.3 Integration of environmental concerns into agriculture policy

The Swedish Board of Agriculture, Swedish Environmental Protection Agency and National Heritage Board jointly evaluate the environmental effects of the Common Agricultural Policy every year. Measures to integrate economic and environmental goals in agriculture and rural development policy are found mainly in the 2000-06 *Environmental and Rural Development Programme* (Sweden's agri-environmental programme). Based on EU rural development regulations, it includes support for environmentally sounder production, conservation of natural and cultural assets and enhanced competitiveness in rural areas. Its annual budget exceeds SEK 3 billion, including EU funds. The programme is founded on a multisectoral strategy that emphasises the many roles of agriculture, including preservation of natural and cultural heritage. It has two priorities: environmentally sustainable agriculture, and economically and socially sustainable development in rural areas. The first involves compensation for collective goods, such as preservation of biodiversity, the cultural heritage and open, varied landscapes. The second involves activities to promote the adaptation and development of rural areas.

Nutrients

The "Zero Eutrophication" EQO requires that, within a generation, "nutrient inputs...are not detrimental to biological diversity" and "the nutrient status of lakes and streams in agricultural areas does not exceed natural concentrations, which means that the water may at most be nutrient-rich or moderately nutrient-rich" (Chapter 3). This EQO is also related to Swedish commitments concerning nitrogen discharges to the Baltic Sea (Chapter 8). The *goals* involved *are ambitious*; the 2000 Government Bill on the EQOs noted that the interim targets "will require vigorous measures, in particular in agriculture and on the part of municipalities". Nitrogen management in

agriculture is also important because of *nitrogen's health impacts*. The risk of nitrogen seepage from farms to water bodies and coastal areas varies (e.g. with commercial fertilisers and manure quantities, crop and soil type, precipitation, irrigation and harvesting). Use of nitrogenous commercial fertiliser grew after the Second World War but later stabilised and recently has begun to decline (Figure 3.3).

Fiscal instruments

The main economic instruments used in relation to agricultural emission goals are *taxes on commercial fertiliser, pesticides and cadmium*, introduced in 1984 and revised in 1995. Their respective annual revenues are around SEK 360 million, SEK 40 million and SEK 10 million. An evaluation of the fertiliser tax suggests that the use of part of the tax revenue to finance information efforts and advisory services has helped reduce nitrogen use. The tax has also raised awareness of the damage that intensive application of commercial fertiliser can entail. The cadmium tax has a large incentive effect, since farmers using low-cadmium fertiliser can avoid paying the tax.

Other instruments

Greater sustainability in agriculture is also promoted through measures such as *information, counselling, education and training*. Focus on Nutrients, a joint initiative of farmers, the county administrative boards and the Board of Agriculture, aims to educate and motivate agricultural stakeholders in regards to nutrient leaching.

