



According to UNEP, governments can use economic instruments to make the "cost of pollution higher than the cost of clean production".

# The role of government

## 5

*Government has arguably the most important role of all in getting industries and companies to adopt environmentally sound technologies, and so reduce pollution and achieve cleaner production and eco-efficiency. In the past, the focus was on command-and-control, but there is now a growing consensus that other measures, such as economic instruments, will be more effective. Voluntary agreements with industry can also work. The key is that whatever regulations and rules governments introduce, they must enforce them to create an enabling environment for industry. Weak enforcement is a problem in many developing countries.*

While it is industry that must implement environmental improvements and move, ultimately, to cleaner production and eco-efficiency, government is an important player, with a major role in providing the framework conditions that will accelerate the process. This requires specific strategies and policy instruments, fashioned to suit individual circumstances. UNEP proposes a tool-box of public policies: a range of policy instruments that includes legislation, financial instruments, demonstration projects and other information and education measures to promote the use of environmentally sound technologies (ESTs), saying that, “Different countries will select the combination of tools they regard as most suited to their needs.” Peer pressure works too, as companies scramble to keep up with competitors reaping the environmental and economic benefits of using ESTs. The best companies are even ahead of government in setting goals for improved environmental performance. But the single most effective force behind the adoption of environmentally sound technologies has been regulatory action.

Historically, most industries in the developed world have started using ESTs only because pollution control regulations have required them to take action to reduce emissions, and it has

been mainly end-of-pipe ESTs that have provided the means for them to do so. Japan’s experience demonstrates this. It was only after a battery of laws was introduced in the 1960s and 1970s to curb major air pollution problems that Japanese industries and companies made huge investments in ESTs, leading to the rapid development of new state-of-the-art technologies and reductions in emissions to the lowest level of any industrialized country. The pattern has been repeated in the United States and Western Europe: tighter regulatory controls over emissions and the adoption of end-of-pipe ESTs by industry, leading to significant improvements in pollution performance and in environmental quality generally. Conversely, the absence of regulations in many developing countries is a key reason why their environment is deteriorating alarmingly.

### Direct regulations

Most existing environmental legislation is in the form of direct regulations, with which polluters are legally obliged to comply and which include various penalties such as fines, imprisonment and the shutting down of offending sites to enforce this compliance. Within this general framework, governments have applied regulations in a variety of ways:

# A partnership approach to achieving sustainable growth

## The South Africa Infrastructure Fund

*Southern Africa's development needs are enormous – South Africa alone needs to spend R60 billion (US\$ 13.5 billion) on new infrastructure. But while the economies of the Southern African Development Community (SADC) are expanding rapidly, the SADC governments cannot fund this growth by themselves. They are now turning increasingly to the private sector for support.*

*The South Africa Infrastructure Fund was launched in July 1996 to attract private sector investment in new projects within the region. It is the first private equity infrastructure fund of its kind in Africa, set up by the Standard Bank of South Africa, sponsored by the Standard Corporate and Merchant Bank in Johannesburg, and now involving 14 institutional investors in a unique programme to demonstrate that infrastructural development can be a joint public-private responsibility.*

*At present, the Fund has R693,142,000 (US\$ 155,000,000) in capital commitments – earmarked for the development of airports, energy projects, gas and oil pipelines, harbours, telecommunications, toll roads, transportation, and water and waste management schemes. The Fund will invest in privately-developed projects, strategic equity partnerships, public-private partnerships, "build-operate-transfer" ventures, concessions and similar equity structures.*

*The South African government has recognized the Fund as an important vehicle for facilitating economic and industrial expansion, and by*

*selecting a preferred bidder for the concession to operate the Maputo Corridor Development Road – N4 Toll Road, an initial investment of the Fund, in just eight months, has also showed its determination to address the country's infrastructural needs.*

*With Africa, and southern Africa in particular, positioned for significant economic growth in the next decade, the challenge is to ensure that investment goes into projects that contribute to sustainable growth. Agenda 21 stressed the importance of the public and private sectors working together to promote sustainable development. The South Africa Infrastructure Fund is an effective channel through which the government and private sector can cooperate as partners to achieve this goal in southern Africa.*

*For further details, please contact*

*Philip Chen  
Managing Director,  
South Africa Infrastructure Fund*

*Tel (2711) 636 0434  
Fax (2711) 636 1517*



With us you can go so much further



Philip Chen

- one way is to specify an environmental goal, without necessarily stating how it is to be achieved or what technology should be used to meet it;
- another is to require a certain technology to be used in certain industries to reduce pollution, without specifying the environmental objective;
- the toughest regulations stipulate both the target and the technology to be used to achieve it.

One of the most common regulatory approaches has been for governments to lay down specific environmental standards, for example, a quality standard defining the level of a particular pollutant in the air or water, perhaps in terms of volume or concentration level; or an emission standard, specifying the amount of a type of emission from a particular source to the environment. The advantages of environmental standards are that they are clear, enforceable (in theory at least), and are also applied across the board to all polluters. But there have been growing doubts about their effectiveness.

Often, regulations have been developed in a piecemeal and reactive fashion, addressing only specific problems, and sometimes resulting in pollution being transferred from one medium to another. National standards may also be difficult, even impossible, to implement and enforce across diverse industries, geographic locations and technologies; while across-the-board standards can cause real difficulties for companies because each one faces different pollution control problems. It may be too costly to upgrade older, less efficient plants, while building a new, non-polluting factory may not be justified because of capital costs or market conditions.

In the United States, regulators introduced the 'bubble concept' to get round this problem. Large industrial complexes have many potential sources of pollution, and at one time the environmental regulations required that each

### BOX 5.1

## *Japan: legislation is the driving force*

The International Center for Environmental Technology Transfer (ICETT) confirms the importance of legislation in driving the development and adoption of environmentally sound technologies in Japanese industry. In addition, Japan's experience illustrates the point that companies can be divided into problem creators and problem solvers. The former pay for polluting, the latter make a profit from pollution control. Of course, sometimes a company can be both a problem creator and a problem solver.

- Sulphur dioxide concentrations reached critical levels in Tokyo and other Japanese cities by the 1960s, and legislation was introduced in 1968 imposing strict rules on the sulphur content of fuel and stringent controls on sulphur emissions from large industrial facilities. Up to that time, the only way of abating air pollution was to dilute flue gas emissions using taller smokestacks, sometimes as high as 120 metres. The breakthrough came with flue gas desulphurization. The first units appeared in 1970, and now all medium to large industrial facilities have such equipment, and Japan has 75 per cent of all global flue gas desulphurization installations. It also has the lowest per capita emissions of sulphur dioxide of any industrialized country, with ambient levels in Tokyo just 10-15 per cent of the levels in the mid-1960s.
- Emission of nitrogen oxides was another major problem. In 1973, the Environment Agency set a new nitrogen dioxide standard, the world's most stringent, requiring that the daily average of hourly values should not exceed 0.02 parts per million. This forced industry to move ahead rapidly with developing air denitrification processes. ICETT reports that "while the national government considered them feasible on a technical basis, private enterprises insisted that some difficulties remained" but, nonetheless, whereas there were just 5 units installed in Japan in 1972, the number had risen to 430 by 1989. The installation of catalytic converters in all new cars was a direct consequence of regulatory standards for nitrogen oxide emissions introduced in 1978. The result of the legislative measures on nitrogen oxide is that Japan's emissions have been reduced to the lowest per capita level of any large economy.

