



# Policy Instruments for Resource Efficiency

Towards Sustainable Consumption and Production



Federal Ministry  
for Economic Cooperation  
and Development



Science Centre  
North Rhine-Westphalia  
Institute of Work  
and Technology



Institute for Culture  
Studies  
**Wuppertal Institute for  
Climate, Environment and  
Energy**



Preface	1
Introduction	3
<b>I. Regulatory Instruments</b>	
<b>1. Norms and Standards</b>	I. 1
Case Study: European Directive on Waste from Electrical and Electronic Equipment (WEEE), European Union	
<b>2. Environmental Liability</b>	I. 7
Case Study: EU Environmental Liability Directive, European Union	
<b>3. Environmental Control and Enforcement</b>	I. 13
<b>II. Economic Instruments</b>	
<b>1. Environmental Taxes</b>	II. 1
Case Study: Trade Tax Reductions for Cleaner Production at Municipal Level, Paraguay	
Case Study: United Kingdom Landfill Tax, United Kingdom	
<b>2. Fees and User-Charges</b>	II. 9
<b>3. Certificate Trading</b>	II. 13
Case Study: European Union Greenhouse Gas Emission Trading Scheme, European Union	
<b>4. Environmental Financing</b>	II. 19
Case Study: Environmental Fund Tunisia - Promotion with grant financing, Tunisia	
Case Study: KfW - Environmental Programme Promotion with preferential credit terms, Germany	
<b>5. Green Public Procurement</b>	II. 27
<b>6. Subsidies</b>	II. 31
Case Study: Promotion of Solar Home Systems in Bangladesh, Bangladesh	
<b>III. Research &amp; Educational Instruments</b>	
<b>1. Research and Development</b>	III. 1
Case Study: Environment-driven Business Development in Sweden, Sweden	
<b>2. Education and Training</b>	III. 7
<b>IV. Cooperation Instruments</b>	
<b>1. Technology Transfer</b>	IV. 1
<b>2. Voluntary Agreements</b>	IV. 5
Case Study: Voluntary Commitments in Chile (APLs), Chile	
<b>V. Informational Instruments</b>	
<b>1. Eco-labelling</b>	V. 1
Case Study: European Union Energy Label, European Union	
Case Study: Forest Stewardship Council Label (FSC), International	
<b>2. Sustainability Reporting</b>	V. 9
Case Study: The Global Reporting Initiative (GRI), International	
<b>3. Information Centres</b>	V. 15
Case Study: Effizienz-Agentur NRW (EFA), Germany	
<b>4. Consumer Advice Services</b>	V. 21
Case Study: Quality Assurance Association of the Dry Cleaners in Hamburg, Germany	
Case Study: Consumer Information and Protection in India, India	
<b>5. Environmental Quality Targets and Environmental Monitoring</b>	V. 29
References	1



Policy makers around the world have started activities to reduce resource use while at the same time increasing economic and social well-being, a vision that relates to the notion of ‘sustainable consumption and production’ (SCP). A range of diverse instruments is already applied to further these goals. To address the complex underlying problems, governments increasingly combine different policy instruments in form of ‘policy mixes’ that aim at providing a sound framework for an increase of resource efficiency and the development of sustainable consumption and production patterns.

Several instruments and a variety of “policy mixes” for resource efficiency and SCP are applied in industrialised countries. Policy makers in developing countries are catching up, and can look to a growing body of experience with innovative SCP policy instruments for implementation in their countries. Making the experience gathered with implementation of SCP policy instruments available to a wider audience, especially stakeholders and decision makers in developing countries, offers an opportunity to promote wider uptake of innovative policy instruments.

### **A hands-on guidance on policy instruments for resource efficiency...**

---

With this compendium, German Technical Cooperation (GTZ), the UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP) and the Wuppertal Institute, with support from the German Federal Ministry for Economic Cooperation and Development (BMZ), aim to provide a quick, hands-on overview of selected SCP policy instruments for boosting resource efficiency. It builds on the recent discussions and practical experience with these instruments, both from developed and developing countries. This compendium directly targets politicians, NGOs and SCP practitioners in intermediary organisations. It does not seek to further the academic discussion on these issues, but is intended to provide a guide that can be

and is used by decision makers at all levels. Therefore, underlying debates are only pinpointed to when necessary, concentrating on established knowledge about these instruments.

### **...with an easy-to-use fact-sheet format**

---

The main section of the publication contains profiles of instruments that public authorities have at hand to promote resource efficiency. The profiles are intended as 'stand-alone', being understandable without reference to other parts of the publication. To ensure usability and a quick overview of the main features of each instrument, a common structure and style was followed for all instruments.

We are aware that the compendium does not give any recommendations which policy mixes to apply. A discussion and/or analysis on how to best mix the policies would be desirable as a reference for policy makers in developing countries. On the other hand, many factors influence the choice of policy instruments - so it might also be a good starting point to analyse which instruments are lacking in a particular country or region, and – depending on the particular circumstances - to introduce new instruments in order to fill those gaps.

### **...to promote wide uptake of resource efficiency and SCP!**

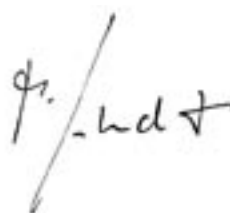
---

GTZ and CSCP would like to promote a wide uptake of policy instruments for resource efficiency through this compendium. We believe it to be unique both in the practicability of presentation as well as in the variety of instruments described. The authors consider the compendium to be a valuable source of information for decision makers both in industrialised and developing countries, and believe it will support the discussion on (and the implementation of) policy mixes that reduce resource use while increasing economic and social well-being throughout the world.



**Stephan Paulus**

Dty. Director  
Environment and Infrastructure  
Division (GTZ)



**Michael Kuhndt**

Head, UNEP/Wuppertal Institute  
Collaborating Centre on Sustainable Con-  
sumption and Production (CSCP)

### **Promoting resource efficiency and sustainable consumption and production**

---

Since the Rio World Summit on Sustainable Development in 1992, there have been many efforts at the local, regional, national and international level to challenge unsustainable consumption and production. Since the mid 1990s there has been a significant effort by many businesses to engage in eco-efficiency and cleaner production activities and multiple instruments are now at hand. Through these efforts the process of changing course toward sustainable development has begun. In parallel, many governments have designed and implemented new and innovative policy instruments that provide incentives and a framework to promote sustainable consumption and production patterns.

Despite limited improvements in energy efficiency and resource productivity, overall resource consumption and waste has continued to increase. Consequently, consumption and production patterns are in most respects less sustainable today than they were 10 years ago. At the Rio+10 World Summit on Sustainable Development in September 2002, national governments adopted the Johannesburg Plan of Implementation. Chapter III of the plan calls “to accelerate the shift towards sustainable consumption and production to promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste.” (Paragraph 15).

Promoting resource efficiency helps to reduce waste, pollution and other environmental impacts by addressing the resource and material flows that are the underlying causes of these problems. A more efficient use of resources can also help to address high priority environmental issues such as climate change and biodiversity loss. Resource efficiency is also closely related to economic and social dimensions of sustainability. There is plenty of evidence that good environmental management and regulation do not impede overall competitiveness and economic development – on the contrary, good environmental policies may also strengthen competitiveness because they often call for innovation. Resource efficiency measures contribute to achieving win-win situations that contain both clear environmental benefits as well as tangible financial benefits for organisations engaged in resource efficiency activities. The case in favour of resource efficiency is particularly strong when viewed in the light of increasing raw material prices. Properly designed environmental regulation can in fact reduce costs, create lucrative markets for environmental goods and services, and stimulate innovation and thereby boost national competitiveness, create jobs and reduce exposure to increasingly costly resource imports. Accordingly, decoupling economic growth from resource and material use in all economic sectors together with reducing the specific environmental impacts of resource use - a ‘double decoupling’ - is vital to make meaningful advances on a broad range of economic and sustainability challenges facing society.

Taking the case of Europe during recent decades one of the key drivers behind actions and policies has been to address the linkage between the internal market and environmental policies through instruments such as the Lisbon Agenda and the EU Sustainable Development Strategy. Laws and standards have been harmonised to ensure that businesses can compete on a level playing field, while also protecting the environment. Environmental policies have sought synergies between the needs of business and environmental goals. This win-win philosophy has helped to improve Europeans’ quality of life, while also reducing costs and opening up new markets for businesses. In the future such win-win policies will be even more important in helping societies to solve serious environmental problems and move towards sustainable consumption and production patterns.

### **Introducing selected policy instruments for resource efficiency and sustainable consumption and production**

---

To improve resource efficiency and promote sustainable consumption and production, there is a need for governments to set realistic long-term policy objectives and targets, apply an appropriate mix of policy instruments and measure progress toward meeting their objectives. Governments have a number of instruments at hand to build a sound policy framework that supports the uptake of resource efficiency measures across the entire production and consumption system. Policy instruments supporting resource efficiency do not only relate to

traditional regulatory or ‘command and control’ approaches but to a much wider array of tools such as economic, informational, cooperation and educational instruments. This compendium introduces a broad range of policy instruments that have shown success in increasing resource efficiency and promoting sustainable consumption and production patterns in a number of jurisdictions. The following figure presents an overview of the policy instruments that are included in the compendium:<sup>1</sup>

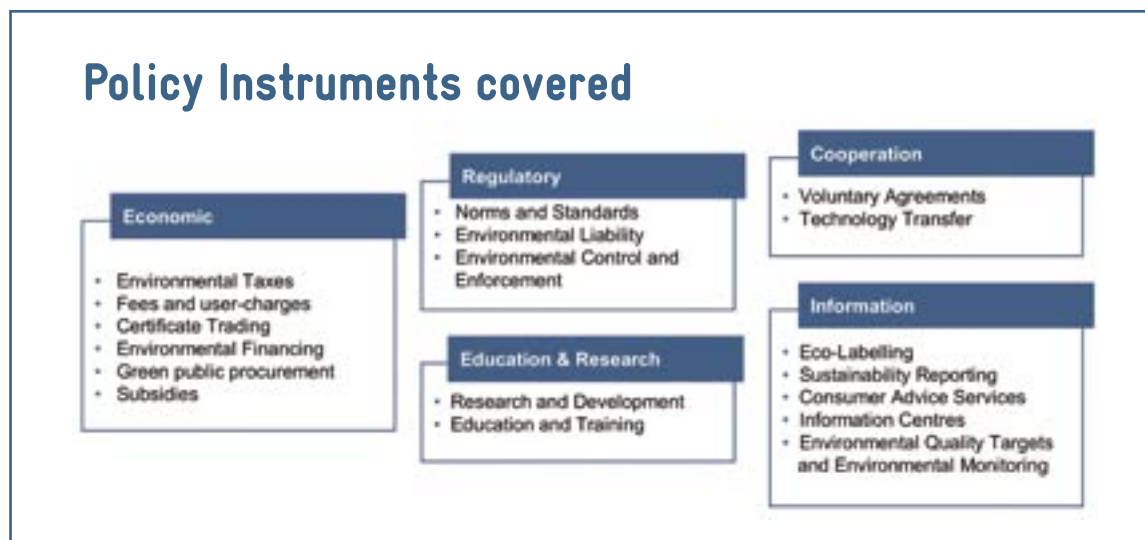


Figure 1: Overview of policy instruments covered in the compendium

This first edition of the compendium describes 18 policy instruments. Each instrument description is provided in the form of a fact sheet that follows the content structure as illustrated in the following figure:

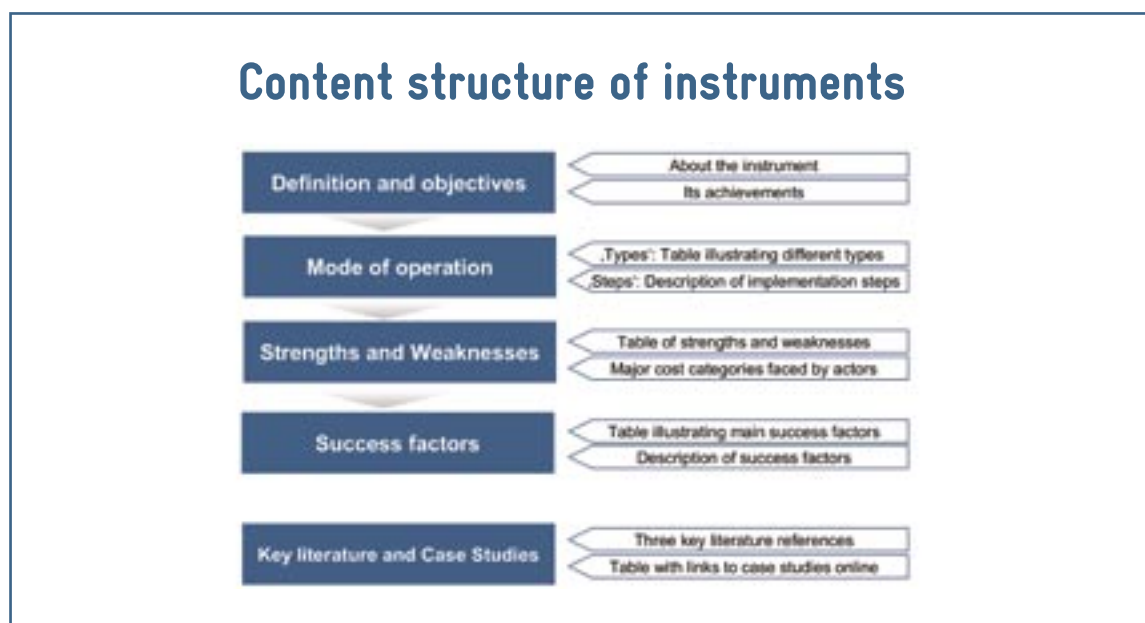


Figure 2: Content structure of instruments

<sup>1</sup> Please note that the compendium is to be understood as a dynamic document. Further policy instruments and more comprehensive policy descriptions will be added over time.



In addition, a number of case studies complement the instruments described in the compendium. These in-depth case studies illustrate the objectives, mode of operation and key lessons that have been drawn during implementation of the policy instruments in practice.

### Classifying policy instruments for resource efficiency

Local, regional and national governments can apply a wide range of different policy instruments for improving resource efficiency. These instruments can be clustered in various ways. This compendium clusters the policy instruments into five categories: regulatory, economic, informational, cooperation and educational instruments (see above, figure 1). In addition, the policy measures described in this compendium are characterised by positioning them within the Resource Efficiency Policy Matrix (see figure 3). The characteristics of each policy can be found on the horizontal axis, describing whether the policy provides assistance and support or rather rewards or penalties for producers and consumers. The further to the left hand side policies rest on the axis, the greater the role for rewards & penalties. The policies on the right hand side of the axis rely on providing support to enable producers and consumers to take advantage of resource efficiency opportunities. The characteristics are described below:

— **Reward / Penalise:** Governments can act in a way that rewards environmentally responsible producers and consumers in a consistent way or alternatively penalise polluting or inefficient producers, thus providing incentives to improve environmental conduct.

— **Motivate:** Governments can engage with producers and consumers by aiming to tackle certain resource efficiency challenges together by providing concrete resource efficiency incentives while at the same time supporting producers and consumers to use them.