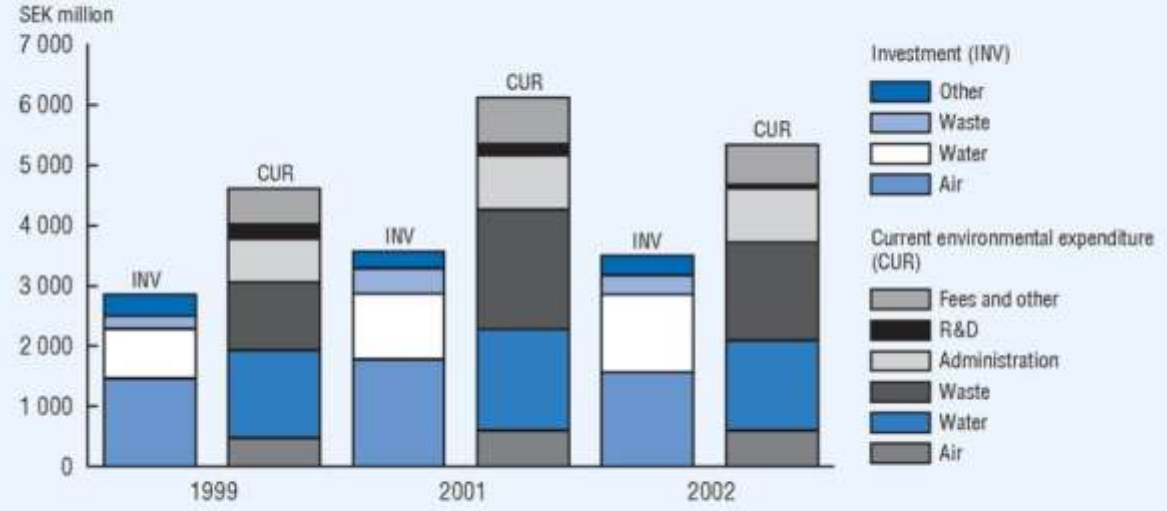
A significant issue in agriculture, and as concerns the "Non-Toxic Environment" EQO, is the *impact of pharmaceuticals* on human and ecosystem health. Sweden is working within the EU to follow up a survey of regulations and directives on human and *veterinary pharmaceuticals* with preparation of new legislation, expected to be completed in 2004.

4. Environmental Expenditure and Financing

4.1 Overall environmental expenditure

Swedish data on environmental expenditure remain patchy, particularly for public expenditure. Data from various years and sources indicate that Sweden's *pollution abatement and control* (PAC) expenditure has continued to represent about *1.1% of GDP* in recent years while *environmental protection* expenditure amounts to about *1.5% of GDP*. In other words, growth in GDP has been accompanied by similar growth in environmental expenditure. This means Sweden's remarkable progress in decoupling environmental pressures from GDP has been achieved at relatively lower cost than in more populated and more densely industrialised countries such as Austria, the Netherlands and Germany.

Figure 5.3 **Private sector[a] investment and current environmental expenditure,** 1999-2002



a) Enterprises.
Source: Statistics Sweden.

Private (business) *PAC expenditure* is best known; it amounted to SEK 8.9 billion in 2002 (60% for operations and 40% for investment). Environmental investment represented about 5% of total investment by industry (Figure 5.3). Public PAC expenditure has totalled around SEK 16 billion in recent years (about 20% national and 80% local; almost 66% water-related). It is not clear how much the local investment programmes mobilised new and additional resources for PAC, nor how much of agri-environmental subsidies went to water pollution abatement (e.g. nitrate pollution).

Concerning *environmental expenditure* (i.e. PAC expenditure plus water supply and nature protection expenditure), almost half is related to water supply and water pollution (Chapter 3), while nature protection accounts for less than 10%, though it has increased very significantly since the mid-1990s (Chapter 4).

4.2 Financing environmental research and technology

Sweden's *investment in research and development*, in relation to GDP, is among the world's highest. Increased investment by business, which accounts for 80% of the total, lifted the level to 4.3% of GDP in 2001. Environmental research should be seen in this context.

Funding for research in environmentally sustainable development from research councils, private foundations and government agencies totals around SEK 1 billion per year. This figure excludes large demonstration projects, such as development of new energy systems and combustion research. The three largest funding bodies are FORMAS (SEK 300-450 million per year), MISTRA (SEK 200-250 million) and the EU (SEK 150-200 million). In addition, universities and institutes have their own budgets in this area, totalling around SEK 500 million per year.

4.3 *Local investment programmes*

In the *local investment programmes*, the government gave municipalities some SEK 6.2 billion over 1998-2004 to speed the transition to sustainability and provide employment (Table 5.4). The grants were intended to have a strong catalytic effect by attracting about twice that much in co-funding. Over the period, 211 programmes in 163 municipalities were approved and total environment-related investment reached almost SEK 21 billion. About 20-25% of the grant funds were unused, however, and were returned to the national budget. It is estimated that the programmes created 2 000 permanent jobs. Estimated environmental effects included a reduction in energy use of 2.1 billion kWh (with a concomitant decline in CO_2 emissions) and a significant reduction of waste sent to landfill. The climate investment programmes that have replaced the local investment programmes have a clearer focus on measures aimed at reducing GHG emissions; their grant allocation totals SEK 840 million for 2003-04.