ICETT points out that in addition to setting mandatory standards, the Japanese government also provided significant financial and tax incentives to industries to invest in ESTs. In 1975, the Japanese Development Bank financed approximately 200 billion yen's worth of pollution control facilities. The government also played a leading role in the development of new technologies: for example, work on flue gas and flue oil desulphurization, carried out between 1966 and 1971, was a collaborative effort by the Ministry of International Trade and Industry and the private sector.

one of these pollution sources conform to mandated standards. Under the bubble concept however, regulators measure only the pollution from the whole complex, which means that one or more smokestacks may exceed the emission standards, but this is allowable because emissions from other discharge points are low enough to keep total emissions below the overall standard. Supporters of the bubble concept argue that this allows companies to phase in pollution control ESTs and expenditures on a planned basis over time.

### Command-and-control criticized

However, the whole command-and-control approach has drawn an increasing chorus of criticism, not least because of its effect on developing new ESTs. A further complicating factor is the rapid increase in small and medium-sized enterprises, which are much more difficult to target and control. In 1991, the United States Environmental Protection Agency noted that federal and state compliance policies “are slowing technological innovation for environmental purposes”, and said that the use of such concepts as best “available, practicable, reasonable technologies” gave companies no incentive to go beyond regulatory norms and risked locking them into traditional technologies. UNEP has also voiced concern, pointing out that command-and-control “encourages the use of expensive pollution control technologies – the adoption of which often reduces the budget for promoting cleaner production. Once a pollution control device is in place, there is little incentive to pay more money to reduce the need for the device.” UNEP has suggested that the ‘negotiated compliance’ approach is better because it aims at obtaining compliance by the use of general and flexible guidelines, and bargaining between the regulators and the regulated.

The Organisation for Economic Co-operation and Development (OECD)

acknowledges that command-and-control has “by and large” been successful in arresting and significantly reducing pollution, but says it has “failed to allow polluters the flexibility to develop and implement alternative technologies to achieve the desired objective”.

“Even where the standards are performance-oriented, not technology-specific, tight compliance deadlines and the desire of industrial managers to minimize the risk of non-compliance have favoured conventional end-of-pipe solutions. Firms have mostly been reactive; they have focused on achieving compliance and minimizing costs for doing so. Industry does not want to be forced to make any technological changes which are costly or reduce production efficiency, and which apparently will not enhance profits. The effect has been to stunt the development of new technological solutions.”

The World Bank has accepted the criticisms of command-and-control, but believes that “specific regulations on what abatement technologies must be used in specific industries” may be, in some situations, “the best instruments available – and the quickest and most effective in dealing with a few large polluters”. Meanwhile, the World Resources Institute (WRI) said in 1991 that “if promoting rapid continuous technological transformation is today’s mission, then requiring all pollution sources to install abatement equipment is not enough. The development and deployment of technologies economically and environmentally superior to those in current use must be stimulated through a wide range of mechanisms.” Regulatory policy design, stated the WRI, “often exhibits systematic bias against new technology, and in favour of the status quo”, and stronger control over new pollution sources “creates a disincentive to modernize plants and equipment, and prolongs the life of old ones”.

The WRI also criticized legislative mandates which encourage regulators to base standards on



The Convention on Biological Diversity requires countries to facilitate access to genetic materials for environmentally sound uses, including the production of new plant varieties needed to achieve food security.

## BOX 5.2

*Regulatory flexibility*

The Environmental Protection Agency (EPA) Common Sense Initiative is an experiment aimed at introducing regulatory flexibility in the United States. Six major industries are the focus of the project's first phase: automotive; computers and electronics; iron and steel; metal finishing; oil refining; and printing. These industries account for more than 11 per cent of gross domestic product and a significant proportion of the toxic releases in the United States.

Special teams have been formed to look at ways of turning "complicated and inconsistent" environmental regulations into new and comprehensive strategies for environmental protection. The teams include representatives from the federal, state and local governments; national and locally based environmental groups; the trade unions; and the industries themselves. Their objective is to find cleaner, cheaper and smarter approaches in the areas of regulation, reporting, compliance and environmentally sound technologies, emphasizing pollution prevention rather than end-of-pipe controls.

the current best available technologies. "Sticking with conventional technologies on which standards are based is less risky for regulators, regulated sources and engineering consultants than adopting less familiar technologies. This creates a high hurdle for entrepreneurs trying to develop and market new technologies." Regulatory agencies, it added, are generally not organized to promote wide-ranging technological change because their focus is on particular problem areas (air and water pollution, and wastes), not on major industries or economic sectors.

**New thinking – new policies**

In fact, there is now a growing shift in thinking away from the traditional command-and-control approach of setting prescriptive standards. In its 1996 report, *Sustainable America*, the United States President's Council on Sustainable Development captured the prevailing mood by stating that while the government's reliance on command-and-control regulation has "dramatically improved the country's ability to protect

public health and the natural environment, society (now) needs to adopt a wider range of strategic environmental protection approaches".

Technology-based standards and regulation, said the President's Council, are not the right answer in all cases, and while these can sometimes encourage technological innovation, they can also "stifle it". The report went on: "There is no doubt that some regulations have encouraged innovation and compliance with environmental laws, resulting in substantial improvements in the protection of public health and the environment. But at other times, regulation has imposed unnecessary – and sometimes costly – administrative and technical burdens, and discouraged technological innovations that can reduce costs while achieving environmental benefits beyond those realized by compliance. Moreover, it has frequently focused attention on clean-up and control remedies, rather than on product or process design to prevent pollution."

The Council advocated a move away from the 'one-size-fits-all' approach to new performance-based policies. "Regulations that specify performance standards based on strong protection of health and the environment – but without mandating the means of compliance – give companies and communities flexibility to find the most cost-effective way to achieve environmental goals. In return for this flexibility, companies can pursue technological innovation that will result in superior environmental protection at far lower costs. But this flexibility must be coupled with accountability and enforcement." Under the President's Council's proposed approach, the focus would switch to the environmental performance of an entire facility, rather than separate air, water and soil requirements. This could mean that the environmental gains for the facility as a whole might exceed what would have been achieved through source-by-source regulations.

## Economic instruments

The President's Council also called for greater use of market forces in promoting sustainable development, specifically economic incentives to reduce pollution and "drive innovations and the development of cleaner and more efficient technologies". In fact, economic instruments (taxes and charges, tradeable emissions permits, deposit returns and subsidies) attract considerable support. According to UNEP, they can be used "to make the cost of pollution more expensive than the cost of cleaner production" and, by providing either rewards for compliance or penalties for non-compliance, they can "shape and direct technological investment, the purchase and use of materials and energy, and the management of pollution and waste". However, as UNEP notes, "if unwisely fashioned, they can subsidize pollution control or environmentally-harmful industrial activity through, for example, inappropriate taxes and subsidies".