— **Support:** Governments can support producers and consumers to take advantage of existing resource efficiency opportunities through multiple means such as providing information and education.

On the **vertical axis**, the policy measures are sorted into those that address ‘hard’ and ‘soft’ factors. **‘Hard’ factors refer to tangible factors**, which are at least partially necessary for getting producers (and consumers) engaged in resource efficiency activities. Hard factors can include issues such as access to finance and technology. **‘Soft’ factors are intangible factors.** Intangible factors can include issues such as human resources and organisational structures. At the societal level, ‘hard’ issues can include legal liability and economic incentive whereas ‘soft’ issues can be concerned with information transparency and stakeholder awareness.

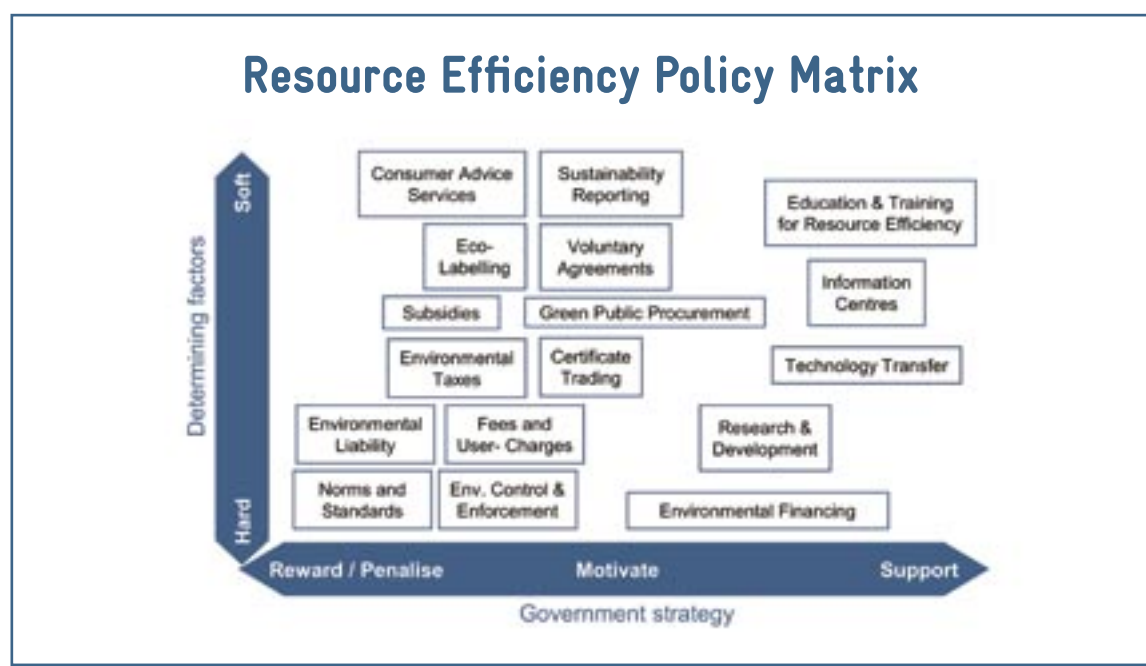


Figure 3: The resource efficiency policy matrix

## The 'Resource Efficiency Policy Radar'

A 'Resource Efficiency Policy Radar' based on the 'Resource Efficiency Policy Matrix' (Figure 3) accompanies each policy instrument description. This radar assists readers to quickly understand the respective instruments within the framework of the 'Resource Efficiency Policy Matrix' and depicts each instrument in terms of whether it provides soft or hard support and whether it provides rewarding/penalising or supporting incentives. The following provides an example for two policy instruments to help readers understand how the radar should be interpreted in this compendium.


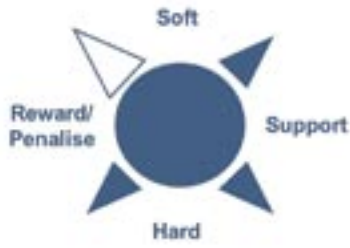
Resource efficiency policy radar	Reward / Penalise vs. Support	Soft vs. Hard
	<p><b>Finance Mechanisms</b></p> <p>Because Finance Mechanisms enable producers to take advantage of existing opportunities, but do not necessarily create new ones the instrument falls into the 'Support' category.</p>	<p>Finance is concerned with tangible issues at the producer level, therefore it is considered a 'hard' policy measure.</p>
	<p><b>Consumer Advisory Services</b></p> <p>Consumer Advisory Services create external rewards for resource-efficient producers, but do not actively help producers to take advantage of these opportunities. Accordingly, the instrument falls into the 'Reward / Penalize' category.</p>	<p>The policy instrument does not directly target the financial bottom line of producers, but changes their stakeholder environment, i.e. makes intangible issues more important. It is thus considered a 'soft' policy measure.</p>

Fig. 4: Examples of the use of the Resource Efficiency Policy Radar

## Towards a sound policy mix for resource efficiency and sustainable consumption and production

While governments in many countries directly produce and consume significant quantities of materials and resources, their primary role is in establishing appropriate frameworks to shape consumption and production patterns in society and thereby address associated resource flows. Policy instruments aimed at increasing resource efficiency thus need to directly mobilise producers and consumers to make meaningful contributions in their respective fields. The range of instruments illustrated in Figure 1 can be used to set the framework conditions for achieving these goals. The challenge for policy makers is to select an appropriate combination of policy instruments to meet specific environmental objectives while also having a positive economic and social impact.

When planning and designing a policy intervention, choosing the right measures is crucial. The optimal choice of policy instruments will depend heavily on local and national conditions and readers are cautioned to avoid approaching problems with "one-size-fits-all" solutions. The question is rather how to combine and tailor different policy measures to provide **a balanced and sound policy mix** that meets the objectives of mainstreaming resource efficiency and shifting toward sustainable consumption and production patterns within the unique context of each local jurisdiction.

In most cases the policy mix will need to address different challenges simultaneously, such as providing both rewards and penalties, while at the same time supporting enterprises through collective incentives. Similarly,

addressing only 'hard' factors will often be insufficient to achieve objectives without application of supporting soft factors. For example, information and communication initiatives are unlikely to reach resource efficiency objectives in the absence of a fiscal framework that provides financial reward for the desired behaviours. In the opposite case, introduction of an environmental tax designed to stimulate resource efficiency can only be effective if producers have access to necessary financial, technological and knowledge resources to change behaviour in response to the tax.

When selecting policy instruments, it is important to consider likely costs and the benefits the policy is intended to achieve. While costs for financial subsidies can be easily estimated, costs arising within firms and public administrations subject to different policy instruments are difficult to accurately quantify. The benefits of resource efficiency policies are often even more difficult to quantify. This is due to the fact that in many cases benefits relate to society and welfare as a whole while costs are often born by the state or by private companies. Where costs and benefits connected to the profiled policy instruments were identified, the authors have included a descriptive table illustrating the basic cost categories likely to be encountered when implementing the different policy measures. However, the general absence of cost-benefit data for the various policy instruments and mixes highlights a need and opportunity for continuing research efforts on different cost-benefit relations with the aim of identifying win-win policy combinations that support the decoupling of environmental impacts from economic growth.





## 1. Norms and Standards

### Definition and objectives

Norms and standards are rules and targets set by public authorities ('command') that subsequently are enforced by compliance procedures ('control'). This has led to the term 'Command and Control' for this group of policy instruments. Norms and standards include amongst others laws, directives, and technical guidance documents as far as these are of a legally binding nature.

Norms and standards are applied to achieve numerous aims: Reducing emissions and waste, increasing resource or energy efficiency, reducing the use of toxic substances and protecting eco-systems. Furthermore they aim to increase the application of certain technologies regarded as beneficial for resource efficiency gains. Norms and standards can also be used to implement the 'polluter-pays-principle', a policy approach that attempts to shift the costs and responsibilities associated with pollution to the polluter who is compelled by the state to address the societal-damaging aspects of their activities (UNEP 2004, GTZ 1998c).

### Mode of operation

Depending on the concrete environmental issue and target group to be addressed, there exist different types of norms and standards. Norms and standards most commonly address businesses but can also target private consumers. They can address environmental issues at different phases of a product life cycle, e.g. during the manufacturing phase, during the use phase or at end-of-life treatment. Different types of norms and standards may require businesses or consumers to comply with a number of dimensions as listed in Table 1:

Type	Description
<b>Emission standards</b>	Specify the maximum level of permitted emissions in quantitative terms (performance-based standards).
<b>Ambient standards</b>	Set minimum desired level of air, water or soil quality that must be maintained.
<b>Technology standards</b>	Specify which kind of technology must be used, e.g. by prescribing or forbidding certain technologies, or by referring to best available technologies.
<b>Management and process standards</b>	Specify certain behaviours and activities, e.g. regular monitoring or maintenance activities or the set-up of take-back-schemes.
<b>Product standards</b>	Specify certain product characteristics, e.g. on chemical residues in products or energy efficiency characteristics.

Table 1: Different types of norms and standards (Porrini 2005, Huppes/Simonis 2000)

Several issues have to be considered for establishing and implementing norms and standards:

Step	Issues to consider
<b>Gather information</b>	Before setting-up norms and/or standards the regulator needs to collect and assess relevant information that is necessary to decide on the physical actions.
<b>Design policy intervention</b>	Policymaking bodies need to appropriately design the respective norm or standard, taking into account possible economic and social side effects.

<b>Monitor compliance</b>	Compliance with norms and standards needs to be monitored and assessed.
<b>Sanction non-compliance</b>	In case of non-compliance, sanctions have to be imposed, e.g. fines or, in grave cases, penal action. Sanctions need to be sufficiently severe and have to be sufficiently enforced to effectively deter non-compliance.

Table 2: Steps and issues to be considered for establishing norms and standards (Porrini 2005, Huppel/Simonis 2000)

## Strengths and Weaknesses

Norms and standards have certain strengths and weaknesses as an instrument promoting resource efficiency as summarised below in Table 3. Due to the variety of different types of norms & standards it is important to carefully analyse and assess existing framework conditions to choose the right norm and/or standard and to set realistic and achievable targets

Strengths	Weaknesses
<p><b>High effectiveness and certainty in achieving objectives</b> If norms and standards are enforced they achieve their aim with certainty. This makes them attractive for problems requiring immediate action and certainty of achieving set goals; especially those related to serious human health problems.</p> <p><b>Relatively easy to set up</b> Norms and standards are in principal relatively quick and easy to formulate and to enact. However, the need to address complex problems or pressure from powerful interest groups may hinder and prolong the process. (Harrington/Morgenstern 2004)</p> <p><b>Clarity for businesses</b> Norms and standards with a clear and verifiable procedure for assessing compliance make it easy to determine whether a polluter follows the norms and standards. This simplifies the task for businesses to assess the consequences of non-compliance and to understand the level of environmental performance they have to achieve.</p> <p><b>Fairness on national level</b> On a national level norms and standards ensure that all businesses are treated equally since all have to achieve the same norms and standards</p> <p><b>Experience and policy-cases available</b> The long record of experience with norms and standards, especially in developed countries, can be used, with regard to both successful and failed examples of norms and standards.</p> <p><b>Independence from market conditions</b> Supportive infrastructures such as functioning markets, tax, and fiscal payment systems are not needed. (UNEP 2004)</p>	<p><b>Norms and standards are economically inefficient</b> Environmental goals tend to be reached at higher total costs than with other, especially economic instruments.</p> <p><b>Low innovation incentive</b> They do not necessarily stimulate the development of new technologies in the long term, as no incentives for companies exist to improve beyond the set standard. Continuous revision of standards can partly overcome this problem. However, in a short-term perspective, they have proven to promote innovation to a considerable degree (e.g. air pollution standards in Germany).</p> <p><b>Impacts on competitiveness and international trade</b> Concerns exist that norms and standards might reduce competitiveness of national industries. Still counter-examples exist, especially in the area of environmental technologies. At the same time norms and standards can be seen and criticised as international trade barriers.</p> <p><b>Vulnerable to corruption</b> If corruption is wide spread, enforcement of norms and standards can be difficult.</p> <p><b>Information requirements</b> It may be difficult to define optimal standards considering all relevant scientific, political and economic information.</p>

Table 3: Strengths and Weaknesses of norms and standards (Source: UNEP 2004, GTZ 1995, OECD 2001, UNESCAP 2006, WBCSD/IIED 2002, Harrington/Morgenstern 2004)

The costs implied by norms and standards are determined by many factors, and they are borne by different actors (see Table 4). The costs can be shifted, e.g. business paying for monitoring services, or setting up private, certified monitoring systems. When evaluating the costs of norms and standards, the total costs should be considered, as well as who is facing them.

Category	Description	Faced by
<b>Formulation</b>	...for setting up the system as outlined above	Government
<b>Abatement</b>	...for getting informed on regulation and options to reach compliance. ...for activities to reach compliance	Private sector/ Polluter
<b>Monitoring</b>	...for monitoring and reporting of emissions ...for monitoring and reporting of emissions	Private sector/ Polluter Government
<b>Verification</b>	.. for verifying monitoring and reporting of polluters	Government
<b>Sanctioning</b>	...for assessing compliance and sanctioning	Government

Table 4: Costs associated to enacting norms and standards

While the costs of norms and standards in a specific situation depend on a variety of factors, research results argue that they are quite expensive in implementation and monitoring, inflexible in adoption and prove to be a rather static instrument (Cole/Grossman 2002, Harrington/Morgenstern 2004, Johnston 1999, Markandya 1998). The picture varies for the different cost categories and always depends on the actual design of the instrument. Abatement costs are generally considered to be relatively high for norms and standards, especially relative to alternative approaches such as economic instruments (Harrington/Morgenstern 2004). Administrative costs for policy formulation, monitoring and sanctioning can also be significant, but it is not evident whether they differ systematically from those of other instruments (Markandya 1998, Harrington/Morgenstern 2004).

### Success factors

The following success factors of norms and standards are drawn from experiences and might differ from case to case depending on the given political, economic and social framework conditions in which a norm and/or standard is going to be implemented. (For a more detailed analysis see: UNEP 2004, WBCSD/IIED 2002).

Success factor	Issues to consider
<b>Governmental capabilities</b>	Appropriate physical, human and organisational resources to collect and assess information on the environmental issues at hand, and the capacity to decide on appropriate measures need to be available. During enforcement, governments have to be capable to oversee compliance and impose sanctions if necessary.
<b>Legal authority and efficacy</b>	A functioning, responsive legal system is required for establishing and implementing norms and standards (e.g. corruption-free law making, implementation and enforcement).
<b>Effective control system</b>	A well-functioning control system with sufficient capacities (e.g. physical equipment, adequate number of competent employees) needs to be in place or to be set up. The system can be financed either by the state or through contributions by the business that is subject to regulation.
<b>Effective and transparent consultation</b>	Norms and standards should be enacted only after effective and transparent consultation. This process should enable governments to assess stakeholders' positions and gain access to their knowledge and experience, without allowing affected groups an inappropriate influence on the policy.
<b>Good political structure and clear priorities</b>	Many norms and standards impose costs on a small group of businesses, while benefits relate to the general public. Political commitment and appropriate political structures are needed to balance special interests with norms and standards enacted to protect or enhance public goods.