Table 5.4 **Local investment programmes**, 1998-2004

	Number of programmes	Total investment (SEK million)	Environment-related investment (SEK million)	Grants (SEK million)	Number of permanent jobs created
1998-2000	42	12 835	7 776	2 320	474
1999-2001	47	4 902	4 562	1 432	664
2000-2002	57	5 836	5 056	1 487	567
2001-2003	40	2 705	2 415	733	214
2002-2004	25	980	928	236	82
Total	211	27 259	20 738	6 210	2 000

Source: Ministry of the Environment.

4.4 *Environmentally motivated subsidies*

Swedish national accounts indicate the trend in total *environmental subsidies* rose during the early 1990s, peaked in 1998 and dropped back to around 0.1% of GDP by 2000 (Table 5.5). That percentage represents *less than 10% of environmental expenditure*; agri-environmental subsidies account for more than 85% of total environmental subsidies.

Table 5.5 **Environmentally motivated subsidies**, 1993-2000

(SEK million in current prices)

	1993	1994	1995	1996	1997	1998	1999	2000
Resource-related subsidies	248	296	1 110	947	1 638	2 694	2 423	2 028
Nature in agricultural sector	226	250	245	–	–	–	–	–
Other measures in agricultural sector	–	–	825	890	1 410	2 446	2 188	1 786
Landscape conservation	17	30	4	0	0	0	0	0
Environment in agricultural sector	5	1	1	1	8	15	5	13
Subsidy for fish cultivation	0	2	0	3	1	4	0	0
Research	0	2	6	7	4	5	4	2
Council on For. & Agricult. Research	0	11	26	38	204	209	226	223
Subsidy for environmental work	0	0	3	8	11	15	0	4
Energy-related subsidies	121	71	152	141	165	178	191	154
Energy efficiency	23	..	3	5	1	13	12	6
Energy technology	–	–	–	–	–	–	51	27
New energy technology	–	–	–	–	–	0	67	32
Energy research	86	64	134	122	164	165	43	66
Bio-energy research	12	11	15	14	0	0	0	0
Heat and power in southern Sweden	–	–	–	–	–	0	15	23
Energy efficiency in eastern Europe	0	0	0	0	0	0	3	0
Transport-related subsidies	0	0	14	2	3	3	14	0
Electric and hybrid vehicles	0	0	14	2	3	3	14	0
Total environmentally motivated subsidies	369	367	1 276	1 090	1 806	2 875	2 628	2 182
(% of GDP)	*0.02*	*0.02*	*0.07*	*0.06*	*0.10*	*0.15*	*0.13*	*0.10*
(% of total subsidies)	*0.62*	*0.63*	*2.08*	*1.98*	*3.74*	*6.77*	*6.54*	*6.44*

Source: Statistics Sweden.

Subsidies can be environmentally motivated or designed for other purposes, such as regional development, with environmental effects being incidental. Large transport subsidies (e.g. for public transport) are not included in the above trend description,

since their main justification is regional, not environmental. National support to local governments through the local investment programmes is also excluded.

Overall, the *polluter pays principle* (in the OECD sense) is followed in Sweden, though it is necessary to watch out for departures from rigorous application of it. Less than 10% of the total of environmental subsidies (1% of PAC expenditure) is *energy*-related, and it mostly aims to increase energy efficiency and improve energy technology. As noted earlier, several energy-intensive *industrial branches* receive significant tax exemptions. Sectors receiving no payments or environmentally motivated subsidies include mining and quarrying, manufacturing, construction, wholesale and retail trade and financial intermediation. Close to 90% of the environmental subsidy total (representing about 10% of PAC expenditure) is resource-related, mostly aimed at *agriculture* and including both nature protection and pollution abatement. In the local investment programmes, support to *municipalities* came to less than 5% of PAC expenditure.