In theory, they are instruments that internalize the social cost of production by imposing an economic cost or penalty for polluting. However, UNEP emphasizes that before any of these instruments are applied, governments need to analyse what forms of economic instruments are already in operation, either explicitly or implicitly. The latter include subsidies to reduce production costs and make industry more competitive with imports and foreign production. Many of these policies cause artificially low prices for energy and water resources. "In general", says UNEP, "policies that result in prices that reflect the real costs involved should be implemented before other economic instruments are employed."

Despite these issues, economic instruments have many champions. The World Bank has long advocated the use of market-based instruments on the grounds that they "encourage those polluters with the lowest costs of control to take the most remedial action, and they thus

### BOX 5.3

## *Effluent taxes in the Netherlands*

The 1969 Pollution of Surface Waters Act in the Netherlands set new controls on discharges from industrial operations and established a system of effluent taxes to finance new wastewater treatment facilities. Some Dutch industrialists were alarmed that the new, high taxes would hurt their international competitiveness, but this proved a false concern.

In a key move, officials from regional water management boards visited every major firm in their area and advised them on how to reduce effluent discharges by installing appropriate technologies. The result was that between 1970 and 1985, oxygen-depleting industrial pollution fell by more than 70 per cent, despite significant increases in production. Was this due to the effluent tax? Several independent studies have found a strong correlation between the tax and the pollution reductions.

The experience of one major company is telling. This multinational produced yeast, alcohol and a wide range of enzymes and pharmaceuticals. When the tax schedule was first proposed for its region, the firm estimated its annual tax bill at US\$10 million, a sum equal to its annual net profit. It examined the cost of an internal wastewater treatment system, but found this would probably cost as much. What the company did was conduct a detailed analysis of its entire operation, including its production processes and various inputs and outputs, as well as forecasts of probable long-term changes in product markets. It then negotiated a major reconstruction programme with the local water board which increased production capacity while also eliminating much of its oxygen-depleting pollution.

Over a 15-year period, the firm reduced its effluent discharges by 92 per cent and cut its effluent tax bill to about US\$1 million.

One study said that the effluent tax had made the company a much more 'eco-efficient' firm. Although it was the innovative thinking and actions of the firm which actually reduced pollution, the threat of high taxes initiated the process.

impose less of a burden on the economy". The OECD says that "prices need to reflect the cost of preserving environmental quality, as well as other resources", and also backs the use of economic instruments as among the measures governments need to take to set an appropriate policy framework.

For the business community, the World Business Council for Sustainable Development

**E**arth is where we live. We take the Earth for granted. Not only that, for centuries we have fought over it, divided it, and destroyed many parts of it.

We have spoiled the soil we need to grow our food, damaged the air we breathe, polluted marine life and the water we use. We have inflicted terrible harm on our environment by wars, and through negligence and the misuse of technology. Global warming, acid rain, nuclear disasters, oil spills and toxic waste are today major threats to our world.

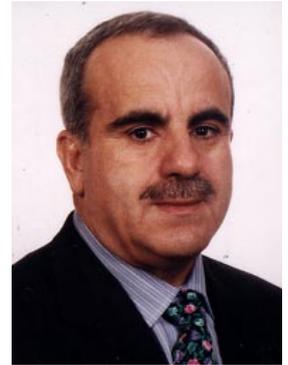
As a leading provider of insurance for energy, property and marine risks, we are fully aware of the dangers from pollution, human behaviour, industrial activity and the carriage of hazardous materials. It is our practice, where appropriate, to evaluate risks based on environmental criteria.

Yet we also appreciate the efforts of responsible industries and government bodies in researching and developing new methods of reducing pollution through the increased use of natural resources, such as solar and water energy, as well as with new and encouraging agricultural techniques.

We are optimistic that the measures being taken by all those involved in the drive towards sustainable development will bear fruit by establishing a balance between continued economic and technological development and the protection of the environment.

We particularly value, and fully support, the activities of the United Nations and its agencies responsible for implementing environmental programmes. We wish them every success – and believe that through their efforts, our planet will become a better place to live, for us and for the generations to follow.

Trust International Insurance Company EC (Bahrain) began operations in 1989 in the State of Bahrain with a paid-up share capital of US\$15m (now US\$50m). The Company's main activity is in the field of insurance and reinsurance. It has subsidiaries and associated companies in the United States, United Kingdom, Cyprus, Algeria, Spain, Qatar, Jordan, Lebanon, Yemen and Palestine. The Group employs more than 300 people. The subsidiaries and associates are involved in direct/domestic insurance and reinsurance coverage, as well as manufacturing and development projects. Group turnover for the 12 months ending 31 December 1997, was in excess of US\$130m. Its consolidated net assets for the same period were more than US\$70m.



Ghazi Abu Nahl, Chairman

TRUST INTERNATIONAL INSURANCE COMPANY EC  
(BAHRAIN)  
P.O. Box 10002, Manama, Bahrain, Arabian Gulf  
Telephone: +973 532425 Facsimile: +973 531586  
Telex: 8177 TIIC BN  
E-mail: tiicbah@batelco.com.bh



شركة ترست العالمية للتأمين ش. م  
(البحرين)  
ص.ب: ١٠٠٠٢ المنامة، البحرين، الخليج العربي  
تليفون: ٥٣٢٤٢٥  
فاكس: ٥٣١٥٨٦ (٠٩٧٣)  
تلكس: ٨١٧٧ تي أي سي ب ن

(WBCSD) says that “public policy should give priority to economic instruments that provide flexibility and encourage innovation”. This echoes the views of the WBCSD’s predecessor, the Business Council for Sustainable Development which, in its *Changing Course* report to the 1992 United Nations Conference on Environment and Development, and in a subsequent report on eco-efficiency, urged governments to adopt economic instruments as the main means of progressively internalizing environmental costs. Stressing that this was critical to promoting eco-efficiency in business, *Changing Course* added: “Economic instruments encourage innovation. They encourage polluters to change to cleaner technologies, and to develop new technologies. They encourage new entrants to try and gain a competitive edge by starting off with new technology. Command approaches can have the same effect, but as they often require companies to use a specific technology, they may not be as effective in motivating continuous change and improvement. In fact, regulations based on outmoded technologies can actually have the effect of slowing improvements in an industrial sector.”

The United States Environmental Protection Agency (EPA) says that “an effective pollution charge system minimizes the aggregate costs of pollution control, and gives firms ongoing incentives to develop and adopt new and better pollution-control technologies”. The WRI points out that economic incentives are also “an attractive policy mechanism for encouraging technological transformation” because reducing pollution has a “real dollar value to a firm”. “If all environmental control options are on an equal footing, the demand for improved technology should increase, and prompt more research and development and investment.”

Economic instruments were in fact endorsed by the United Nations Conference on Environment and Development. Principle 16 of the Rio Declaration states: “National authorities

#### BOX 5.4

### *Nitrogen oxide charge in Sweden*

The nitrogen oxide charge in Sweden is a direct charge on measured emissions from a limited group of large sources, rather than a charge based on the characteristics of input fuels (as with a carbon tax). The decision to calculate the tax in this way was governed by the nature of the process by which combustion causes nitrogen oxide emissions.

Direct measurement of the emissions leads to a much more precisely focused incentive than charges based on the fuel characteristics. However, the measurement technology is expensive, so the nitrogen oxide charge was confined to a relatively small group of sources: large heat and power plants which could afford it.