<b>Policy coherency</b>	Other policies might be obstructive to the intention of a regulatory policy enacted. Coherency between different policies enacted is necessary for norms and standards to achieve the desired effect at reasonable cost.
-------------------------	--

Table 5: Success factors of norms and standards; Source: UNEP 2004

## Key Literature and Case Studies

- Turner, R. Kerry, D. Pearce, I. Bateman (1993):** *Environmental Economics: An Elementary Introduction*. The Johns Hopkins University Press
- GTZ (1995):** *Market Based Instruments in Environmental Policy in Developing Countries: Framework for Policy Planning and Institutional Development in the Environment*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, 1995 (<http://www.gtz.de/de/dokumente/en-instruments-environmental-policy-1995.pdf>)
- OECD (2001):** *Sustainable Development: Policies to Enhance Sustainable Development*, Organisation for Economic Co-operation and Development (OECD), General Secretariat, SG/SD (2001) 5/FINAL, 27. April 2001 (<http://www.bmu.de/files/pdfs/allgemein/application/pdf/pol-report-f.pdf>)
- Harrington, Winston/Morgenstern Richard D. (2004):** *Economic Incentives versus Command and Control: What's the best approach for solving environmental problems?* Fall/Winter 2004, Resources for the Future (RFF) ([http://www.rff.org/Documents/RFF\\_Resources\\_152\\_ecoincentives.pdf](http://www.rff.org/Documents/RFF_Resources_152_ecoincentives.pdf))
- Cole, Daniel H., Grossman, Peter Z. (2002):** *Toward a Total-Cost Approach to Environmental Instrument Choice*. In: T. Swanson, ed., *An Introduction to the Law and Economics of Environmental Policy: Issues in Institutional Design*, 20 Research in Law and Economics 223-241 (2002).
- Johnston, Nick (1999):** *Environmental Policies and Industrial Competitiveness: The Choice of Instrument*. Gatekeeper Series, GK 99-01, International Institute for Environment and Development
- Markandya, A. (1998):** *The Cost of Environmental Regulation in Asia: Command and Control versus Market-based Instruments*, in: Asian Development Review 1998, Vol. 16, No. 1, P. 1-30 (<http://www.adb.org/documents/periodicals/adr/pdf/ADR-Vol16-1-Markandya.pdf>)
- UNEP (2004):** *The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges*. United Nations Environment Programme
- UNESCAP (2006):** *Virtual Conference on Integrating Environmental Considerations into Economic Policy Making Processes*. United Nations Economic and Social Commission for Asia and the Pacific. Website accessed 19th April 2006 ([http://www.unescap.org/drpad/vc/orientation/M5\\_2.htm](http://www.unescap.org/drpad/vc/orientation/M5_2.htm))
- WBCSD/IIED (2002):** *Breaking New Ground – The MMSD Final Report*. International Institute for Environment and Development, World Business Council for Sustainable Development
- Porrini, Donatella (2005)** *Environmental policies choice as and issue of information efficiency*. Working Paper, Università degli Studi di Milano
- Huppes, Gjal/Simonis, Udo. E (2000):** *Environmental Policy Instruments in a New Era*, CML- SSP Working Paper 2000.002, November 2000, Centre of Environmental Science (CML), Leiden University (<http://www.leidenuniv.nl/cml/ssp/publications/wp2000-002.pdf>)

Case Studies / Examples	Link
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany – Standards for air pollution control	<a href="http://www.bmu.de/english/air_pollution_control">http://www.bmu.de/english/air_pollution_control</a>
Japan's 'Top Runner' Standard	<a href="http://www.eccj.or.jp/top_runner/index.html">http://www.eccj.or.jp/top_runner/index.html</a>
An online compendium for a number of instruments and case studies on SCP (including regulatory instruments)	<a href="http://www.iisd.org/susprod/compendium.htm">http://www.iisd.org/susprod/compendium.htm</a>



## Case Study: European Directive on Waste from Electrical and Electronic Equipment

### What is the European Directive on Waste from Electrical and Electronic Equipment?

---

The Waste from Electrical and Electronic Equipment (WEEE) Directive forms part of an overarching strategy to increase the responsibility of producers not only to finance recycling and disposal but also to provide incentives for minimising life-cycle impacts of electrical and electronic equipment. The Directive was agreed on 13 February 2003 and it was to be transposed into national law not later than 13 August 2004 by EU member states. Collection of WEEE under the Directive was to begin 14 August 2005. The objective of the WEEE Directive is to reduce the waste from electrical and electronic equipment by encouraging and setting criteria for the collection, treatment, recycling and recovery. Together with two other directives (Directive on Restriction of the Use of Certain Hazardous Substances and Directive for the Setting of Eco-Design Requirements for Energy Using Products) the WEEE directive can be seen as one attempt to implement the objectives of the EU Integrated Product Policy IPP.

### How does the European Directive on Waste from Electrical and Electronic Equipment work?

---

The WEEE Directive covers 10 product categories (e.g. large household appliances, small household appliances, IT & telecommunications equipment, consumer equipment, medical devices, automatic dispensers). For each product category, producers are obliged to collect and recycle prescribed quantities of electrical and electronic equipment (depending on the category). EU member states are responsible for enacting domestic legislation that meets the requirements of the Directive including the organisation of collection and recycling systems, the control and the waste treatment-logistics (e.g. set up of registers for producers to collect information regarding quantities and categories of electrical and electronic equipment put on the market as well as waste routes and achieved recovery/recycling rates). The WEEE Directive affects producers, retailers/distributors as well as private households. Producers (manufacturers, sellers and resellers of own-brand equipment, and importers and exporters of electrical and electronic equipment) are responsible for financing collection, treatment, recovery and environmentally sound disposal of WEEE. Producers must register quantities of electrical and electronic equipment placed on the market and either independently or collectively (e.g. compliance scheme) operate a return-collection system and demonstrate that the collection, recovery and recycling targets have been achieved in accordance with the respective national legislation in EU member states.

Retailers/distributors are obliged to provide free take-back of WEEE for private consumers who are purchasing electrical equipment on an old for new basis. They are also responsible for delivering collected WEEE to designated facilities to ensure treatment and recovery in accordance with the Directive. Private householders are entitled to return WEEE to designated collection facilities without charge. The specific collection system in each member state differs with local authorities in some member states providing collection facilities either with or without financial support from producers whereas in other member states producers are obliged to arrange collection.

### Evaluating the European Directive on Waste from Electrical and Electronic Equipment (WEEE)

---

Collection of WEEE under the Directive began August, 2005 and experience to date is limited. Because of broad disparities in how the Directive was transposed in the different member states a review of national WEEE legislation was announced by the European Commission in May 2006. Key issues that have led to challenges include collection targets, product exemptions which has complicated financing schemes, some supply disruptions for hazard free parts and wide variations in penalty clauses. Concerning collection and recovery targets, member states are obliged to report to the Commission not later than 31 December 2006. Despite a development and implementation process of nearly ten years, many companies (mostly SMEs) and national and (particularly) local governments were unprepared. Nonetheless, some good examples for information policies can be found in, for instance, the United Kingdom Department of Trade and Industry Information Hotline, in commercial

initiatives (Farnell in One), in research institutes (IZM Fraunhofer, Berlin, Germany) and in industrial trade associations (Orgalime, ZVEI - German Electrical and Electronic Manufacturers' Association).

Because of the significance of the European market for the electrical and electronics industry, the Directive has achieved global significance and can be said to have established a new global standard for the phase-out of toxic substances and recyclability of WEEE. This aspect has led critics to point out that compliance with the Directive poses a significant challenge for business, particularly for non-EU-companies. The Directive is an example of international scale implementation of the Producer Responsibility Principle and integration of external (waste collection, treatment and recycling) costs for products, which provides a market incentive for producers to consider product end-of-life issues in design.

Some weaknesses that have been pointed out include collection targets that are considerably lower than collection performance in many European countries (e.g. Sweden collects about 8-9 kg per capita annually). Also, there are significant differences in the financing and operation of the systems in the different member states, which may distort incentives for producers to integrate environmental considerations in product design. The co-existence of large scale producer operated collection and recycling systems with previously established recycling initiatives (often combined with social services) has also been criticised because the larger recyclers can out compete older smaller initiatives, which may threaten some social initiatives and income sources for smaller WEEE processors. A further challenge connected to the different ways the Directive has been transposed at the national level is inter-EU trade in second hand goods since fees will have been paid in the country of original sale while final disposition will occur in a different jurisdiction. The issue of exports of used electrical goods to developing countries is even more problematic in that these countries lack capabilities to effectively manage WEEE when it eventually reaches end of life. A final challenging aspect of the Directive is information gathering and control which is needed to demonstrate compliance with collection and recycling targets.

### **Further information on the European Directive on Waste from Electrical and Electronic Equipment**

---

#### **References**

[http://ec.europa.eu/environment/waste/weee\\_index.htm](http://ec.europa.eu/environment/waste/weee_index.htm)

<http://ecodesign.izm.fraunhofer.de>

<http://www.orgalime.org/issues/weee.asp>

<http://www.defra.gov.uk/ENVIRONMENT/waste/topics/electrical/index.htm>

<http://www.zvei.de>



## 2. Environmental Liability

### Definition and objectives

Environmental liability makes the causer of environmental damage (“polluter”) pay for remediating the damage he has caused and is one form of implementing the “polluter-pays” principle. The objective behind establishing environmental liability is two-fold. First, liability serves to compensate parties who have suffered injury or damage, which can include both individuals and ‘society’ at large. Second, as liability creates a cost for causing harm, it provides a direct incentive not to pollute and to reduce corporate environmental risks (Comm.2000, GTZ 1995, von Seth/Ott 2000).

Three criteria are required to make environmental liability an appropriate policy measure: (1) there is a need to identify one or more actors responsible for causing the harm or pollution, (2) damage needs to be concrete and quantifiable, and (3) a causal link between the damage and the polluter needs to be established (Comm.2000). This makes environmental liability suitable for cases where damage results from industrial accidents or from gradual pollution caused by hazardous substances or waste coming into the environment from identifiable sources. However, liability is not a suitable instrument for dealing with pollution of a widespread, diffuse character, where it is impossible to link the negative environmental effects with the activities of certain individual actors (e.g. effects of climate change brought about by CO2 and other emissions (Comm. 2000).

### Mode of operation

The main choice when setting up a liability system is between a negligence regime and a strict liability regime:

Type	Description
<b>Negligence-based liability regime</b>	Polluters are held liable only where the damage can be shown to be attributable to negligence or insufficient care (also referred to as fault-based liability). Negligence-based liability regimes are argued to be more economically efficient because incentives to invest in abatement costs will not exceed benefits of reduced pollution. It is considered appropriate for activities that are not inherently dangerous but nonetheless have caused harm (Comm. 2000).
<b>Strict liability regime</b>	Polluters pay for the environmental damages caused by their activity, regardless of their behaviour (also referred to as no-fault liability). Strict liability is typically applied to risks created by actors engaging in abnormally hazardous activities for all injuries caused by their conduct. This can create incentives for over-investment in abatement and inefficient allocation of scarce resources. A strict liability regime will ensure that risk is borne entirely by the actors carrying out inherently dangerous activities, rather than victims or society at large.

Table 1: Different types of environmental liability

Strict liability regimes are commonly applied in the environmental field because of the greater certainty of achieving desired results and because it is particularly difficult to determine the standard to assign liability on the base of negligence – e.g. where pollution has many sources and many victims and it is difficult to prescribe efficient pollution standards based on a calculus of the abatement cost and the external harm of every source of pollution (Porrini 2005).

Liability might also be combined with mandatory insurance. While this ensures that polluters can be held liable in every event, it weakens the individual incentive effect, as the risks are distributed among all the insurance policy holders. This effect is even stronger, if the insurance premium is calculated on indirect criteria, such as tonnage in the case of oil tankers, instead of on the basis of actual risk (GTZ 1995). The market for environmental liability insurance is not well developed (see Strengths and Weaknesses).

There are some typical steps in implementing environmental liability:

Step	Issues to consider
<b>Setting up the legal framework</b>	Setting up the legal rules establishing environmental liability, including the scope of liability, and the legal institutions and procedures for dealing with legal actions.
<b>Determine type of liability regime</b>	Decide between strict or negligence-based liability system (see above).
<b>Legal action</b>	Depending on the concrete regulation, liability may be invoked through the action of a private party or a state agency on behalf of society at large. For activities subject to liability there is a need to define the acceptable defences, the burden of proof and mechanisms for remedial action. In a (strict) liability system the victim files an action claiming a causal link between the defendant's conduct and the plaintiff's injury or disease, which is then processed in court. In the case of a negligence regime, an additional judgement on the behaviour of the polluter is necessary.
<b>Compensation</b>	A system of liability assignment finally results in a compensation the polluter pays to the victims. Its amount is set according to the damage or injury suffered by the victims.

Table 2: Steps and issues to be considered of introducing environmental liability Source: Huppés/Simonis 2000, Boyer/Porrini 2002, Porrini 2005, Comm. 2000, (see also: World Bank 2005)

## Strengths & weaknesses

Environmental liability has distinctive strengths, but it also has some weaknesses:

Strengths	Weaknesses
<p><b>Remedial effect</b> This effect helps to recover the costs of damages (through restoration or compensation) that occur in violation of existing environmental standards or as a result of (partly) unregulated behaviour</p> <p><b>Preventive effect</b> Environmental liability law provides a signal to potential polluters that they will have to provide compensation for any pollution they may cause, and thus require them to better integrate (internalise) the environmental impacts of their actions in their decision making</p> <p><b>Flexibility</b> The amount of the sanction payment encompasses the actual damage caused, making it suitable to address damage through a wide range of substances by one integrated instrument.</p>	<p><b>Judicial</b> The system relies upon a case-by-case adjudication system; there may be problems in determining the causal link; it may lead to inconsistent verdicts, generate long delays in court proceedings and may be more profitable to lawyers and experts than to the victims</p> <p><b>Financial</b> Because of increasing costs and penalties for environmental accidents, polluters can in some cases end up insolvent making them unable to pay further clean-up or compensation costs. Financial issues are particularly relevant in the instance of smaller firms undertaking hazardous activities as they often lack resources to manage risk and pay for damages.</p> <p><b>Information related</b> Plaintiffs in environmental liability cases can lack adequate information about a firm's technology, efforts to prevent pollution or the incident in question, placing them at a disadvantage relative to defendants.</p> <p><b>Insurance market</b> The market for environmental liability insurance is not well developed because of an absence of generally accepted methods to quantify environmental damage. Liability caps can overcome this problem but at the cost of eroding application of the polluter pays principle (Comm2000).</p> <p><b>Risk delegation</b> Strict liability regimes have been shown to result in delegation of high-risk production activities from larger to smaller firms with the aim of avoiding liability. Smaller firms are generally less capable of effectively managing risks and are less likely to possess the financial resources to remediate uninsured harms (Comm.2000).</p>

Table 3: Strengths and weaknesses of environmental liability; Source: Boyer/Porrini 2002, Lefevre 2003, EEA 2006, Comm. 2000

A cost advantage of liability systems arises as legal costs are incurred only in case of a lawsuit. If the system works well, in the sense that there are incentives for choosing the efficient level of care, there are few suits: thus the costs are low. However, as businesses bear the full responsibility for choosing the right actions to reduce their risks, they may face considerable (information) costs.