1. Environment and Employment

Unemployment in Sweden rose from 1.7% in 1990 to 5.4% in 2003, but remained well below the 2003 OECD average of 7.1% (Box 6.1). The country's environmental industry (environmental manufacturing and services) has contributed significantly to the low unemployment rate.

1.1 Employment effects of environmental policy

The government's active environmental policy combined with broad environmental awareness among consumers and producers has resulted in the development of a *strong environmental industry*. Since 1998, the Environmental Advisory Council has drafted several strategies for the development of an environmentally sustainable business and industry sector.

Environmental industry development directly benefits from targeted *environment-friendly public procurement*. The Committee for Ecologically Sustainable Procurement took measures in 1998-2001 to encourage the use of public procurement (which totalled SEK 400 billion in 2002, or 18% of GDP) as an instrument for promoting environmentally sustainable development. The government invests heavily in environmental research and development as well, spending about SEK 40 billion, or 1.8% of GDP, in 2002.

The most significant example of a targeted national government effort to create environmental jobs is that of the *local investment programmes for sustainable development*. In 1998-2002, these programmes provided local authorities with SEK 6.2 billion in grants to move towards sustainable development practices and create jobs. Projects funded were designed to reduce environmental impacts, support more efficient use of energy and other natural resources and promote the use of renewable resources such as biogas. The government grants usually covered 30% of the costs; total cumulative expenditure through June 2002 (i.e. including contributions by local authorities and enterprises) was SEK 27 billion. The 164 participating local authorities estimate that 19 000 full-time jobs were created. In 2003, these programmes were replaced by *climate investment programmes* aimed at reducing greenhouse gas emissions, with SEK 900 million in grants allocated for 2003-04.

The National Labour Market Board has for many years been engaged in long-term efforts to integrate environmental concerns into its activities. Jointly with the National Forestry Board, it has been implementing the Green Jobs programme, which helps unemployed people find jobs in the *forestry sector*. Out of over 1 500 participants, about 55% have found permanent environmental jobs.

Environmental technology exports are promoted through the Swedish Environmental Technology Network (annual budget SEK 7 million), which focuses primarily on end-of-pipe technology. In addition, an environmental export centre was established in July 2004 to support cleaner technology exports.

1.2 Environmental employment market

The Swedish environmental industry is large and growing rapidly. In 1998 (the latest year for which such figures are available) the country had over

6 700 environmental enterprises employing nearly 95 000 people (about 1.5% of the labour force), mostly in waste management and natural resource-related companies. The turnover of the environmental industry was about SEK 163 billion, or 4% of Swedish industry's total (Table 6.1).

In 2003, the Swedish Trade Council surveyed 528 *environmental exporting companies* throughout the country (mostly small and medium-sized enterprises in both products and services) and reported that the business trend for 1999-2002 was favourable. Environmental companies formed Sweden's fastest growing exporting industry in 2002, with annual export growth of 8.4% and turnover of SEK 39 billion (including SEK 14 billion in exports, or 1.6% of total exports). Water technology and services account for 63% of the total environmental export volume; in the domestic eco-industry market, waste management holds the largest share.

The International Institute for Industrial Environmental Economics in Lund has reported continuous growth in the number of Sweden's *environment-related jobs*. In the years ahead, more and more people will devote at least some of their working hours to environment-related tasks.

Table 6.1 **Structure of the Swedish environment sector,**[a] 1998

Environmental activities	Number of enterprises	Number of employees
Pollution management, including	2 997	42 016
Solid waste management	*1 967*	*17 321*
Waste water management	*164*	*5 154*
Analytical services, data management	*636*	*12 156*
Other	*230*	*7 385*
Resource management, including	2 820	38 812
Recycled materials	*169*	*4 707*
Renewable energy	*195*	*6 981*
Energy saving and management	*382*	*4 029*
Sustainable agriculture & fishing	*1 038*	*2 612*
Indoor air pollution control	*893*	*17 578*
Other	*143*	*2 905*
Cleaner technologies and products	191	5 451
Other environmental activities	719	8 628
Grand total	6 727	94 907

a) Public and private activities for the production of environmental goods and services. Does not include environmental administration staff per say.