The nitrogen oxide charge did not come into force until January 1992, but its incentive effect started as soon as the Swedish parliament approved its introduction. The plants took a number of measures, including investments in new ESTs and new control systems, to reduce emissions by 35 per cent between 1990 and 1992.

should endeavour to promote the internalization of environmental costs, and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest, and without distorting trade and investment.” Yet progress since then has been patchy. Taxes and charges have been the most widely applied of the possible economic instruments. Many industrialists oppose them, partly because they fear they will affect their companies’ ability to compete at both international and micro levels, even though there is no evidence that higher environmental standards damage competitiveness.

#### Ecotaxes

The OECD reported in 1996 that environmental tax measures included those on motor vehicle fuels, other energy products, batteries, plastic carrier bags, drinks sold in disposable containers, pesticides, tyres, chlorofluorocarbons (CFCs) and halons; while charges included

“For the next century, the challenge is to implement substantial increases in natural resource productivity, to become effective and systematic in doing more with less”

John Bruton,  
Prime Minister of Ireland

water, sewage, water effluent, municipal waste, waste disposal and hazardous waste. It commented: “Ecotaxes change relative prices to ensure that polluters take account of the effects of their activities on the environment. Polluters have at least three options to reduce emissions, besides reducing output. They may install pollution abatement technology, improve production efficiency or change processes to reduce the use of polluting substances. When taxes are imposed only on inputs, producers cannot reduce their tax payments by using end-of-pipe technology ... Because polluters have to pay taxes on emissions, ecotaxes provide a permanent incentive to reduce pollution, and to innovate.” However, the OECD also struck a cautionary note: “Environmental taxes may not always provide the same dynamic feature in areas of innovation. For instance, an input tax may not provide an incentive to install available emission reduction technologies such as scrubbers – and a consumption tax may not provide incentives to producers to reduce emissions.”

The European Environment Agency called for more ecotaxes in a special report in 1996. It said that the use of environmental taxes within the European Union (EU) had accelerated over the past five or six years in Scandinavia, Austria, Belgium, France, Germany, the Netherlands and the United Kingdom, but still accounted for only 1.5 per cent of total tax revenues in 1993. Five countries have implemented carbon taxes: Denmark, Finland, the Netherlands, Norway and Sweden. Denmark’s tax, first introduced in 1992, was imposed on all types of carbon dioxide emissions, except gasoline, natural gas and biofuels. A subsidy is available to producers of electricity for the amount provided by renewable energy (wind and water power) and renewable fuels (biogas and biofuels), or by decentralized heat and power generation based on natural gas. Norway’s tax system includes taxes on atmospheric emissions of carbon dioxide, sulphur dioxide and lead, while Sweden exempts biomass and biofuels from its carbon, sulphur and nitrogen oxide taxes.

The European Commission wants an EU-wide carbon tax. It says that neither technical nor economic constraints can be blamed if the industrialized countries fail to meet goals for carbon dioxide emissions under the Framework Convention on Climate Change. It has identified a number of cost-effective technical options to reduce emissions by up to 10 per cent in the period 2005-2010, and argues that a tax on carbon dioxide emissions will spur countries to act. But the 15 EU member states remain deadlocked over the issue.

A draft directive, prepared by the Commission’s tax directorate in 1996, proposed that, for the first time, EU governments would tax electricity, coal and natural gas, as well as increase taxes on oil products (including gasoline and diesel) every two years. Under the proposal, governments would be required to tax electricity and the heat generated during its production at a progressively increasing rate

from 1998 to 2002. The current system of excise taxes on mineral oils would be extended to cover coal and natural gas and, as with electricity, the minimum tax rates would be raised every two years until 2002. Most member states do not tax coal at the moment, and just over half do not tax natural gas. The draft proposals have been fiercely attacked by the major European industries, which have warned that new taxes would harm their competitiveness in world markets, and also claimed that “by depriving industry of the cash needed to invest further in more energy-efficient technologies, these taxes would slow progress in energy efficiency initiatives, and hence in curbing greenhouse gas emissions”.

In July 1996, a Japanese Environment Agency panel said that Japan could stabilize its carbon dioxide emissions at 1990 levels by 2000 if it levied a carbon tax. The tax could also raise over US\$9 billion in revenues to help industries introduce new and additional energy-efficient technologies. But Japanese business opposes a carbon tax, and the Ministry of International Trade and Industry is lukewarm towards the idea.

### European Union broadens policies

The EU has begun to broaden the range of policy instruments it intends to use. The Fifth Environmental Programme, adopted in 1993 and running through to 2000, moves beyond command-and-control to include market-based proposals to internalize environmental costs. This shift recognizes that, despite the adoption of over 200 pieces of EU legislation over the past 20 years, Europe’s environment still suffers considerable problems. Even so, new directives which set objectives that have to be achieved, but which allow member states to choose how to achieve them (unlike regulations, which lay down specific actions or measures), still reflect the command-and-control philosophy. For example:

- the Directive on Packaging Waste sets recovery targets of between 50 and 60 per cent;
- the Directive on Air Pollution by Emissions from Motor Vehicles is one of two directives designed to cut vehicle emissions by 70 per cent by 2010, by introducing new technologies for cars, such as on-board diagnostics;
- the Directive on Quality of Fuels is the second directive aimed at cutting vehicle emissions – it focuses on the oil industry and envisages tighter fuel quality standards by 2005;
- the Directive on the Ecological Quality of Water will require the pesticide and fertilizer industries to introduce measures to reduce pollution;
- the Directive on the Quality of Water Intended for Human Consumption will require a number of industrial sectors, such as pesticide, copper and lead tube suppliers, as well as the construction industries, to meet certain standards;
- the Directive on Landfill Standards will require all landfilled waste to be pretreated, demanding investment in sorting stations, composting units and incineration plants, and will require gas from both new and existing landfills to be collected and used, or flared off.

The two directives aimed at cutting vehicle emissions will require the adoption of new technologies by both the automotive and oil industries. The directives followed the three-year Auto Oil Programme, which included a research project called the European Programme on Emissions, Fuels and Engine Technology, designed to investigate the relationship between fuel and engine technology in terms of emissions. Vehicle makers will have to install on-board diagnostic systems that will monitor emissions, and the data will be available for proposed official annual inspections. This



## Managing environmental risk to gain competitive advantage

---

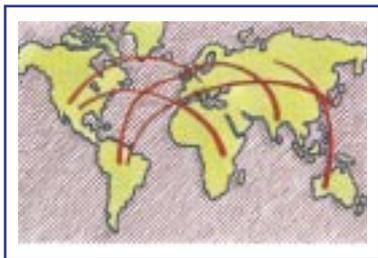
Sedgwick, a world leader in risk consultancy, insurance and reinsurance broking and financial services, uses its global distribution network to deliver high quality, strategic environmental risk management and consultancy services to clients, wherever they operate.

We led the insurance and financial services sector in recognising the need for pro-active environmental risk management and responsible operation by encouraging and assisting clients to identify and manage their environmental exposure and to set and achieve national and international environmental performance objectives.

Our environmental risk management services are based on two basic concepts: that any change must make economic sense, well-intentioned actions that have no commercial value will not be sustained; and that, unless real alterations are made to the way an organisation operates, there will be little impact on its exposure to risk or achievement of environmental improvement. Protecting the environment need not be a technical and complex matter. Environmental risks can be managed and clients can address their environmental responsibilities by focusing on fundamentals.