Category	Description	Faced by
<b>Formulation</b>	...for setting up the system as outlined above	Government
<b>Risk abatement</b>	...for getting informed on liability, and options to reduce environmental risks. ...for activities to reduce environmental risks	Private sector/ Polluter
<b>Legal costs</b>	...for suing the polluter	Damaged party
	...for setting up and maintaining legal system	Government
<b>Sanctioning</b>	...payment to the damaged party	Private sector/ Polluter

Table 4: Costs of implementing and maintaining environmental liability measures

## Success factors

While implementing environmental liability there are several factors to be considered:

Success factor	Issues to consider
<b>Business knowledge regarding risk abatement</b>	A liability system can be especially effective compared to more traditional legislation if businesses have an information advantage vis-à-vis public authorities on the benefits of abatement activities, the cost of reducing risks, and the probability and the severity of accidents.
<b>Probability of legal action</b>	A low likelihood with which the polluter would face a legal suit can render a liability regime less effective. This might be the case when the victims are widely dispersed and have few incentives to initiate a legal action, when harm appears only after a long delay, and when specifically responsible polluters are difficult to identify.
<b>Sufficient evidence on polluter and causal link</b>	There need to be one or more identifiable actors (polluters); the damage needs to be concrete and quantifiable; and a causal link needs to be established between the damage and the identified polluter(s). (Comm.2000, GTZ 1995, von Seth/Ott 2000).  The question of the burden of proof and acceptable defences for legal actions needs to be resolved (Comm.2000).
<b>Legal authority and efficacy</b>	A functioning, responsive legal system is required for establishing and implementing liability, including well-educated legal employees and low levels of corruption.
<b>Business capacity to compensate polluters</b>	Polluters may not be able to pay the full costs of an accident because of the insufficient assets. This problem especially arises the greater the probability or the severities of an accident, and the smaller the assets of the firm are relative to the potential damages.

Table 5: Success factors for environmental liability. Source: Porrini 2005

## Key Literature & Case Studies

**Boyer, Marcel/Porrini, Donatella (2002):** *The Choice of Instruments for Environmental Policy: Liability or Regulation?* in: Swanson, Timothy (ed.): *An Introduction to the Law and Economics of Environmental Policy: Issues in Institutional design*, Research in Law and Economics Series Vol.20, 2002

**Comm (2000):** White Paper on Environmental Liability, Commission of the European Communities, COM 2000 66 final, Brussels, 9.2.2000

**Porrini, D. (2005)** *Environmental policies choice as and issue of information efficiency*. Working Paper, Università degli Studi di Milano

**Lefevere, Jürgen (2003):** *Interactions of the EU Environmental Liability Regime*, Foundation for International Environmental Law and Development (FIELD), Final Draft, January 2003

Case Studies / Examples	Link
EU Environmental Liability Directive	<a href="http://ec.europa.eu/environment/liability/index.htm">http://ec.europa.eu/environment/liability/index.htm</a>
UK Directive on Environmental Liability, and a brief outline of existing UK liability regimes	<a href="http://www.defra.gov.uk/environment/liability/index.htm">http://www.defra.gov.uk/environment/liability/index.htm</a>
Techniques for environmental economic valuation	<a href="http://www.epa.qld.gov.au/publications?id=710">http://www.epa.qld.gov.au/publications?id=710</a>

## Case Study: EU Environmental Liability Directive

### What is the EU Environmental Liability Directive?

After the publication of a White Paper on environmental liability (COM(2000)66) and an intensive conciliation process among EU Member States, the European Parliament and Council approved the Directive on Liability for Damage to the Environment in March 2004. The Directive comes into force in 2007, by which time all EU Member States must have adopted legislation specifying liability for environmental damages, including damage to biodiversity in 2000 natural areas.

The legal basis of the Directive is the polluter-pays principle, and it is a step towards integrating environmental costs into production costs and in the prices of goods and services across Europe. The legal regime is a public law regime where compensation is decided by a 'competent authority'. As a consequence the general public or non-governmental organisations will have to submit their complaints to this competent authority that will decide if measures are needed.

### How does the EU Environmental Liability Directive work?

The EU Environmental Liability Directive:

- Covers liability for damage to water, land, animal and plant species and habitats.
- Covers concrete and quantifiable damage, including diffuse and multi-source pollution, where a causal link can be established between the damage and the identified polluter(s);
- Establishes that a damaged environment should, as a first priority, be restored to its (further specified) baseline conditions. If this is not possible, complementary and compensatory remedial action is required. In the case of the latter, a resource-to-resource or service-to-service approach must be used;
- Permits environmental evaluation, as a last resort, to be used to determine the extent of necessary compensatory remedial measures;
- Does not evoke any compulsory financing mechanisms such as insurance or central funds, but encourages Member States to promote the development of appropriate systems.

There are a number of exceptions where the Directive does not apply. Most noteworthy are exemptions for damage falling within the scope of a range of international conventions, e.g. on nuclear liability and liability for accidents happening in territorial waters.

The Directive specifies ways of remedying environmental damage. Primary remediation restores the environment to the same type, quality and comparable value, i.e. full restoration of the damaged environment. Complementary remediation, when full restoration of the damaged environment is not possible, requires the polluter to make other environmental goods and services available, e.g. by improving conditions in an existing habitat or creating a new natural habitat (forest, wetland, etc.) not necessarily connected with the polluted environment. Compensatory remediation requires the polluter to pay for measures to compensate for interim losses occurring before primary and complementary remediation has achieved its full effect.

### Evaluating the EU Environmental Liability Directive

The adoption of the Liability Directive and its implementation by 2007 are likely to induce several changes for concerned parties. Production decisions, including choice of technology, location of production and choice of production components, will be weighed more carefully against the risk of having to compensate for environmental damage and/or premiums to be paid to insurance companies.

The currently rather limited market for environmental insurance can be expected to develop significantly in the future. Insurers may as a consequence exert greater influence on production decisions in order to reduce the risk of accidents.

Research into and development of environmental technologies can be expected to increase. One approach envisaged is that insurers/governments will reward companies that spend resources on developing environmentally-cleaner production, for example by reducing insurance fees or fees to central funds.

The European Commission assumes that the new regime can also lead to behavioural change. Experience suggests that the threat of liability combined with market-based pressures from consumers, investors and other firms are significant motivators for operators to adopt more comprehensive environmental management systems (EMS), which leads to integrated approaches to including environmental concerns in business management. This would effectively strengthen not only the polluter-pays and precautionary principles but also the global principles of environmentally sustainable economic growth and decoupling of economic growth from environmental degradation.

### **Further information on the EU Environmental Liability Directive**

---

#### **European Commission of the European Communities – Environmental Liability Website:**

<http://ec.europa.eu/environment/liability/index.htm>

#### **Commission of the European Communities (2000): White Paper on Environmental Liability, COM (2000) 66 final, Brussels.**

[http://europa.eu.int/eur-lex/en/com/wpr/2000/com2000\\_0066en01.pdf](http://europa.eu.int/eur-lex/en/com/wpr/2000/com2000_0066en01.pdf)



### 3. Environmental Control and Enforcement



#### Definition and objectives

In this text, control of environmental impacts and enforcement of compliance with environmental legislation will be termed “environmental control and enforcement”. Environmental control and enforcement includes activities of the public sector to inspect companies or projects whether they comply with environmental regulation, laws and standards. It also includes authorities’ activities or services to grant permits to projects and operations. In addition, the “polluter” or party causing environmental impacts can apply self-control mechanisms to monitor environmental impacts.

Environmental control and enforcement therefore includes

- **Permitting** by authorities. Permit processes often include or require environmental impact assessments. The objective of permit processes is to judge, allow or reject projects or companies’ activities by a neutral body applying a standard set of criteria. The conditions when to give or refuse a permit need to be defined. Environmental impact assessments can provide important information on further requirements for inspection and control by authorities, and they can also provide baseline information to assess environmental impacts.
- **Inspection** of companies by inspectors of authorities: compliance with environmental regulation, laws and standards, and with environmental permits.  
Emissions and environmental impacts of ongoing operations can be checked directly by authorities – e.g. wastewater, air, waste generation or health and safety issues.
- **Control or checking of information** submitted by the private sector. Expert knowledge is required to check or control parameters relating to environmental impacts, and to allow acceptance or rejection of such information.
- Environmental control is linked to **environmental self-control** of companies ‡ voluntary agreements. Environmental self-control of companies can be covered through reporting via environmental management systems such as EMAS or ISO 14001. Control by authorities should not duplicate self-control mechanisms, but verify and strengthen such mechanisms.

Environmental control can also be linked to **environmental monitoring** since monitoring contributes to assessing environmental impacts.

Overall, control of environmental impacts through authorities should contribute to raising the resource efficiency of companies and of projects – the provision of advice should therefore be integrated into environmental control. Control should also help to achieve environmental policies and targets. Besides assessing compliance with environmental legislation, control can help to identify inefficiencies in companies, and it also contributes to a balanced market through equal application of environmental criteria.

#### Actors:

Environmental control has to be carried out by a party or body that is neutral/independent regarding the companies or projects to be inspected and/or assessed. The public sector is therefore responsible for control in most cases. The public sector is also responsible for environmental enforcement. It is also essential that the control is carried out by experts who know the business or projects in question. The public sector often lacks specific expertise. It is possible to share the tasks of environmental control and parts of enforcement with business associations, or with private actors acting for the public sector. The advantage of business associations is the specific expertise, and the trust of the companies. The possible lack of independence is a disadvantage.

In general, the polluter pays principle should be applied when developing financing schemes for control of environmental impacts, and for enforcement of environmental legislation. The costs of environmental control and enforcement (inspection, permits) are often carried by the public sector. The more self-control mechanisms are integrated, the more the private sector will carry the costs.

## Mode of operation

Step	Issues to consider
<b>Identify issues to be controlled</b>	Define the issues to be controlled. They might be medium-specific such as wastewater, air or noise pollution, or sector-specific and cross-media such as control of power plants, petrol stations or specific industries.
<b>Appraise the statutory basis for control and enforcement including indicators. If necessary, create or amend the statutory basis. (Legal framework)</b>	It is necessary to have a statutory basis for control and enforcement. The statutory basis should include indicators that help controllers to permit or reject activities. Such indicators need to be clear and measurable. Ideally, the statutory basis also contains the control system to be applied (see next steps). If a legal system is lacking or needs to be amended, it will take time before control and enforcement can be started. Self-control can help to bridge those gaps.
<b>Define control and enforcement system (actors, costs) (Institutional and organisational framework)</b>	Define the control and enforcement system. This involves all steps mentioned in this table. It is important to discuss the control and enforcement system with all parties involved – both the public and the private sector. Even though discussions might lengthen the process, they ensure that a system is defined which is supported by both the public and the private sector. Also, the expertise of the public and private sector should come together when defining a control and enforcement system.
<b>Decide upon the neutral/independent body as controller, and clarify the tasks of all actors.</b>	It is important to define who shall control, and who will enforce. It might be the authority, a business association or a private party (e.g. consultancy) that is paid by the public and/or private sector for the service of environmental control. It is important to clarify in this context the tasks of the authority, the controller (if different), and the companies.
<b>Define control of independent body</b>	It is necessary to define who will check the quality of the control by the independent body, and how it will be checked.
<b>Set up a financing scheme</b>	It is necessary to secure the funds for environmental control and enforcement. Often, authorities lack sufficient funds to ensure good environmental control and enforcement. Since the private sector also has an interest in functioning and adequate control and enforcement systems, it is important to define an efficient system and to secure financing. Through tax financing, the private sector indirectly funds the system. The private sector may also contribute directly to the costs of control (polluter pays principle).
<b>Secure expertise of controllers/ inspectors and of laboratories</b>	The persons that shall control or inspect need to have expertise both in technical and in environmental issues. It is important that the controller/inspector has sufficient expertise to perform his/her task (identification of problems, sampling). It is also important to have the necessary laboratory expertise (sampling, analytics). It is recommended to have a certification system to check the expertise of controllers/inspectors. Laboratories involved in environmental control should be accredited. Additional training and capacity development may be necessary before starting control.
<b>Document control</b>	Thorough and adequate documentation of control results is required. It is important to define who should have access to what kind of information at which stage.
<b>Evaluate control and enforcement system</b>	Does the control and enforcement system fulfill requirements and expectations? Is the system efficient, or can it be improved? – Improvements should be suggested and agreed upon with all involved parties.

Table 1: Steps and issues to be considered for establishing environmental control and enforcement

## Strengths & weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>■ Control and enforcement allow for equal assessment of projects and companies, and for application of laws and standards. They are therefore a basis for ensuring free and just competition.</li> <li>■ Control makes it possible to identify inefficiencies in production and businesses, and to eliminate those inefficiencies.</li> <li>■ Control by business associations has the advantage of trust and expertise.</li> <li>■ Control by business associations allows authorities to concentrate on “black sheep”.</li> <li>■ Control and enforcement by authorities contribute to environmental monitoring and to ensuring compliance with environmental policies and legislation.</li> </ul>	<ul style="list-style-type: none"> <li>■ Control and inspection requires practical expertise. However, official controllers/ inspectors have difficulty in obtaining this practical expertise.</li> <li>■ Control and enforcement often lack the aspect of advice. The aspect of advice on how to reach compliance with indicators should be strengthened. Control should contribute to raising resource efficiency.</li> <li>■ Control by business associations is more readily possible if environmental standards are already high.</li> <li>■ Control by business associations enlarges the distance between authorities and companies.</li> <li>■ Inadequate salaries of private or public controllers/ inspectors lead to a risk of corruption.</li> <li>■ Control and enforcement have a negative image and often imply a traditional understanding of confrontation between public and private sector.</li> </ul>

Table 2: Strengths and weaknesses of environmental control and enforcement

Category	Incurred by
<b>Control /inspection by independent body</b>	Authority or, through levies, by companies
<b>Control/certification/accreditation of controller/inspector/laboratory</b>	Authorities. Laboratories. Associations or bodies that wish to become involved in control/inspection (e.g. self-control: ISO 14001).
<b>Sampling and analytics</b>	Companies and/or polluters (vehicle owners, households) for their emissions. Sometimes authorities if it is in the public interest to carry out additional analyses beyond those necessary to assess environmental impacts (≠ environmental monitoring).
<b>Permits</b>	Authority, or through fees by private sector
<b>Self-control</b>	Private sector

Table 3: Costs associated to enacting environmental control and enforcement

## Success factors

- Participatory processes for laws and standards
- Qualified staff as controllers/inspectors (number, expertise, trust by companies). The qualification can be judged by a certificate. In general, a technical background is not sufficient to be qualified as controller/inspector.
- Qualified staff to assess requests for permits and environmental impact assessments.
- Analytical capacity of laboratory/ies for analyses
- Independence of controllers

- Controllers/inspectors can act as advisors. It is important that advice is available on how to fulfill legislation step by step. The controller does not have to provide this advice, but should be able to refer to a competent body.
- In company or project assessment, adaptations for improvement should be possible. Closing of companies or denial of projects should be limited to extreme cases. Otherwise, the best and most efficient solutions should be sought through negotiation and advice.