Source: Eurostat.

3.2 *Distributional effects of the green tax shift*

In its 2001 budget bill, the government presented a *green tax shift strategy*, aimed at making taxes greener through burden reallocation to increase economic efficiency, environmental effectiveness and employment gains. Initial steps included changes in the energy and CO_2 taxes to bring in SEK 3 billion in additional revenue, and in the income and labour taxes to raise the threshold of non-taxable income (reducing revenue by SEK 2.5 billion) and reduce employer payroll taxes (for SEK 0.5 billion less). Further steps were taken in the same direction with proposals in the 2002 and 2003 budget bills. The green tax shift is primarily focused on reducing CO_2 emissions, improving energy efficiency and stimulating the use of renewable forms of energy. The government is aiming at energy taxes that are sustainable in the long term and comply with EU requirements. The overall effect of the green tax shift for 2001-10 is expected to amount to around SEK 30 billion.

Increased taxes on energy consumption tend particularly to affect low-income families since they use a larger share of their income for energy and often have older cars, heating boilers, etc. To balance these effects, the emphasis is on reducing low-income families' income taxes. For business and the public sector, reducing the employer payroll tax is an administratively simple way to compensate businesses, municipalities and government agencies for increased energy costs.

The government estimated in its 2004 budget bill that the average net effect of the tax shift has so far been under 1% of disposable income in all social groups.

Sweden's Green Tax Commission concluded that a general reduction in payroll tax would have a relatively limited positive impact on employment. This has particularly been true since the reduction has so far been very small compared to the income tax cut. At the same time, the *increased energy taxes* may lead to job losses in energy-intensive industry and transport.

6. Environmental Development Aid

Sweden's percentage of gross national income (GNI) devoted to official development assistance (ODA) was expected to reach 0.87% for 2003 despite a recent economic austerity programme. Thus Swedish ODA remains *well above the Rio target of 0.7%* of GNI (Figure 8.3), despite recent volatility; after Sweden's ODA/GNI ratio peaked at 1.03% in 1992, government-wide budget cuts after 1995 resulted in a decline to 0.7% in 1999.

In the 2002 Bill "*Shared Responsibility: Sweden's Policy for Global Development*" Sweden set a goal of contributing to equitable and sustainable development through all its development aid activities. Basing its proposals in part on the OECD Development Assistance Committee guidelines on "Integrating the Rio Conventions into Development Co-operation", Sweden has identified three priorities: i) systematically integrating objectives of multilateral environmental agreements (MEAs) into development co-operation activities; ii) providing technical assistance to help developing countries implement MEAs; and iii) revising its guidelines and strategies for development aid to better address global environmental issues. The Swedish International Development Co-operation Agency (SIDA) gives priority to development projects on water resources, sustainable farming and forestry, land conservation, the marine environment and urban environmental issues.

SIDA estimates that more than 10% of its ODA budget goes to *environmental projects* and that nearly 50% goes to projects with considerable environmental components. Sweden also funds *environmental activities of multilateral organisations* and contributes to international organisations concerned with natural resource management, including the development banks, the United Nations Environment Programme (UNEP), the FAO and the CGIAR institutes. Sweden contributed USD 58.3 million to the second replenishment of the Global Environment Facility (1999-2002).

Since the early 1990s, SEPA has operated a Central and Eastern European Co-operation Programme (EUR 2.0 to 2.5 million per year), which is an important channel for *environmental assistance to central and eastern European countries*, especially those bordering the Baltic (Estonia, Latvia, Lithuania, Poland and Russia). Among other aims, the programme seeks to help environmental agencies become better able to comply with EU environmental legislation and other international environmental commitments. In late 2004 the programme's focus is expected to shift to northwest Russia, Belarus and Ukraine.