## Wide ranging global expertise

---



Sedgwick's team of qualified environmental risk consultants is based round the world, and particularly in the US, Australia and Europe. We have invested in communications technology, to provide a rapid exchange of information and ideas across our international network. We can offer advice on a global scale or at local level. We are constantly aware that *"global change comes from local action"* (Gro Harlem Brundtland, 1990).

We provide a wide range of environmental risk management and consultancy services, backed by technical support as required, including:

- Environmental policy construction
- Pre-acquisition and pre-divestment environmental risk analysis
- Environmental project co-ordination and management
- Environmental audits
- Environmental risk management training
- Technical analysis and reporting of environmental risk for insurance broking and investment purposes
- Development of insurance, alternative risk transfer and finance solutions.

## Practical management

---



Sedgwick provides true environmental risk management consultancy by initially identifying the risk or risks and then providing the practical means for their management. Great emphasis is placed on offering strategic consultancy advice at board level, since the issues we are addressing are vital to the success and, sometimes, survival of a company. We then harness a company's internal resources to achieve economies of scale and ownership, to agreed objectives. Finally, we ensure that our recommendations make financial sense, with measurable benefits, allowing a straightforward decision-making process and clear justification to management and key stakeholders.

We are also involved in the examination of global environmental change and the link to natural perils, particularly severe weather patterns and its impact on multinationals.

## Serving the community

---



Sedgwick is aware of its relationships with the larger world community and we use the information gained in our environmental risk management operations to contribute to governmental, national and international organisations and business sector interest groups, by providing support and advice on the business risk element of environmental liabilities.

Despite its complexities, environmental risk can be approached in a similar way to any other risk. Its successful management is vital to us all.

Sedgwick Group plc  
143-149 Fenchurch Street  
London EC3M 6BN  
United Kingdom

For further information, contact  
Dr Marcel Steward  
Environmental Risk Management Consultant  
+44 161-238 7267

contrasts with the present situation where such testing is only done on the production line, and there is no subsequent monitoring of emissions performance.

The expected standards are based on technologies in development, such as pre-heated catalysts for petrol cars and nitrogen oxide-reduction catalysts for diesels. They represent a cut in exhaust gases of 20-40 per cent for the main emissions (particulates, carbon dioxide and nitrogen oxides). Once these technologies are in place, the onus will be on the oil industry to produce more efficient fuels. By 2002, leaded petrol should be phased out (except for countries with a large number of older cars on the road), and in 2005 expected new standards will require the industry to reduce the amount of sulphur in petrol and diesel. At a meeting of EU environment ministers in October 1996, several countries criticized the package as not strict enough, in particular because it did not take account of best available technologies. The EU's Environment Commissioner, Ritt Bjerregaard, agreed that the proposals did not go to the limit of what was technically possible, but she said that imposing best available technologies would have doubled the cost for only modest additional environmental benefits.

### Taxing energy

Driving up the price of energy itself has equally important objectives:

- to improve the efficiency of existing technologies;
- to stimulate efforts to develop more energy efficient technologies;
- to switch to less polluting energy sources (where possible).

Road transport has been one obvious target. The United Kingdom is among a number of countries that has taxed unleaded petrol at a lower level than leaded fuel, and the difference in price is one of the reasons why nearly 70 per cent of all petrol sold in the country is now

unleaded. Logically, there should also be tax incentives for alternative energy sources to fossil fuels. But solar energy, for example, does not enjoy the same tax treatment as conventional energy and, since solar power plants have high capital expenditure and essentially no fuel costs, on a lifetime basis they are in effect taxed more than conventional plants. A fossil fuel levy has been proposed to help level the playing field. Financial incentives, including subsidies, are needed to encourage the use of renewable energy sources and to assist the growth of commercial markets.

### California and zero-emission vehicles

Perhaps the most dramatic example recently of legislation accelerating the development of new ESTs has been the Californian state government's decision that a percentage of new vehicles sold in the state must be zero polluting. This move prompted a flurry of activity by the major United States and other automotive manufacturers on electric cars, with the first commercial vehicle being launched in the United States in 1996. In early 1996, the state dropped the original requirement that 2 per cent of all new vehicles sold there in 1998 must be zero polluting, with the figure rising to 5 per cent in 2001. But it did keep to its original 10 per cent requirement for zero-emission vehicles by 2003 (an increase of a million vehicles a year). Moreover, it said it would require auto manufacturers to accelerate their research into advanced battery technologies and begin selling their low-emission vehicles nationwide by 2001. The agreement provided for heavy damages if the requirements are not kept.

### The voluntary approach

Alternatives to legislation and regulation include negotiated compliance or voluntary agreements, and self-regulation by industry. The principles for voluntary agreements are:

## BOX 5.5

*Covenants work in the Netherlands*

The Netherlands' National Environmental Policy Plan relies heavily on a consensus-based, voluntary approach through more than 70 covenants, signed by government and industry. They have the status of binding contracts under civil law and have become a major instrument in Dutch environmental policy.

The Institute for Applied Environmental Economics (TME) and Aries Consultancy conducted a study of the effect of this consensus approach on the application of process-integrated ESTs.

- One agreement, the Hydrocarbons 2000 (HC 2000) programme, started in 1986, focuses on strategies for achieving a reduction in hydrocarbon emissions of 50 per cent in 2000, relative to 1981. The programme was initiated after the government published draft regulations which would have required several industries to make heavy investments in various areas. Thanks to the programme, hydrocarbon emissions had fallen from 263,000 tonnes a year in 1981 to 217,000 tonnes by 1992. This was achieved by a battery of industry measures including: active coal or biofiltration (chemicals); improved

technologies to reduce emissions from paint overspraying and substituting paints low in or free of solvents (metal industry); using biofilters to reduce solvent emissions and incinerating the emissions (printing industry). TME and Aries reported that the industries felt that "technological development and market introduction was accelerated by this programme".

- The Packaging Covenant, signed in 1991, includes a government commitment not to introduce regulations; no sanctions if targets are not reached; and freedom for industry to decide on what specific measures to take to reach agreed packaging reduction targets. By 1995, the progress achieved on waste reduction, materials re-use and product re-use was ahead of schedule. Most research and development activities have been in the area of product modification, including lower materials use.

- The Covenant with the Base Metal Industry, signed in 1992, involves 37 companies making iron, steel, aluminium, zinc and copper

products. It includes reduction goals for a number of substances, among them sulphur dioxide, nitrogen oxides, lead and dust. The agreement provides that if certain targets are not going to be reached, industry must look for additional measures and technologies as soon as possible, and if new technologies become available, making it possible to achieve higher reductions, these higher targets will replace the old ones. By 1995, the industries were largely on track to meet their targets, using a mix of integrated and end-of-pipe measures.

Of the covenant-based approach generally, TME and Aries said it "realizes environmental attention at the strategic and management level in industry, which influences the investments and technological choices to move in a more integrated direction. First results from the different programmes indicate that increased application and development of cleaner technologies is actually occurring. In particular, the HC 2000 approach has stimulated the development and application of cleaner technologies."