### Key Literature and Case Studies

---

European Union: European Network for the Implementation and Enforcement of Environmental Law (IMPEL): IMPEL Reference Book for Environmental Inspection. <http://ec.europa.eu/environment/impel/refbook.htm>

EU: Integrated Pollution Prevention and Control: The EU has a set of common rules for permitting and controlling industrial installations in the IPPC Directive of 1996. Under the IPPC, reference documents for best available technologies have been formulated. <http://www.ec.europa.eu/environment/ippc/>

International Network for Environmental Compliance and Enforcement (INECE): [www.inece.org](http://www.inece.org)

US Environmental Protection Agency: Environmental Compliance and Enforcement. <http://www.epa.gov/compliance/index.html>

EU: Waste-related conditions in environmental permits. Report. January 2005. Pdf for download on EU website. [http://ec.europa.eu/environment/impel/pdf/waste\\_report.pdf](http://ec.europa.eu/environment/impel/pdf/waste_report.pdf)

Evaluation von Branchenvereinbarungen im Kanton Zürich. INTERFACE Institut für Politikstudien, Luzern. April 2005. Baudirektion Zürich, Amt für Abfall, Wasser, Energie, Luft (AWEL) pdf-File.

### Case Studies / Examples

---

**Switzerland, Zurich:** Voluntary agreements of specific industries replace control/inspection by authorities: The control or monitoring of environmental impacts is carried out by business associations. See key literature.

---

**Morocco:** Voluntary agreement of the cement association APC (association professionnelle des cimenteries) with the Environment Ministry (Ministère de l'Aménagement du Territoire, de l'Environnement et de l'Eau). The cement manufacturers control their emissions and submit this information regularly to the ministry.

---



### 1. Environmental Taxes

#### Definition and objectives

Environmental taxes - or ‘eco-taxes’ as they are commonly called- are taxes with a potentially positive environmental impact (EEA 2006). They can be collected from businesses, consumers or any other organisation. They usually have both an environmental and a revenue raising effect. The environmental effect arises from internalising environmental costs (‘getting the prices right’) and implementing the polluter-pays-principle by inducing consumers and producers to adopt more environmentally compatible behaviour. The revenue effect is created by the additional governmental income through the new tax, although proposals to implement environmental taxes are often accompanied by reductions in other taxes or recycling of revenues to support environmental objectives. Furthermore the revenue effects tend to decrease over time with the environmental benefits increasing.

#### Mode of operation

While environmental taxes are primarily levied on businesses, they induce behavioural changes in all sectors, including the consumer, through transmitted price signals. All authorities with fiscal responsibilities, including local and regional governments, can in principle apply eco-taxes. The most effective level of government to apply eco-taxes will depend on the nature of the environmental problem to be addressed and its causes. For problems concerning only people in a clearly demarcated area, local eco-taxes can be applied whereas regional, national or international level problems will require involvement of higher levels of government.

A variety of parameters needs to be decided on when setting up an environmental tax:

Parameter	Issues to consider
<b>Tax base</b> <sup>1</sup>	Taxes can be applied to different activities, resources, emissions or goods. The tax base should be decided on according to policy objective and feasibility. For example, if emissions cannot be taxed directly due to monitoring problems, a “process input” tax can be a substitute.
	<b>Emission tax:</b> Payments are directly related to the measurement (or estimation) of the pollution (i.e. air or water pollution, land contamination, noise) caused (EEA 2006).
	<b>Product tax:</b> Payments are levied on the units of harmful substance contained in products: for instance, a carbon tax is based on the carbon content of each particular fossil fuel. The product tax may also be levied per unit of the product, if the objective is to reduce usage of the product generally (e.g. a tax on pesticides) (EEA 2006).
	<b>Natural resources:</b> Payments accrue according to use of natural resources, e.g. water, land, raw-materials, energy carriers, etc...
<b>Tax rate</b>	Setting the right tax rate is crucial and information either on price elasticity or the marginal damage inflicted by external effects is needed to set it right.
<b>Taxpayer</b>	Tax revenue can be collected at the level of businesses or private consumers. The person or organisation paying a tax may not necessarily carry the burden in the end, depending on how prices and markets react to the introduction of the tax. The point of intervention in the market will also need to be carefully selected in light of the capacity of targeted actors to act on the financial incentives to achieve the desired outcome.

<sup>1</sup> The following text mainly considers emission taxes, but similarly applies to other types of environmental taxes as well.

<b>Revenue allocation</b>	The collected revenue can either be channelled to the general budget or be allocated for a specific purpose. This “revenue earmarking” can be for environmental expenditures, for financing transition costs or for compensatory cross subsidies. Revenues raised can also be used to compensate for reductions in other less desirable taxes.
<b>Exemptions</b>	Some actors can be partly or fully exempted from the tax, e.g. due to concerns regarding redistribution between different groups or competitiveness of specific industries. As exemptions might compromise the efficiency of eco-taxes, they should be applied with care.
<b>Institutional setup</b>	Different governmental departments can be responsible for collecting the tax revenue, monitoring compliance and sanctioning in case taxes are not paid. An important consideration in the design of environmental taxes are technical emission measurement requirements, the number of targeted actors and opportunities for tax evasion, which can result in significant tax collection costs for government.

Table 1: Parameters for environmental taxes

The process of implementing an eco-tax can be characterised by five distinctive steps:

Step	Issues to consider
<b>Initial research and design</b>	The problem needs to be clearly identified and its causes understood. This is important to plan the right measures as well as to secure public support.
<b>Policy formulation</b>	Governments need to formulate a coherent policy framework embedding the eco-tax. It shall cover the main parameters as outlined below.
<b>Dialogue and information</b>	Dialogue with different stakeholders on the objectives and measures of the policy framework is needed to check the consistency and feasibility of the policy and raise support for its implementation.
<b>Enforcement</b>	Emissions need to be measured; the tax to be paid determined and collected. In cases of non-compliance, sanctions have to be imposed.
<b>Monitoring &amp; Revision</b>	Measures are required to check whether environmental and economic aims of the tax are achieved, and what corrective actions can be taken to improve the effectiveness of the tax. Eco-taxes need to be periodically revised, as environmental or economic conditions might change in a way that requires an adaptation of the policy.

Table 2: Steps and issues to be considered for establishing an eco-tax

## Strengths & weaknesses

Eco-taxes have both an environmental and a revenue effect. They are generally perceived as advantageous as they can achieve environmental goals in an efficient way, raise governmental revenue and simultaneously improve the tax structure of an economy. It should be noted however that tax revenues are likely to decrease as an eco-tax replaces a more traditional tax on goods or products and results in reduced pollution and in turn reduced tax revenues. Relatively high price elasticity can result in heavily reduced consumption after applying the tax. It is the nature of an environmental tax that the more effective it is the less revenue will be generated through it over time.

Strengths	Weaknesses
<p><b>Environmental goals are achieved at lower costs</b></p> <p>Environmental improvements happen in the best place and with the best technology that yields the environmental goal with the lowest costs. Practical experience confirms that eco-taxes indeed reduce the costs of achieving a given environmental goal, and this often enables more ambitious environmental goals than under command and control type regulation.</p>	<p><b>Reinforce informal economic activity</b></p> <p>In some cases eco-taxes can also reinforce informal economic activity. If tax revenues are collected from formal actors only, and government fails to control illegal or informal operators, imbalances might occur that favour additional informal activities (GTZ 2004c).</p>

**Promote long-term resource efficiency activities**

Eco-taxes promote long-term resource efficiency activities and provide continuous incentives for research in environmental technologies, especially if the businesses perceive the tax to persist in the long term.

**Mobilisation of revenue**

Especially for developing countries that have a small tax base and face difficulties in raising government revenues, eco-taxes can be an attractive option to mobilise government revenues and align environmental and economic goals.

**Reduce distortions**

Eco-taxes can be a relatively harmless way to raise government revenues in terms of economic efficiency, allowing reductions of other more harmful taxes that cause more distortions, especially taxes on human labour (Kerr 2001:6). Eco-taxes may thus help to make the tax structure more efficient, thereby raising national competitiveness and overall societal welfare.

**Evasive actions**

Re-locating activities to places outside of the regulated area remains probably the most frequent evasive action taken, leading to economic losses and undermining the environmental effect, especially as activities are likely to be shifted to a country with lower environmental standards.

**Illicit behaviour and corruption**

Companies can try to avoid the eco-tax by illicit behaviour, e.g. the falsification of pollution records or engagement in corruption with government officials.

**Information gaps and political influence**

In order for the policy to achieve its objectives in an efficient way, polluters from as wide a range as possible need to be included. This can be hindered by data gaps on emission sources and resistance from influential lobbies leading to potential exclusion of critical industry sectors or exclusion of a large informal economy from the tax.

**Contradictions with subsidies**

Eco-taxes can contradict subsidies provided for important but scarce environmental goods (like water) for social policy reasons<sup>2</sup>. An eco-tax in this case could be perceived as reducing redistribution and might face political opposition.

Table 3: Strengths and weaknesses of eco-taxes

	Before eco-tax	After eco-tax	Revenue effect of eco-tax
<b>Tax rate</b>	16%	20%	--
<b>Consumption</b>	1,000,000	500,000	--
<b>Revenue</b>	160,000	100,000	60,000 reduced revenue

Table 4: Example for decreasing tax revenue due to high price elasticity

Evidence shows the administrative costs of eco-taxes to be slightly above average when compared to other taxes. Eco-taxes being raised in conjunction with product taxes tend to have particularly low administrative costs, as existing structures for tax collection can be used. The costs related to an eco-tax can be summarised as follows:

Category	Description	Faced by
<b>Policy formulation</b>	...for establishing the tax system as outlined above	Government
<b>Abatement</b>	...for obtaining information on abatement options. ...for paying required eco-taxes and undertaking activities to reduce emissions	Businesses/ consumers
<b>Monitoring</b>	...for monitoring and reporting	Businesses
<b>Sanctioning</b>	...for assessing compliance and sanctioning	Government

Table 5: Costs associated with eco-taxes

<sup>2</sup> However, the redistribution element of subsidies might be low, non-existing or even negative even if perceived differently by society (World Bank 2005). Thus, while redistribution might be preferred from an environmental perspective, it might be advisable to use alternatives to subsidies on environmental goods, both for fiscal and environmental reasons.

## Success factors

Applying an eco-tax requires specific governmental resources and capabilities at different stages. Governments thus need considerable regulatory capacities, which makes eco-taxes an unsuitable substitute if regulatory policies have failed or are likely to fail due to a lack of enforcement capacity and/or political commitment.

First, the nature of the environmental problem needs to possess certain characteristics to be effectively addressed by an eco-tax:

- The impact caused by the emission should be the same or similar for each unit;
- The impact should be more or less uniformly distributed;
- It should not involve serious health problems for humans that need immediate action;
- The pollutant should be measurable in quantitative terms.

Second, general economic and political framework conditions need to be supportive of an eco-tax. This covers a range of legal, fiscal and economic issues, including capacities within governments. While some are directly under governmental influence and can be addressed in the short term, others require more long-term oriented action by governments:

Success factor	Justification
<b>Rule of law and low corruption levels</b>	...to ensure that tax revenue is actually collected and sanctions are applied. A large informal sector and incomplete record keeping of businesses can also result in implementation gaps.
<b>Proper enforcement of property rights</b>	...to give businesses an incentive to invest in pollution abatement installations.
<b>A functioning judiciary system</b>	...allowing governmental offices to get judicial support for imposing fines and giving third parties the possibility to sue businesses not in the state of compliance.
<b>Functioning reporting systems</b>	...to allow governments to determine the tax to be paid in a consistent manner. Incomplete information regarding the tax base can lead to inefficiencies and unequal treatment of different actors.
<b>Governmental capacity</b>	...is needed at all stages of the process described above. Governments need to gather sound data to set appropriate tax rates, handle the emission data submitted by companies and finally administer the revenue collection.

Table 6: Success factors of eco-taxes

## Key Literature and Case Studies

**GTZ (1995):** *Market-Based Instruments in Environmental Policy in Developing Countries: Framework for Policy Planning and Institutional Development in the Environment*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn 1995

**OECD DAC (2005):** *Environmental Fiscal Reform for Poverty Reduction*. DAC Guidelines and Reference Series, Organisation for Economic Co-operation and Development

**World Bank (2005):** *Environmental Fiscal Reform – What Should Be Done and How to Achieve It*. The International Bank for Reconstruction and Development / The World Bank

Case Studies / Examples	Link
Environmental taxes – EEA Reports on market-based instruments in Europe that contain a number of Case Studies on Environmental Taxes	<a href="http://reports.eea.europa.eu/technical_report_2005_8/en">http://reports.eea.europa.eu/technical_report_2005_8/en</a> <a href="http://reports.eea.europa.eu/eea_report_2006_1/en">http://reports.eea.europa.eu/eea_report_2006_1/en</a>
Clinch, J.P. and Gooch, M.: „Economic Instruments in Environmental Policy”	<a href="http://www.economicinstruments.com">http://www.economicinstruments.com</a>



## Case Study: Trade Tax Reductions for Cleaner Production at Municipal Level

### What are Trade Tax Reductions for Cleaner Production?

A proposal for trade tax reductions at the municipal level in Paraguay was put forth within the framework of a Technical Cooperation initiative between the MERCOSUR trade organisation and Germany. The MERCOSUR or “Common Market of the South” was founded in 1991 by Argentina, Brazil, Paraguay and Uruguay. The principal idea of this cooperation project is to promote cleaner production in cities and municipalities and thus create win-win situations whereby companies can reduce tax burdens while municipalities face reduced environmental pollution from industrial activities.

### How are the tax reductions designed to work?

In Paraguay, a major part of municipal revenue consists of a trade tax, paid by large industries based on their annual turnover. In close cooperation with three medium-sized cities - Caaguazú, Villarica and Coronel Oviedo - an economic instrument was designed that intended a step-wise tax reduction (to a maximum reduction of 20% of tax payable) for those industries that implement cleaner production programmes and can actually demonstrate measurable and independently verified results such as emission reduction, pollution minimisation or increased natural resource use efficiency.

The implementation of the instrument required a modification of the municipal tributary ordinances so that the reduced municipal tax income may be compensated within the framework of evaluation and verification procedures and related fees. On the whole, the design of the system provides advantages to enterprises that make steady advances under a cleaner production programme. The introduction of the tax reduction is required to be accompanied by awareness building, information and training measures for public authorities, industries and independent consultants.

### Evaluating the tax reduction model in Paraguay

Due to the early stage of project implementation an evaluation of the operation of the programme is neither existing nor possible. However, it is clear that political lobbying and awareness building are required in order to convince local politicians of the benefits of the model. Nevertheless the existing interest among different municipalities demonstrates that there is a demand for the model and that the chances of replication are good. Apart from environmental benefits and efficiency gains, the possibility of compensation for lower municipal tax revenues and the creation of local capacities for environmental management are crucial elements.