8. International Trade and the Environment

The Swedish economy is *heavily dependent on international trade;* exports totalled about 44% of GDP in 2001, up from 20% in 1990. This doubling of exports' value stemmed in part from EU accession in 1995 and the depreciation of the Swedish krone. Trade in goods generated some 80% of total export income in 2001, the principal export categories being metal (iron and steel), forestry and engineering (e.g. motor vehicles, telecom equipment). A majority of exported goods (56% of value, or SEK 409 billion) went to other EU countries, 9.5% went to the United States and 7.5% to Norway.

Sweden attaches importance to international negotiations on *trade and environment*, and has argued in international forums for greater consistency among multilateral environmental and trade agreements. It has been especially active in recent years on regulation of the international chemicals market, sponsoring work on the Stockholm Convention on POPs and helping initiate work on the development of a strategic approach to international chemicals management. As a party to the Rotterdam Convention, Sweden applies the principle of *prior informed consent* (PIC) in its international trade in dangerous chemicals. In compliance with the EU directive on PIC, the government requires i) notification of the intent to export chemicals that have been banned or severely restricted within the EU; ii) conformance with the UNEP/FAO voluntary PIC procedure; and iii) packaging and labelling of chemicals in compliance with EU legislation.

Sweden chairs the OECD Working Party on *Export Credits and Credit Guarantees* and in 2002 revised its environmental guidelines for project screening. Standards for benchmarking include the guidelines in the World Bank's Pollution Prevention and Abatement Handbook and in EU reference documents on best available techniques. Applying the World Bank's project classifications, Sweden requires full environmental impact assessments (EIAs) for "Category A" projects (large projects in environmentally sensitive sectors or locations) and limited EIAs for "Category B" projects. In both cases, the exporter is responsible for providing the EIA, which must be carried out by a reputable independent consultant. The Swedish Export Credit Bank, Exportkreditnamnden (EKN), sometimes stipulates environmental pre-conditions before issuing a credit guarantee. Environmental monitoring is carried out as a normal part of overall project monitoring. In cases of reinsurance, EKN requires the partner export credit agency to follow the OECD Common Approaches on Environmental and Officially Supported Export Credits. No statistics permitting evaluation of the frequency and extent of application of the environmental guidelines were available for this review.

8.3 Timber

Sweden accounted for 21% of total timber imports in the European Union in 2001. Concerning tropical timber, progress has been very limited on *Objective 2000* of the International Tropical Timber Organization (all internationally traded timber to come from certified sustainably managed forests by 2000). The great majority of wood and wood products does not come from certified forests, although Sweden has actively supported ITTO programmes aimed at improving forest management in producer countries and has funded numerous development projects to this end.

8.4 Endangered species

Sweden's *Statutory Order concerning Protection of Endangered Species*, together with relevant regulations in the Environmental Code, transpose into national law all EU and CITES requirements concerning trade in products derived from endangered species. Enforcing CITES provisions is the joint responsibility of the Customs Service, police, Coast Guard and county administrative boards.

Customs seizures were almost exclusively made at Stockholm's Arlanda Airport in 2001 and 2002. The number of seizures was 3 853 in 2001, declining to 3 589 in 2002. Aside from one seizure at Göteborg-Landvetter Airport in 2001, no other customs offices (at airports, ports, post offices, etc.) made any seizure of CITES goods during 2001-02. CITES seizures represent 0.4% of total customs seizures, on average, and generally involve small quantities of consumer items such as snakeskin shoes and ivory bracelets.

Swedish inspectors participate in *CITES enforcement training* offered by the EU in addition to their own internal training. An obstacle to implementation of EU and CITES legislation in Sweden has been that fines and jail sentences are low in relation to the potential gains from smuggling. Also, there appears to be a need to step up inspection and enforcement in ports and post offices.