- the authorities set the framework and targets, and industry is free to choose how to reach them;
- the agreement is voluntary, but based on the principles of producer/product liability;
- if industry does not comply with the agreement, the targets can be converted into command-and-control legislation.

Business prefers such agreements even though support of them is under threat of legislation, because they do allow companies more flexibility than regulatory standards, and they keep industry's *bête noire* (more taxes) at bay.

UNEP supports such negotiated compliance between regulators and industries. Voluntary agreements that attempt to get business and government to work together to reach environmental goals without resort to regulation are growing in popularity worldwide.

But a report by the German Centre for European Economic Research, commissioned by the German Ministry of Trade and Commerce in 1996, said that such deals were unenforceable and unlikely to achieve environmental results beyond what businesses would have done anyway. Governments, it added, should keep the

## BOX 5.6

*Government-industry partnerships advance energy-efficient ESTs*

Governments can help the advance of ESTs by initiating research and development projects and working in partnership with industry to move them forward. In the United States, the Department of Energy has played a critical role in the development and dissemination of a number of important energy-efficient technologies. Three of the most successful are low-emissivity (low-E) windows, electronic ballasts and high-efficiency supermarket refrigeration systems.

- Low-E windows address the problem of heat losses in buildings by reflecting long wave infrared radiation back to the inside of the building.
- Electronic ballasts help fluorescent lights to start, and also control the current flowing through the lamp: they are more efficient than the conventional electromagnetic ballasts.
- The new supermarket refrigeration systems use multiple compressors, a floating head pressure control, a microprocessor control system and control algorithms.

In all three cases, the Department of Energy initiated and funded research and development projects, and worked with private companies to develop, refine and demonstrate the new technologies. According to the American Council for an Energy-Efficient Economy, these technologies are yielding “large benefits” to manufacturers, consumers and the environment. “Without the Department of Energy’s financial and technical assistance, it is unlikely that the companies would have actively pursued what were then perceived as high-risk, uncertain technologies.”

The primary energy savings from their use reached over 250,000 trillion joules a year by 1995, and the value of the savings in energy is about US\$1.5 billion a year at current energy prices. The council estimates that, together, the three technologies reduced annual pollutant emissions in 1995 by 18.5 million tonnes (carbon dioxide), 100,000 tonnes (sulphur dioxide), 76,000 tonnes (nitrogen oxide), 3,700 tonnes (particulates) and 485 tonnes (volatile organic compounds).

option of intervening to mandate the use of certain technologies. The Canadian Institute for Business and the Environment said in 1996 that the country’s move to embrace voluntary environmental initiatives as a substitute for regulation was becoming bogged down: not only had it slowed environmental protection and pollution prevention, it had retarded

innovation of environmental technology and hurt Canada’s competitiveness in the international EST markets.

From a different perspective, a report from the Global Environmental Management Initiative, which studied several United States and European programmes, found that “to increase private sector participation, incentives will have to be made bolder”. In *Changing Course*, the Business Council for Sustainable Development said self-regulation “has achieved and will continue to achieve important improvements in the environmental impacts of business and industry” and may prove cheaper than command-and-control regulations or economic instruments. However, it acknowledged that self-regulation can be frustrated by ‘free rider’ companies, using non-compliance to gain an unfair competitive advantage.

**Incentive programmes**

Governments can also introduce incentive programmes or subsidies to promote ESTs. In fact, a number have done so and experience suggests they work. The Netherlands, for example, uses subsidies combined with government-sponsored demonstration projects for new cleaner technologies. The government also has an accelerated depreciation programme for specific ESTs and publishes an annual list of qualifying technologies, updated to take account of changes in such things as energy price levels. Return on investment ranges from three to seven years. Dutch data show a good correlation between the level of subsidy and implementation of new ESTs.

The arm of government can also extend to environmental technologies themselves. The California Environmental Protection Agency’s Technology Certification Programme offers a ‘seal of approval’ for companies producing ESTs. Agency engineers peer review the technologies to assure their effectiveness,

reliability and protectiveness: approved ESTs are then subject to a 30-day public review period. Illinois, Massachusetts and New Jersey, as well as the German state of Bavaria, have signed reciprocal agreements with the Californian agency. Canada has been developing a national certification programme for ESTs modelled on the one in California. The aim is to verify that claims about a technology's performance are based on sound scientific information and tested according to standard protocols by certified, qualified laboratories. The move has drawn a mixed reaction from suppliers of ESTs.

### International agreements

National laws and regulations are not the only forces driving ESTs. International environmental agreements, which have mushroomed in recent years, now run well into the hundreds (including non-binding guidelines and regional agreements). The International Institute for Sustainable Development (IISD) says that the "demand for sustainable technologies is being driven, in part, by the recognition of such global problems as atmospheric change, loss of biodiversity, toxic chemical accumulations, and resource degradation and depletion". International agreements "catalyse enormous change", says the IISD, and domestic legislation and regulations follow as countries implement their international commitments. It has identified a number which are "driving technologies, now or in the future".

- The Montreal Protocol on Substances that Deplete the Ozone Layer, ratified by 127 countries, calls for the complete phase-out of fully halogenated chemical emissions. It is the most advanced international agreement and has been implemented by national legislation in dozens of countries (see Box 5.7).
- The Framework Convention on Climate Change became law in March 1994. It aims

to reduce emissions of greenhouse gases, including carbon dioxide, which augment the natural greenhouse effect on the Earth's atmosphere, triggering climate change.

- The Convention on Biological Diversity aims to conserve biological diversity and to make sustainable and equitable use of its components. It requires countries to rehabilitate and protect ecosystems, and facilitate access to genetic materials for environmentally sound uses. It became law in December 1993 and will most affect the pharmaceutical, agricultural, energy and forestry sectors.
- The Great Lakes Water Quality Agreement, between Canada and the United States, focuses on technologies and practices that minimize emissions of toxic substances into the Great Lakes. Over the past 20 years, it has resulted in considerable investments in water pollution control and sewage treatment technologies. The emphasis is now shifting to water pollution prevention technologies.

### In the developing world

Regulatory actions have been much less advanced in the developing world and the results to date have been disappointing. One of the major problems and concerns is that when legislative standards have been introduced, they have been enforced weakly or not at all. According to the Asian Institute of Technology, Asian governments have met "numerous difficulties" in implementing laws and regulations even though legislation, mainly based on regulations in the developed countries, has been adopted by practically all of them.

In Malaysia, for example, pollution control measures adopted in the 1980s led to some improvement in air quality, but "in a number of cases, the government has not been able to control repeating offenders due to its limited powers and some loopholes in the regulations". In Indonesia, while numerous environmental



**WE MAKE GREAT  
IDEAS COME TRUE**



*Aguamilpa  
Hydroelectric Plant*



*Mexico City Subway*



*Coatzacoalcos Bridge*



*Nikko & Intercontinental  
Hotels*



*Silica Plant in Altamira*

## **A World Class Construction Company**

**F**ounded in 1947, ICA is Mexico's largest construction company with over 30 years of experience in the international market.

The company provides a complete range of construction and related services for the private and public sectors, developing infrastructure facilities, as well as industrial, urban and housing projects. It is involved in the construction, maintenance and operation of highways, bridges and tunnels, and in the management and operation of seaports, water supply systems and sanitation facilities under concessions granted by the Mexican and other governments. ICA is also engaged in the manufacturing and marketing of industrial goods, and in the quarrying and marketing of construction aggregates, particularly limestone.