Good training and information work is necessary for successful application. Last but not least, a comprehensive monitoring system is important to guarantee the proper development of the instrument in its introduction phase. In the case of Paraguay a supporting factor has been the compatibility with the ongoing general decentralisation of environmental management that is being supported by, among others, the Inter-American Development Bank.

### Further information

#### Proyecto Competitividad y Medio Ambiente

Dr. Detlef Schreiber, Senior Advisor GTZ  
 c/o DINAMA, 11100 MONTEVIDEO, Galicia 1133, URUGUAY  
 Tel.: +598-2-9170710 int. 4108 / 4110  
 Mail: mercosurgtz@mercosurgtz.org  
 Homepage: www.mercosurgtz.org

See also the following publications, jointly edited by the MERCOSUR Working Group on Environment (SGT

No. 6 – Subgrupo de Trabajo Medio Ambiente) and the GTZ:

“Gestión Ambiental y Producción Más Limpia en el MERCOSUR – Logros Alcanzados en los dos Primeros Años del Proyecto Competitividad y Medio Ambiente” (2004, Spanish / Portuguese)

“Elementos de Política y Herramientas de Gestión Ambiental y Producción Más Limpia en el MERCOSUR” (2004, Spanish / Portuguese)

The joint project “Competitiveness and Environment” is carried out by the MERCOSUR Working Group for Environment and GTZ in close cooperation with the Working Group for Industry and private sector organisations. The objective of the project is to establish and implement a common strategy for cleaner and more efficient production patterns. Working areas include policy development, public-private cooperation as well as practical efforts and the exchange of experiences in cleaner production, resource efficiency and environmental management. Economic instruments and incentives are considered a key element, particularly to integrate environmental and economic policies and to address small and medium-sized enterprises (SMEs), which are a key target group.

The approach to market-based instruments under the project could be characterised as ‘down-to earth’ and oriented towards pragmatic mechanisms that can be implemented with relatively minor changes to existing legal frameworks and/or promotion schemes to make them work (more effectively) for sustainable production. Baseline studies on competitiveness and environment within MERCOSUR and at the member state level in 2002 / 2003 have shown significant differences between the countries and suggest a country-specific approach. Following experience sharing seminars between MERCOSUR countries, including expertise drawn from Chile and CEPAL, studies were launched at the national level in order to identify instruments that could be implemented within relatively short time.

With their differing situations the recommended instruments vary considerably from one country to another. The proposal for Argentina aimed at integrating cleaner production explicitly into existing SME promotion schemes. It was suggested that Uruguay should develop primarily market-based instruments in the areas of industrial waste water and solid waste, directly related with its general law on environmental protection. However, the approach in Paraguay described above aims at the municipal level and is coherent with general decentralisation efforts in environmental management. In addition to the mentioned instruments, soft incentives like cleaner production awards are promoted and at the MERCOSUR level the use of a future structural fund for the promotion of sustainable production was evaluated.

## Case Study: United Kingdom Landfill Tax

### What is the UK Landfill Tax?

---

The UK Landfill Tax was introduced by the government in October 1996 to help reduce the amount of waste being land filled in the UK, to promote re-use and recycling, and provide funding for research into more sustainable ways of managing waste.

It is a weight-based tax that applies to commercial and industrial waste as well as to municipal waste. There are different tax rates for active waste and inert waste. The initial tax rate was derived from assessments of external costs, and based on consultations with industry, local authorities and environmental groups.

Presently, the Landfill Tax generates between 500 and 600 million GBP annually. Of the amount collected, 6.8% is available each year for spending on approved projects through the Landfill Tax Credit Scheme. The Landfill Tax Credit Scheme encourages and enables landfill operators to support a wide range of environmental projects by giving them a 90 per cent tax credit against their donations to Environmental Bodies. The Department for the Environment, Food and Rural Affairs (DEFRA) also distributes funding for sustainable waste management projects through the WIP Fund (Waste Implementation Programme).

### How does the UK Landfill Tax work?

---

The tax is applied to all waste disposed at licensed landfill sites, although there are some exemptions. There are two tax rates: a lower rate of GBP 2 per tonne that applies to inert/inactive waste (typically construction waste) and a standard rate applicable to all other types of waste, originally GBP 7 per tonne, increasing by GBP 1 per tonne each year. From 2005/06, to help reach the targets of the Landfill Directive, the standard rate is set to rise by at least GBP 3 per tonne per year until it reaches GBP 35 per tonne. The rate in 2005 was GBP 19 per tonne.

To make the tax revenue neutral, its implementation was accompanied by reductions in employers' national insurance contributions. Some revenues have been earmarked for waste management research and investment projects in landfill areas.

The UK Treasury is developing mechanisms to earmark increasing tax revenues to help business address issues of waste management, in particular approaches to improve resource efficiency through waste minimisation.

### Evaluating the UK Landfill Tax

---

The introduction of the waste tax has significantly improved overall quality and quantity of available data. Design changes and a simultaneous increase in tax rates were made because the landfill tax did not affect household waste amounts when first introduced, since it provided no incentives for change of behaviour and householders have a limited capacity to prevent waste in absence of broader institutional changes (e.g. provision of recycling infrastructure). With the introduction of a Landfill Tax Credit Scheme it is now foreseen that government will initiate information projects on waste reduction potentials at the household level.

### Further information on the UK Landfill Tax

---

Defra, UK - Environmental Protection - Recycling and waste  
<http://www.defra.gov.uk/ENVIRONMENT/WASTE/topics/index.htm>





### 2. Fees and User-Charges

#### Definition and objectives

Public authorities levy fees and user-charges for services provided (e.g. effluent or refuse disposal), or where the revenue is used for a specific purpose (e.g. funding clean-up or abatement measures). They are collected from businesses as well as from private consumers. Payment of user charges depends on the individual benefit principle and attempts to link the amount paid to the benefits received by a particular individual or firm. Fees and charges can be applied by general government or by bodies outside the general government, such as an environmental fund or a water management board (OECD, 1999 in ETC/RWM, 2006).

Similar to taxes, fees and user-charges are implemented with a triple objective.

- First, setting a price for a good or service induces resource efficiency as people or organisations use it more efficiently, and limit their demand according to their willingness to pay. Clear price signals encourage the efficient use of environmental and natural resources and can address resource efficiency challenges like air emissions, packaging, waste management and water effluent.
- Second, fees and user-charges are used to finance government service or pay for the protection of the environmental good provided ('full cost recovery'). They form a significant base for revenue collection by public authorities, thereby relieving pressure on public budgets and also promote economic efficiency in governments' resource use. However, fees might be set below the full costs for social reasons (e.g. for potable water).
- Third, fees and charges reflecting accurate prices, i.e. costs, can promote accountability in the public sector. Efficiency requires that scarce resources are utilised in their best possible manner, with the price of any good being one of the most important sources of information. Proper use of charges can make clients aware of the costs of the services they receive and they will in turn motivate public administrations to improve their delivery efficiency and service.

#### Mode of operation

Different types of fees and charges may require firms or individual consumers to make payments either based on their individual behaviour or on a general estimate. Below is a table showing the different categories of user fees and charges and their description:

Type	Description
<b>User fees</b>	User fees are the most common way to recover costs for providing a service. They are charged for a particular benefit that an individual receives for using a resource or facility (e.g. water, sports complex, park entrance). The purpose of this kind of fee is to recover part or all of the cost of the service provided. They are also 'voluntary' in nature in the sense that they require the consumer to pay the extent to which he/she chooses to use the service. They are useful at the local level where user groups are easily identifiable.
<b>Effluent discharge fees</b>	Effluent discharge fees are usually levied on industrial facilities and are based on the volume and content of pollutants or wastes that are discharged into water, air or soil. Under this system, any discharger is required to pay for every unit of pollution discharged into water, air or soil. Also called pollution related charges they are widely used to cover costs in pollution abatement, household solid waste collection, hazardous waste and government costs for industrial permit administration.

<b>Regulatory fees</b>	Regulatory fees are charged to regulate activities for the public good that are especially linked to health, safety or other protective purposes. This kind of fees applies to activities like restaurant inspections, land use or building permits. Individuals paying these types of fees do not directly benefit from the services provided but the wider public does benefit through overall improved environmental protection.
<b>Non- Compliance fees</b>	Non-compliance fees are payments imposed on polluters who fail to comply with environmental or natural resource management requirements and regulations. They are also referred to as “fines” or “penalties”, and they can be proportional to selected variables, such as damage due to non-compliance or profits linked with non-compliance (UNEP, 2006).
<b>Product charges</b>	Product charges are levied on products considered problematic or harmful to the environment either through their manufacture, consumption or disposal (e.g. fertilizers, batteries, pesticides). The aim of this charge is to design a real price of the product that includes the costs of collection, disposal and treatment. Product charges are used to finance return-collection and recycling systems and discourage inappropriate disposal.
<b>Impact Fees</b>	Impact fees are a relatively new phenomenon and refer to cash payments by developers to local governments to offset the strain their developments may create on roads, schools and other infrastructure.

Table 1: Different types of fees and user-charges

## Strengths & weaknesses

The implementation of fees and user-charges to promote resource efficiency has some distinctive strengths and weaknesses, some of which are highlighted below:

Strengths	Weaknesses
<p><b>Strong incentives for resource efficiency</b> Emission charges can provide strong incentives towards resource efficiency, e.g. by discouraging emissions, waste generation and use of environmental resources. Through the price mechanism, fees and charges address the financial interest of the target groups.</p> <p><b>Cover governmental expenses</b> Government service providers are often under-funded, and their deficits have to be covered by general government budget. Full cost recovery can make these institutions financially self-sustaining, thus freeing money for other expenses.</p> <p><b>Easy to monitor</b> Generally, charges are applied to point sources, which are relatively easy to monitor. Charges may also be applied to non-point sources such as farms and urban areas. Administrative and service fees are comparatively easy to collect.</p> <p><b>Reward careful users</b> Individual fees and charges reward careful and efficient users of governmental services or environmental goods and avoid the problem of indirectly subsidising wasteful users. Appropriately designed user charges may constitute an important element in achieving a ‘fair taxation’ system.</p>	<p><b>Vulnerable to illicit behaviour and corruption</b> Illicit behaviour, e.g. the falsification of pollution records or involvement of government officials in corruption can distort the collection of fees and user-charges.</p> <p><b>Social considerations</b> Charging for services previously provided on a free basis can lead to concerns about the accessibility of services to the poor, with water user-charges being among the most debated issues. Concerns exist that charges might be borne at disproportionate levels by the poor, depending on the concrete pricing mechanism. A solution is to apply fees only above a certain level of usage volume.</p> <p><b>Trade-off between social issues and environmental effectiveness</b> Political considerations regarding social consequences of charges may lead to charge rates that do not cover the actual costs of the service provided and/or which are insufficient to have a significant impact on resource efficiency improvements.</p> <p><b>Managerial interest and attitude</b> Fees and user-charges can conflict with the interest of public service providers, as they cause opposition among their clients, require organisational adaptations, and lead to accountability pressure. If charges reduce demand for services, public service providers will lose clients, budgets and influence.</p>

Table 2: Strengths and weaknesses of fees and user-chargers

The cost of user fees and charges depends on the type of charge levied, but generally tends to be rather low when compared to other economic instruments. The cost categories related to a user fee/charge policy are summarised as follows. The actual charges themselves are not included as costs.

Category	Description	Faced by
<b>Policy design</b>	...for establishing the fee or user-charge ...for collecting fees and user-charges	Government
<b>Compliance</b>	...for gathering information to adapt behaviour to new price signals	Private sector/ Polluter / Consumers
<b>Monitoring and Sanctioning</b>	...for assessing compliance and sanctioning non compliance	Government

Table 3: Costs associated with fees and user-charges

## Success factors

For successfully designing and implementing fees and charges, there are several factors to be considered:

Success factor	Description
<b>Consultation with users and target groups</b>	When introducing a charge or fee or significantly altering existing fees, users and target groups should be consulted in a transparent manner. This will enable users to understand the rationale of the charge and avoid misunderstandings. The views of users can be useful in designing and implementing an effective and efficient user fee/charge system. Also, public service providers should regularly and systematically seek the views of service users in order to better understand their service needs.
<b>Monitoring, reporting and revenue collection</b>	An effective, efficient and transparent system for monitoring and reporting and the collection of revenues is the basis for the functioning and credibility of the system. The entire process should be safeguarded against corruption and other illicit behaviour to the greatest extent possible. Designing the process of implementation in a simple, rational and less complex manner can reduce administrative costs for collecting the fee or user-charge.
<b>Full cost and effectiveness</b>	Before setting a fee or charge rate, the full cost of providing the service that is subject to a charge needs to be determined. This costing should be carried out regardless of whether the intention is to fully or partially recover the cost of providing the service.
<b>Appropriate pricing</b>	Pricing should be based on competitive market prices, and the principle of full cost recovery for each service (this may also include remediation and environmental protection measures) should be applied unless there is a clear rationale for fees different than full cost recovery (e.g. for vital resources such as potable water).  Consideration should be given to differentiate prices for peak and off periods in order to spread the demand and reduce infrastructure needed to meet peak use periods.  Charging fees for one service can have a significant impact on the demand for substitute services if they are not subjected to a similar price. Consideration therefore needs to be given to charges for substitute services.
<b>Equity Considerations</b>	Implementing user fees and charges should recognise and consider reduced charges for users where full cost recovery would mean an 'excessive financial burden' on individual users. This may be relevant especially for low-income individuals, smaller entities and users located in remote areas. The criteria for applying lower charges should be clear and explicit. Differentiated fees or charges might be considered, e.g. setting fees that are to be paid once a certain usage or consumption level of the provided service or good is passed.

<b>Finance transition period</b>	Provisions should be made to allow users to adequately change their behaviour as a response to the fee or user-charge introduced. Finance might be provided to small and medium sized enterprises to allow them making investments in resource efficiency measures as a response to a newly introduced charge.
<b>Revenue Treatment</b>	The revenues raised should be classified as offsetting receipts so as to illustrate that users are paying a charge in return for a specific service whose responsibility for revenue management rests with the organisation. Consideration should be given to flexible budgetary arrangements for organisations financed by user charges. This would allow users to respond to increased service volume by allowing similar increases in expenditure and user charging receipts.

Table 4: Success factors of fees and user-charges

### Key Literature and Case Studies

- ETC/RWM (2006):** *Economic instruments to promote material resource efficiency*. Main report from phase 1
- OECD (1998):** *Best Practice Guidelines for User Charging for Government Services*. PUMA Policy Brief No. 3. Available at [www.oecd.org/dataoecd/19/38/1901769.pdf](http://www.oecd.org/dataoecd/19/38/1901769.pdf)
- UNEP (2006):** *Financing for the Environmental Conservation of the Red Sea and Gulf of Aden* (PERSGA)

Case Studies / Examples	Link
Congestion Charging in London, Great Britain	<a href="http://www.cclondon.com/">http://www.cclondon.com/</a>
Waste Water Charge Germany	<a href="http://www.umweltbundesamt.de/water/themen/gwr.htm">http://www.umweltbundesamt.de/water/themen/gwr.htm</a>
Further list of examples on fees and user-charges can be found at:	<a href="http://www.economicinstruments.com">http://www.economicinstruments.com</a>





### 3. Certificate Trading

#### Definition and objectives

In certificate trading systems governments establish a maximum quantity of emissions to the environment in a region and issue certificates or permits allowing certificate holders to emit pollutants or the use of environmental goods up to the defined maximum. Firms may only emit pollution for which they hold certificates and certificates can be freely traded among firms. By purchasing additional certificates, firms may increase their emissions beyond the limit set out in their initial allocation of certificates. Since the number of certificates available is limited, firms selling certificates must reduce their emissions beyond the level in their initial permit allocation. Trade occurs between certificate holders who have different costs and opportunities for reducing their emissions with the result that pollution abatement occurs where it is achievable at the lowest cost.

Certificate trading has been applied to a large degree as an instrument to reduce air pollution (US-EPA 2003: 2-1), and the following description largely deals with certificate trading applied with this objective. However, the instrument can be used to address a wide range of problems as shown in the first step in the implementation process below, with most of the issues raised here equally applying.

#### Mode of operation

Different kinds of players are normally involved in certificate trading systems, such as governmental agencies, private companies, certificate brokers and others. Whereas governmental agencies are primarily responsible for setting up the framework for certificate trading, companies and brokers are mainly engaged in the following market activities.

Figure 1 provides an overview on how the involved players relate to each other:

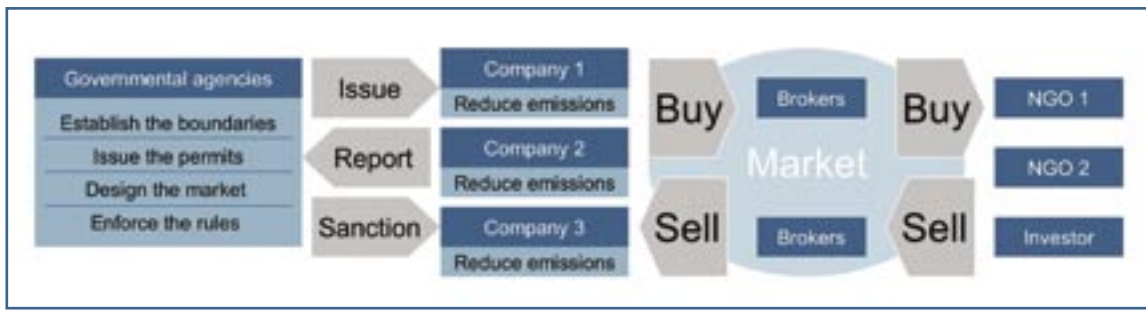


Figure 1: Different actors in a certificate trading system

Governmental agencies normally lead the process of setting up a certificate system. Generally this occurs in five major steps:

Step	Issues to consider
<b>Establishing the boundaries</b>	<p>Government decides what shall be covered by the certificates, e.g.:</p> <p><b>Emissions</b>                      Certificates can entitle the holders to emit a certain amount of measured (or estimated) pollution (i.e. air or water pollution, land contamination, noise).                      Emissions are suitably addressed by a certificate trading system if the impact caused by the emission is the same or similar for each unit, is more or less uniformly distributed and does not involve serious health problems for humans that need immediate action.</p>

	<p><b>Usage rights</b> Certificates that entitle land use (e.g. for tourism construction), use of governmental infrastructure, and may cover hunting or fishing rights.</p> <p><b>Natural resources</b> Provide certificate holders with the right to extract or use a certain resource, e.g. water, fuels, timber, metals, other raw materials, etc...</p>
<b>Setting up the system</b>	<p>This entails who shall be subjected to the certificate trading, the quantity of certificates issued, dates for implementation of the programme and penalties for non-compliance (US-EPA 2003:3-2). Other issues for consideration include whether emission limits will be reduced over time (necessitating a retirement of issued certificates) and the geographical scope of the system.</p> <p>It also needs to be decided if additional certificates are to be issued under certain circumstances. For example, carbon credits can be granted for re-forestation that binds carbon emission and thereby creates a 'carbon sink' (Australian Greenhouse Office 1999c).</p>
<b>Issuing the certificates</b>	<p>In the beginning the certificates need to be allocated among the participants. Different mechanisms can be used to do this (Tietenberg 2003:410):</p> <p><b>Auctions</b> Certificates are allocated in a public auction where the highest bidders get certificates. Auctions lead to revenue raised for the issuing authorities.</p> <p><b>Grandfathering</b> Certificates are allocated due to past emission levels of the participants in a certain reference period.</p> <p><b>Random access</b> Certificates are allocated via a 'lottery'.</p> <p><b>First come, first serve</b> The first applicants get the certificates.</p>
<b>Designing the market</b>	<p>Procedures and rules for trading the certificates need to be set. It has to be decided who can trade and on what terms. This can include spatial restrictions to trade, and rules for transactions of trading emissions in one period against emissions in former or future periods ('banking'). Institutions eligible for serving as brokers have to be selected. It has to be decided who is responsible for monitoring the market activities and take actions to ensure proper functioning.</p>
<b>Enforcing the rules</b>	<p>Emissions need to be measured and reported. In case certificates do not cover emissions at specific emission sources, sanctions need to be imposed by the authorities.</p>

Table 1: Steps and issues to be considered regarding certificate trading. Source: Adopted from Australian Greenhouse Office 1999a, OECD & EEA 2005

## Strengths & weaknesses

Certificate trading can achieve environmental goals with certainty and at low costs – with the condition that the trading system has to function properly. The benefits and weaknesses of a certificate trading system are summarised in the table below:

Strengths	Weaknesses
<p><b>Environmental goals are achieved at lower costs</b> Environmental improvements happen in the best place and with the best technology that yields the environmental goal with the lowest costs. Practical experience confirms that trading systems indeed reduce the costs of achieving a given environmental goal, and this often allows more ambitious environmental goals than under direct regulation (Tietenberg 2003).</p>	<p><b>Reliance on other policy instruments</b> Certificate trading relies on government's capacity to sanction businesses in case of non-compliance. Consistent measurement and enforcement of compliance rules has proven necessary for programmes to yield the environmental and economic benefits envisioned.</p>

**Promote long-term resource efficiency**

Trading systems promote continuous resource efficiency improvements and research in environmental technologies, especially if the number of certificates is reduced in a predictable manner over time.

**Certainty to achieve environmental goals**

The government can set the amount of certificates autonomously. The level of emissions cannot exceed the amount of certificates if actors are compliant, even with unexpected economic growth and new emission sources.

**Freedom of allocation**

The efficiency of the instrument does not depend on how certificates are initially allocated. The allocation mechanism can thus be used to reach other political goals: Auctions can be used to raise government revenue; grandfathering can help to buy political support from businesses. Certificates, e.g. fishing rights, can also be allocated to local communities for giving them ownership of local natural resources and strengthen their position vis-à-vis large businesses.

**Functioning market for certificate trading required**

Markets for certificate trading work only if sufficient supply and demand of certificates exists and is expected to exist in the future.

**Evasive actions**

Re-locating activities to places outside of the regulated area remains probably the most frequent evasive action taken, leading to economic losses and undermining the environmental effect, especially as activities are likely to be shifted to a country with lower environmental standards.

**Increasing concentration**

Better-capitalised businesses can buy out smaller certificate holders and thereby gain undue market power (Tietenberg 2003). When applying grandfathering rule to initially allocate the certificates, new market entries can be hindered, as the businesses entering the market need to buy certificates that were issued to established businesses for free.

Table 2: Strengths and weaknesses of certificate trading. Source: Tietenberg 2003, UNEP 2004

A certificate trading system imposes different category costs such as:

Category	Description	Faced by
<b>Set-up</b>	...for setting up the system as outlined above	Government
<b>Abatement</b>	...for activities to reduce emissions	Businesses
<b>Market operation</b>	...for trading certificates in the market. ...for running the market and keeping records ...overseeing market transactions	Businesses Brokers Government
<b>Monitoring</b>	...for monitoring and reporting emission levels	Businesses
<b>Sanctioning</b>	...for assessing compliance and sanctioning	Government

Table 3: Costs associated with certificate trading

As the certificate trading system reduces the abatement costs occurring when implementing technological and organisational changes to reduce emissions, parts of these savings can be used to finance costs for setting up and running a certificate trading system on both business and government side. Site owners can be required to pay for monitoring equipment or pay a fee per certificate to cover government expenses (for examples see Tietenberg 2003, p. 404).

**Success factors**

General economic and political framework conditions need to be supportive of certificate trading. This covers a range of legal, fiscal and economic issues, including capacities within governments. While some are directly under governmental influence and can be addressed in the short term, others require more long-term oriented action by governments. Some basic conditions are summarised below:

Success factor	Issues to consider
<b>Rule of law and low corruption levels</b>	...to ensure that sanctions are actually applied. A large informal sector and in-complete record keeping of businesses can also result in implementation gaps.
<b>Proper enforcement of property rights</b>	...to give businesses an incentive to invest in pollution abatement installations.
<b>A functioning judiciary system</b>	...allowing governmental offices to get judicial support for imposing fines and giving third parties the possibility to sue businesses not in the state of compliance.
<b>Functioning financial systems</b>	...as the basis for establishing a functioning market for certificates. If business actors lack experience with formal financial institutions, markets are going to be small with few transactions taking place.
<b>Functioning reporting systems</b>	...as governments are unable to control all emission sources, they need to rely on functioning reporting systems where businesses report their emissions together with other data.
<b>Governmental capacity</b>	...is needed at all steps of the process described above. Governments need to gather sound data to set appropriate emission limits, handle the emission data submitted by companies and finally administer the fines.

Table 4: Legal, fiscal and economic conditions needed for the functioning of certificate trading systems (from UNEP 2004)

## Key Literature and Case Studies

**Australian Greenhouse Office (1999a-d):** *National Emissions Trading: Establishing the boundaries*. Discussion paper Series (1-4), Commonwealth of Australia, Canberra.

**OECD & EEA (2005):** *OECD/EEA database on environmentally related taxes, fees and charges, other economic instruments and voluntary approaches used in environmental policy and natural resources management*. <http://www2.oecd.org/eoicst/queries/Main.htm>, accessed 2 February 2006

**Tietenberg, T. (2003):** *Environmental and Natural Resources Economics*, 6th edition, Boston: Addison Wesley.

**UNEP (2004):** *The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges*. United Nations Environment Programme

**US-EPA (2003):** *Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control*. United States Environmental Protection Agency, Office of Air and Radiation

Case Studies / Examples	Link
European Union Emission Trading Scheme (EU ETS)	<a href="http://ec.europa.eu/environment/climat/emission.htm">http://ec.europa.eu/environment/climat/emission.htm</a>
International Emissions Trading Association	<a href="http://www.ieta.org">http://www.ieta.org</a>
US Environmental Protection Agency – Allowance Trading System	<a href="http://www.epa.gov/airmarkets/trading/">http://www.epa.gov/airmarkets/trading/</a>

## Case Study: European Union Greenhouse Gas Emission Trading Scheme

### What is the EU Greenhouse Gas Emission Trading Scheme?

The European Union Emission Trading Scheme (EU ETS) is the largest multi-national, greenhouse gas emissions trading scheme in the world. The ETS is the main EU tool for reaching the Kyoto Protocol objective of a reduction of 8% CO<sub>2</sub> equivalent (336 Mt CO<sub>2</sub> equivalent) by 2012 relative to the 1990 baseline for 15 EU member states. The ETS was established through binding legislation proposed by the European Commission and approved by the participating member states and European Parliament. The ETS commenced operation on 1 January 2005.

### How does the EU Greenhouse Gas Emission Trading Scheme work?

Under the ETS, each participating country proposes a National Allocation Plan (NAP) including caps on greenhouse gas emissions for power plants and other large point sources. The European Commission must approve each NAP which determines the quantity of CO<sub>2</sub> emissions granted by Member States to domestic companies. The allocations can then be bought or sold by the companies concerned. The logic of the system is that by creating scarcity through the allocation of CO<sub>2</sub> emission allowances within the energy and industrial sectors a functioning market will develop where emitters with high abatement costs can purchase emission rights from emitters with lower abatement costs and reductions are made at the least overall cost. The European Commission assessment of the NAPs is based on 12 common criteria established in the Directive on Emission Trading. Criterion 1 for example provides that the proposed total quantity of allowances must be in line with a Member State's Kyoto target.

The ETS consists of two phases. In the first phase (2005-2007) the EU ETS includes CO<sub>2</sub> emissions alone from some 12,000 installations covering energy activities, production and processing of ferrous metals, the mineral, pulp & paper and board industries, representing approximately 45% of EU CO<sub>2</sub> emissions. The second phase (2008-12) is to cover not only CO<sub>2</sub>, but all greenhouse gases.

In order to ensure equity among affected industries, various measures have been implemented including base year periods, different methods for allocation among sectors, the presence and absence of auctioning processes, careful treatment of new entrants and rewards for early action. Initial allocation of allowances in all countries was done without charge (i.e. grandfathering).

### Evaluating the EU Greenhouse Gas Emission Trading Scheme

Experience under the greenhouse gas trading scheme is too limited to draw reliable conclusions concerning the environmental and cost effectiveness of the scheme. Concerning the performance of the start-up and learning phase (2005 – 2007) the European Environment Agency projects that the EU as a whole will meet its Kyoto Protocol commitment, although this assumes that several member states will overreach their specific targets to compensate for others who are unlikely to meet their national level goals. Many Member States will be relying on the Kyoto Protocol's flexibility mechanisms -the Clean Development Mechanism (CDM) and Joint Implementation (JI).

Working groups (established under the European Climate Change Programme) consisting of government officials and representatives from business and NGOs identified cost-effective measures to reduce greenhouse gases that could be achieved at roughly 20 /t CO<sub>2</sub>e. The working groups also considered the social cost of not controlling CO<sub>2</sub> emissions. While recognising the difficulties in assessing the damage cost the European Commission recently indicated that CO<sub>2</sub> damage costs can range from 14 to 80 /t CO<sub>2</sub>e, which provides an indication of the cost effectiveness of the CO<sub>2</sub> reduction measures.

An example of a significant positive impact of the ETS is the development of a carbon market. As a result of this market, a whole range of businesses has emerged in Europe including carbon traders, carbon finance specialists,

carbon auditors and verifiers. New financial products such as carbon funds have emerged on the market. Trading data show carbon prices rising from a low of around 7 /t CO<sub>2</sub> in early February 2005 to a high of 29 /t CO<sub>2</sub> in early August 2005 and falling once again in April 2006 to 13 /t CO<sub>2</sub>.

Some important variables inevitably remain outside the control of policymakers. One example is the effect of dramatic price increases for natural gas causing many ETS installations to switch to coal and increasing the demand for carbon allowances which in turn affects the trading system. Drought conditions in Spain have also caused many hydroelectric generators to switch to fuel burning, which has also created additional demand for CO<sub>2</sub> allowances.