ICA offers its clients quality engineering, procurement, construction, design and project management services

through a variety of formats including unit costs, reimbursed costs, turnkey and lump sum contracts, providing financial support through advisory services, equity investment and limited or non-recourse financial structures. With regional offices in Latin America, the United States, Europe and Asia, ICA has consolidated itself as a world provider of construction-related services and as an active participant in today's global marketplace.

Being a world class company today means giving priority to environmental issues. ICA leads the way in environmental protection by complying with all international regulations and by performing rigorous environmental studies for all projects in order to take the necessary measures to keep environmental effects to the minimum.

ICA's projects contribute to a better future in Mexico and elsewhere. The company's commitment is to ensure that it is a sustainable future.



## BOX 5.7

*The Montreal Protocol – a dramatic impact on ESTs*

The Montreal Protocol on Substances that Deplete the Ozone Layer is an international agreement that has had a more dramatic impact on the development of new environmentally sound technologies than many national regulations. It has spawned a flurry of business activity in chlorofluorocarbon (CFC) recycling equipment and services; alternative refrigeration and air conditioning technologies; substitute chemicals; and new cleaning processes for electronic equipment.

The aerosol spray can industry is one example. The industry, faced with pressure from environmental activists and mounting consumer resistance, began substituting alternative propellants before the protocol was adopted, but the protocol speeded up the process towards a complete phase-out in developed countries.

Technology has played a major role in the industry's switch-over to alternatives, mainly hydrocarbons. Ozone depleting substances are also used in refrigeration (domestic, commercial and industrial refrigerators and freezers); air conditioning; foam production (insulation, cushioning and packaging); fire protection; and industrial solvents (circuit board production and cleaning).

The protocol has forced industries to look for alternative substances and technologies. Examples of new technologies developed because of the protocol include those that follow.

- The first system to use air-cycle cooling for air conditioning passenger trains has been developed. It uses air, instead of ozone depleting substances, as a refrigerant, together with a special high-power compressor to provide the compressed air needed for the cooling cycle. The German railways have already ordered the first production units, and other rail operators in France, the United Kingdom and the United States are interested.

- A citrus by-product, d-limonene, is now available as an alternative to chlorinated solvents such as CFCs.

- A biodegradable substitute for styrofoam, for use in fast food containers, has been developed in Wuhan, China.

A major element in the agreement is that it provides specific financial assistance to developing countries (which have a longer time to phase out CFCs) to adopt replacements if they cost more than what is being replaced. In November 1996, industrial nations agreed to provide US\$540 million over three years to the special Multilateral Fund to help developing countries' efforts to phase out ozone depleting substances. The developing countries had asked for US\$800 million.

One example of a project implemented under the Multilateral Fund involved a

company in Venezuela, which produces about 2,600 tonnes a year of expanded polystyrene sheet, a form of flexible plastic foam, which is made into products such as polystyrene plates and packaging. The company used 260 tonnes a year of CFCs as a blowing agent for the foam. The project, coordinated by the World Bank, involved two other companies, one from Japan and one from the United States, which had extensive expertise in this area. The Venezuelan factory was modified to state-of-the-art foam manufacture, using hydrocarbon butane as a blowing agent. Including new waste systems, the project cost US\$1.6 million, largely paid for through the Multilateral Fund.

In addition, the Montreal Protocol also urges countries to ensure the transfer of the best technology "under fair and most favourable conditions". An example of such technology transfer in action involves China's domestic refrigeration industry. The United States Environmental Protection Agency has introduced Chinese engineers to American non-CFC refrigeration technologies, while Germany's official aid agency, GTZ, has arranged the transfer of a leading non-CFC technology based on the experience of Germany's refrigeration producers. Thanks to this collaboration, China has gained access to modern refrigeration technology, and developed national expertise in non-CFC refrigeration, which it can spread through the industry to accelerate the move to ozone-friendly alternatives.

protection laws have been enacted since 1974, "compliance by industry is far from satisfactory". China has had increasing problems implementing regulations, particularly with small-scale industries.

The result, says the institute, is that "many Asian developing countries have so far

experienced low effectiveness in implementing the command-and-control approach". One reason is the "lack of political will to strictly enforce legislation". Even so, the "ineffectiveness of command-and-control does not deter the governments from using this type of regulation", among other reasons, because it is

## BOX 5.8

### 'Technology tree'

The International Institute for Sustainable Development has developed a 'technology tree', showing how the various international agreements can affect industries, their production processes, technologies and even their end products. The Framework Convention on Climate Change is a good example.

Activity affected	Product/process affected	Family of technology	Technology
Energy supply	Solar heating Solar thermal electric Solar electric	Water heaters Power towers Photovoltaic	Amorphous Silicon Polycrystalline Other
	Wind	Electric	Turbines
	Biomass	Combustion Gasification Alcohols	
	Nuclear	Fission Fusion	
	Natural gas/propane		
	Geothermal		
	Wave Ocean thermal		
Energy conversion and transmission	Thermal electric generation		
	Co-generation		
	Tri-generation		
	District heating		
Energy use	Lighting	Fluorescent	Tube Compact Circline
		Incandescent HID Induction Ballasts Reflectors	Radiowave Core and coil Electronic Silver Aluminium
Electric drive Heating Cooling Building design Internal combustion engine Transportation Industrial Other			
Livestock production	Cattle production (75 per cent of total livestock)	Selective breeding Bioengineering Diet supplements	
	Other livestock		
Rice production	Rice paddies	Biogas digester Selective breeding Bioengineering Water management Methane inhibitors	
Biomass burning	Crop residues	Composting Biogas digesters Permaculture techniques	
	Slash and burn Shifting cultivation Land clearing (Deforestation)	Timber Biomass fuels	
Nitrogen fertilization	Urea Ammonium nitrite Ammonium sulphate Ammonium phosphate Nitrogen solutions Organic farming practices	Selection of fertilizers for low nitrogen oxide production	
		Planting legumes	
Soil cultivation	Chemical-based cultivation Tillage practices Organic farming practices	Nil/low tillage Mulching Planting legumes Organic fertilizer	

“a source of power and influence for governments, and offers a way to hide the true cost of environmental protection”.

Some Asian governments are now turning to market-based economic instruments. Thailand leads the way, with a number already in use, including subsidies for pollution control equipment. The Philippines’ Environment Code guarantees importers of pollution control technologies a tax credit, and deposit-refund schemes exist in several industries. In China, factories that use waste gas, waste liquids and other residues as their main material qualify for tax reductions or exemptions. “Pure regulations have not achieved the desired effect in most Asian developing countries”, the institute reports. “Market-based economic instruments may provide additional tools for environmental management, but their use in Asia is still limited. Experience has shown that while there is increasing interest in their use, there is still a need to combine economic instruments with elements of command-and-control. Therefore, economic instruments should not be viewed as replacements for regulations, but should be seen as complementary.”

UNEP has laid down a number of general principles for the efficient use of regulations:

- since environmental regulations were originally designed with pollution control in mind, it is important that governments explicitly consider their implications for cleaner production;
- while developing countries must establish their long-term environmental goals, they need to allow enough time for these goals to be attained;
- stricter requirements can often be imposed on new industries, because those already established have to make larger investments to reduce emissions;
- there is no point in establishing goals if they cannot be implemented and enforced, and if governments are unable to ensure compliance;
- it is better to specify progressively restrictive

### BOX 5.9

## *Conflicting cases: Mexico and Tanzania*

The United Nations University Institute for New Technologies (UNU/INTECH) has confirmed that effective and enforced environmental legislation is a powerful influence on the transfer of ESTs. It assessed the role of legislation in two countries: Mexico and Tanzania. Mexico is in a relatively advanced stage of development, with a well-established environmental legislative framework, high environmental standards and strong enforcement. Tanzania lacks both an effective regulatory framework and enforcement practices.

- The study found that in Mexico “rigorous enforcement practices have a deterrent effect on companies with respect to corporate behaviour and investing in ESTs. In order to bridge the gap between legal requirements and existing capacities to comply with them, ESTs need to be acquired. The demand by companies for suitable ESTs, and related knowledge, is increasing. This is having a positive impact on the growth of the national market for ESTs, and on the improvement of the national capacities for EST innovation.”
- In Tanzania, there was “practically no pressure on companies to seek more environmentally sound methods of production, and apply ESTs”. Also, companies were not usually aware of environmental legal requirements. “Little need was felt by companies to inform themselves about environmental regulations which apply to their specific lines of production, or to seek cleaner production solutions. Consequently, the demand for ESTs is limited, and where emerging, mainly provoked by economic benefits. This is having a negative impact on the dynamics of the national markets for ESTs, and the development of national capacities for EST innovations.”

UNU/INTECH concluded that these studies “underline the important role that well-established and properly enforced national environmental legislation can play for the effective transfer, use and dissemination of ESTs”.

performance goals than to impose static requirements, since the latter often lead companies to apply pollution control not cleaner production technologies;

- goals should be defined so that they must first be achieved through cleaner production methods, followed by pollution control technology only if necessary;
- discretionary regulations, which allow



الشركة الأحمدية للمقاولات والتجارة ش.م.ك مقفلة

Ahmadiyah Contracting & Trading Co. KCSC

## BUILDING A NEW FUTURE

*By providing housing and infrastructure, the construction industry makes a vital contribution to the social and economic development of every country – especially one that is ravaged by war.*

*As one of the country's leading construction and trading enterprises, Ahmadiah Contracting and Trading Co. KCSC is playing a vital role in Kuwait's post-war reconstruction effort. The company has been helping to build a better future for Kuwait for more than 40 years – handling major public and private projects such as hospitals, power stations, motorways, sewage treatment plants, houses, commercial centres, office developments and hotels – all vital to the country's long-term sustainability.*

*We are conscious that construction has serious impacts on the environment. The leadership of the company – Mr. Abdul Mohsen Faisal Al Thuwainy (Chairman), Mr. Ahmad Faisal Al Thuwainy (General Manager), and Mr. Antoine T.N. Najjar (Managing Director) – is committed to incorporating environmental considerations into all our projects, large or small.*

*To ensure the best possible standards, we use the latest high technology to support our highly-qualified engineers and technicians, top-class*

*project management skills and 2,600 committed employees.*

*In building sustainable communities, the construction industry must address the issues of air and water pollution, waste and energy use. As a major presence in Kuwait, Ahmadiah Contracting and Trading Co. KCSC accepts its responsibilities so that future generations of Kuwaiti citizens can be left with a legacy they will be proud to inherit.*



Mr. Abdul Mohsen  
Faisal Al Thuwainy  
Chairman

P.O. Box 446  
Safat 13005 Kuwait  
Tel.: 965 4814477 - 4816357  
Tel.: 965 4832781 - 4814848  
Fax: 965 4831367  
E-mail: [actc@ncc.moc.kw](mailto:actc@ncc.moc.kw)  
Telex: 23314 Ahmadia - C.R.: 6689

flexibility on how goals are to be achieved, are preferable to regulations that specify what must be done, and how.

UNEP even questions whether developing countries need to introduce regulations. “They certainly do not have to be in place before launching a cleaner production offensive. The implementation of cleaner production does not necessarily depend on the existence of an extensive regulatory system. Developing countries may well find it more feasible to depend on raising awareness of the economic benefits implicit in cleaner production. Coupled with suitable support measures, this will be enough to persuade many industrial leaders to adopt cleaner production procedures – with regulations and economic instruments playing a less important role than they have in the industrialized countries.”

On the other hand, the World Bank supports the use and enforcement of regulations and financial instruments in developing countries, while cautioning them against imitating OECD countries and setting “unrealistically tight standards”, then enforcing them only selectively. “Better to have fewer and more realistic standards that are truly implemented”, the Bank says,

adding that regulations should first be concentrated on controlling emissions from large industrial facilities. As environmental policies evolve in developing countries, there should be more use of market-based instruments which, among other things, “provide a financial incentive for innovation in developing pollution controls and low-waste technologies and practices”.

### Critical role

The OECD states that “market forces will not of themselves” lead to the wider adoption of ESTs, let alone the introduction and use of cleaner production technologies. Governments will need to make greater use of a combination of economic instruments, regulation, incentive programmes and voluntary agreements with industry and other sectors of the economy. “None of these instruments has yet been allowed to show its full potential.” It adds: “Unless government takes a lead, even incremental steps towards implementing cleaner technologies are unlikely to occur. Moreover, countries that do not take the incremental steps may well find their economy at a competitive technological disadvantage in future, compared with those countries that move faster.”

### Sources

*Business and the Environment*, various issues, Cutter Information Corporation.

*Changing Course*, 1992, Business Council for Sustainable Development.

*EarthEnterprise™ Tool Kit*, 1993, International Institute for Sustainable Development.

*Eco-Efficient Leadership*, 1996, World Business Council for Sustainable Development.

*Environment Watch Western Europe*, various issues, Cutter Information Corporation.

*Environmental Performance in OECD Countries: Progress in the 1990s*, 1996, OECD.

*Environmentally Sound Technology and Sustainable Development*, 1992, ATLAS Bulletin.

*EPA Journal*, May-June 1992, United States Environmental Protection Agency.

*Global Environmental Change Report*, various issues, Cutter Information Corporation.

*Government Strategies and Policies for Cleaner Production*, 1994, UNEP IE.

*Implementation Strategies for Environmental Taxes*, 1996, OECD.

*Industry and Environment*, various issues, UNEP IE. *OzonAction*, November 1995, UNEP IE.

*Partnerships: a Path for the Design of Utility/Industrial Energy Efficiency Programs*, 1996, American Council for an Energy-Efficient Economy.

*Sustainable America: a New Consensus for Prosperity, Opportunity and a Healthy Environment*, 1996, President's Council for Sustainable Development.

*Technologies for Cleaner Production and Products*, 1995, OECD.

*The History of Pollution and Environmental Restoration in Yokkaichi*, 1994, International Center for Environmental Technology Transfer.

*Transforming Technology: An Agenda for Environmentally Sustainable Growth in the 21st Century*, 1991, World Resources Institute.

*World Development Report 1992: Development and the Environment*, World Bank.