### Further information on the EU Greenhouse Gas Emission Trading Scheme

European Commission 2005: EU action against climate change; EU – emission trading an open an open scheme promoting global innovation,

[http://europa.eu.int/comm/environment/climat/pdf/emission\\_trading3\\_en.pdf](http://europa.eu.int/comm/environment/climat/pdf/emission_trading3_en.pdf)

European Union Press Releases: Questions & Answers on Emissions Trading and National Allocation Plan <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/05/84&format=HTML&aged=1&language=EN&guiLanguage=en>

University of Virginia in collaboration with PEW Centre on Global Change. (2006): Early Observations on the European Unions Greenhouse Gas Emission Trading Scheme: Insights for United States Policy Makers, <http://www.pewclimate.org/docUploads/Early%5FObservations%5Fon%5FEUETS%5FThomson%2Epdf>

European Commission, Ecofys and McKinsey 2005: Review of EU emission trading scheme, Survey Highlights, [http://europa.eu.int/comm/environment/climat/pdf/highlights\\_ets\\_en.pdf](http://europa.eu.int/comm/environment/climat/pdf/highlights_ets_en.pdf)

WWF and Öko-Institut (2005): The environmental effectiveness and economic efficiency of the European Union Emissions trading Scheme: Structural aspects of allocation; [http://assets.panda.org/downloads/okoinstitutetal\\_2005\\_euetsstructuralanalysisexecutivesummaryfinal.pdf](http://assets.panda.org/downloads/okoinstitutetal_2005_euetsstructuralanalysisexecutivesummaryfinal.pdf)



### 4. Environmental Financing

#### Definition and objectives

Environmental financing is an instrument used for promoting environmentally beneficial measures through financial institutions or independent funds. Loans and/or grants are provided to fully or partially finance measures beneficial to the environment on more favourable terms than those in the prevailing market. Such measures are usually initiated through programmes of governments or credit lines of donor agencies with the necessary resources to provide the financial resources for such a scheme.

In general, financing should be provided only for the following project situations: (a) improvement of already existing, still polluting or inefficient facilities, if no environmental standards exist or the actual enforcement of existing standards has started or enforced standards were made stricter; (b) selected new or any other pilot projects, if they comply with significantly stricter environmental standards as required; (c) new or existing facilities, where new technologies are being implemented which impose risks great enough to deter investors.

New conventional projects should in all cases be required to meet existing environmental standards according to the “polluter-pays-principle” and should not be eligible for preferential financing.

The main objectives of environmental financing are:

- To promote investments in direct reduction of actual environmental pollution or implementation of cleaner and resource-efficient technologies - this may include industrial activities as well as investments for resource-efficient buildings.
- To disseminate knowledge of environmental investments and stimulate application of cleaner processes and end-of-pipe pollution abatement technologies.
- To assist countries where required to broaden their environmental policy mix through the introduction of environmental financing and thereby support their pursuance of improved environmental targets.

As environmental financing is implemented through the financial sector, an additional impact would be to broaden the services of the domestic financing market. Environment ministries usually do not focus on or bear direct responsibility for a general improvement of the financial sector, but may provide funds. As in many cases a well-developed financial sector is not in place, it may be necessary to assist interested financial institutions entering into this new lending field. Objectives of providing assistance should be to create an enabling economic environment capable of providing long-term financing and to establish a financing structure over time where the necessary funding to subsidise lending will come from sources other than donor agencies.

The actors involved in the establishment and operation of environmental financing reflect the differing objectives of this instrument and can be grouped on three hierarchical levels:

- The environmental ministry (possibly in cooperation with a donor agency) and if required the ministry responsible for the financial sector
- The financial institution (FI), preferably a promotional, development or APEX bank, which provides financing directly to clients or via retail or commercial banks, the environmental authorities (if engaged in the appraisal of individual project applications) and consultants to assist the FI or other banks in appraising and monitoring investments.
- Clients of the FI or the retail banks, i.e. sub-borrowers who are the direct final beneficiaries that will apply the funds toward qualifying investments, and consultants or equivalent assistance to support the clients particularly in identifying and planning the intended measure.

If financing is provided through an independent fund, as is the usual case for grant mechanisms, additional organisations might be involved.

## Mode of operation

Several steps are necessary to consider when establishing an environmental financing initiative:

Step	Issues to consider
<b>Identification of the environmental problem(s) to be solved</b>	<p>Before establishing a specific environmental financing programme, it is necessary to identify the primary environmental problems to be addressed. Environmental monitoring systems are one mechanism to provide information for identifying priorities. Where specific additional information is required, targeted surveys can also be undertaken. Industry associations could also be a good source of information, but it is difficult to obtain relevant data from companies. Analysing efforts should avoid focussing on the type, level and area of pollution alone but should also consider resource efficiency, which can be an underlying problem for environmental challenges. Additionally the potential for multiple causes of environmental problems should be considered.</p>
<b>Defining the policy approach of the environment ministry</b>	<p>The government must decide:</p> <ul style="list-style-type: none"> <li>■ Whether voluntary environmental improvements initiated through such a programme are considered sufficient to achieve a certain target.</li> <li>■ Whether preferential financing measures shall be combined with stricter enforcement measures.</li> <li>■ On the degree to which dissemination of more efficient or new cleaner technologies should be stimulated and the threshold for entrepreneurial risk needed to qualify for access to funds.</li> <li>■ If legislation is necessary to govern the environmental fund.</li> <li>■ About the source of the necessary financing and how it will be secured (general budget, fees, donor funds).</li> </ul> <p>In addition, responsible key actors should analyse if alternative economic instruments such as tax incentives or preferential import duties could be more effective or act in a complementary role in reducing environmental impacts.</p>
<b>Identifying the appropriate financial institution and structure of the financing and implementation concept</b>	<p>Because of the importance of the financial institution in the operation of the environmental financing, competent financial institutions with an interest in broadening their portfolio should be carefully selected. The central issues when structuring environmental financing are to determine the level of subsidies to be provided (in total and for individual credits), the form by which financing will be provided (a decision principally between whole or partial investment grants, preferential interest rates for loans or a combination of both) and the distribution of currency exchange risks. The appraisal of credit applications can be fully undertaken by the financial institution or, particularly where non-repayable grants are provided, in partnership with the environment authorities.</p>
<b>Marketing of the financing facility, training and advisory services</b>	<p>It is necessary to inform the clients of the financial institution of the intention and approach of available financing opportunities. The financial institution (or involved retail banks) should have the necessary network of affiliates and a motivated staff (internal incentives may also be necessary). There may be a need for advisory services for an initial period to build capacity among inexperienced financial institutions in particular for project appraisal and monitoring activities. Advisory services may also be needed over a longer time frame to provide assistance to potential clients to identify investment opportunities and for preparing applications for credit.</p>
<b>Monitoring implementation and evaluation of environmental impacts</b>	<p>Existing environmental monitoring (and measuring) systems should be assessed with respect to whether an evaluation of the environmental financing initiative is possible. Where deficiencies are identified, appropriate changes should be made.</p> <p>Although it is not the usual task of financial institutions or banks to take responsibility for environmental monitoring activities, they can exercise a control function over the use of the funds provided. Financial support for companies may be necessary in order to promote monitoring of impacts.</p>

Table 1: Steps and issues to be considered when implementing environmental financing



## Strengths and Weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>■ Sub-borrowers are likely to respond to environmental financing measures more favourably than to traditional state driven command-and-control approaches.</li> <li>■ Environmental financing initiatives could be combined with time-limited exemptions for compliance with certain environmental standards.</li> <li>■ An environmental financing initiative could act as a start of subsequent national environmental financing schemes.</li> <li>■ Access to credit, particularly for SMEs, is usually made possible if the credit line is appropriately backed up by the financial institution, the state or donors which may support innovation among SMEs.</li> <li>■ Financing terms can be flexible with respect to interest rates, repayment and grace periods, and the portion of project cost financed as a grant as well as timing of disbursement.</li> <li>■ Environmental financing can help companies to keep their competitiveness in case of stricter environmental standards or increase it by realising cost savings through more efficient use of resources.</li> </ul>	<ul style="list-style-type: none"> <li>■ Only creditworthy clients have access to such financing. - Candidates deemed unworthy of credit often lack resources to adequately improve their operation in a manner that does not threaten the environment.</li> <li>■ Companies serving local markets without high competition may not perceive a need to increase efficiency or reduce pollution and therefore may not show interest in an environmental financing scheme.</li> <li>■ Incentives for companies to make use of such financing are also low if environmental standards are not enforced, or if input resources are heavily subsidized (→ success factors).</li> <li>■ If the subsidy from such credits and grants is large, intensive control of the end uses of financing is necessary to reduce the risk of misuse. This control can lead to extra cost.</li> <li>■ Voluntary actions supported by the credit line may be insufficient to achieve compliance with environmental threshold levels.</li> <li>■ Lending policy should not exclude larger companies given their comparatively high potential for environmental impacts. However the absence of a maximum ceiling for individual credits or grants may result in a small number of large projects receiving a majority of the available funding.</li> <li>■ There is a certain degree of doubt, whether it is environmentally desirable to provide the same level of subsidies for integrated process measures and end-of-pipe solutions. Integrated measures seem more promising, but are also more complex and therefore more difficult to implement. Policy should clarify this aspect in advance of any support.</li> </ul>

Table 2: Strengths and weaknesses of environmental financing

The costs implied by environmental financing are shown in the following table:

Category	Description	Faced by
<b>Formulation</b>	...for setting up the system as outlined above.	Government and financing institutions (and donors)
<b>Planning and implementation of investment</b>	...for marketing the financing possibility, preparing the setting up of a new financing facility and training of own staff. ...for identifying improvement measures, its planning, financing application, implementation and operation.	Financial institutions Sub-borrower (Private sector/ Polluter)
<b>Monitoring</b>	...for reporting of completed investment and its successful operation as well as monitoring of repayment. ...for monitoring and reporting of improvements to environmental authorities.	Sub-borrower and Financial institutions Sub-borrower
<b>Verification</b>	...for verifying monitoring and reporting of polluters usually on a random basis (not in all cases).	Government (and donor)
<b>Follow-up and evaluation</b>	...for assessing compliance and impact of instrument.	Government and donor and possibly financing institutions

Table 3: Costs associated with establishing an environmental financing system

## Success factors

The following success factors for environmental financing schemes have been drawn from experiences and may differ from case to case depending on the local political, economic and social conditions.

Success factor	Issues to consider
<b>Responsibility of government</b>	<ul style="list-style-type: none"> <li>■ A clear environmental policy framework and a strict enforcement of standards.</li> <li>■ Reduction of subsidies on resources such as energy, water or input materials.</li> <li>■ A developed financial sector with pro-active promotional or APEX and retail banks with a degree of environmental expertise. In addition the promotional or APEX bank should have favourable borrowing possibilities from capital markets or other sources.</li> </ul>
<b>Responsibility of the financial institution</b>	<p>A proactive approach by the financial institution with top management support for promotion of environmental issues, including:</p> <ul style="list-style-type: none"> <li>■ An understanding within the financial institution of the linkages between clients' improved environmental performance and the reduced financial risk to lenders.</li> <li>■ Information for clients regarding the ecologic and economic advantages of pollution prevention investments and of higher material efficiency.</li> <li>■ An environmental unit or at least a technical department with some environmental expertise.</li> <li>■ Regular training of staff within the financial institution, ideally by a competent environmental unit within the organisation.</li> </ul>
<b>Task of the institutions who prepare the concept of the financing scheme</b>	<ul style="list-style-type: none"> <li>■ The instrument should be focussed either regionally, on (industrial) sub-sectors, on specific sizes of companies or on specific technologies. The type of environmental challenge the financial instrument is intended to address should also be defined clearly.</li> <li>■ Subsidies for individual projects should be limited to prevent abuse by borrowers.</li> <li>■ To ensure transaction costs remain low a single financial institution should ideally be an exclusive funding provider and application procedures should be transparent.</li> <li>■ Appropriate performance indicators for all projects should be developed.</li> </ul>
<b>Activities on the level of the client/borrower</b>	<ul style="list-style-type: none"> <li>■ The success of the financial support will be increased when the sub-borrower is also financially involved as this increases the notion of 'ownership' of the investment and ensures the proper operation of end-of-pipe measures, which at times involve additional running costs.</li> <li>■ Clients should become familiar with the advantages of environmental financing and/or cleaner technologies.</li> <li>■ For sub-borrowers assistance should be available for identifying appropriate investments. Such assistance provided by experienced consultants or advice services could also be arranged by the financial institution or by the state.</li> </ul>

Table 4: Success factors of environmental financing

## Key Literature and Case Studies

**Lovei, Magda (1999):** Environmental Funds, Discussion Note No.1, World Bank

**KfW Development Bank (1996):** Environmental Finance – A new challenge for Financial Sector Development, Orientation Paper, Frankfurt/Main, Germany

**BMZ (2004):** Sektorkonzept Finanzsystementwicklung, Bonn, Germany, p. 19ff

**Wieandt, Paul (1992):** Investitionen in den Umweltschutz – Herausforderung und Chance für Unternehmen und Kreditinstitute aus: Banken und Ökologie (Herausgeber Henner Schierenbeck/Eberhard Seidel), Gabler Verlag

**P3U (1998):** Finanzinstrumente für Umwelteinvestitionen von KMU in ausgewählten Entwicklungsländern, Arbeitspapier Nr. 15

**Umweltkatalog (2001):** Umweltaspekte bei der Förderung von Entwicklungsbanken, Herausgeber BMZ, Entwicklung des UVP-Instrumentariums

**WIR Issue Brief (2005):** Multilateral Development Bank Lending through Financial Intermediaries: Environmental and Social Challenges, June 2005

## Case Study: Environmental Fund Tunisia - Promotion with grant financing

### What is the environmental fund Tunisia?

The Tunisian government initiated the industrial environmental fund (FODEP) with support of German Financial Cooperation. This measure became necessary when stricter environmental legislation obliged industrial companies to comply with new environmental standards and to carry the additional costs themselves (resulting e.g. from required investments into state-of-the-art technology or end-of-pipe measures) according to the polluter-pays-principle.

The background for the implementation of strict environmental standards was the strong concern that the pollution from industrial production of agro-, textile-, leather-, construction material and chemicals threatened drinking water resources and was endangering public health as well as causing other sorts of environmental degradation associated with water pollution. Given the scarcity of water in the country this was a major problem. In the course of strict monitoring by the national environmental authority many companies were identified contributing to pollution. Consequently, an arrangement was made with respective companies to comply with the relevant standards within a given time frame.

The environmental fund was to assist them by subsidising the necessary investments. Due to the wide spectrum of environmental problems it was decided that only investments for wastewater treatment, solid waste disposal as well as clean air improvement and noise protection were eligible for promotion.

### How does the environmental fund Tunisia work?

Following actors were and still are involved in the work of the environmental fund: The Environmental Fund (FODEP) itself, which is a unit within the environmental authority (ANPE), a ministerial consultative commission, the Environment Ministry, selected Tunisian commercial banks, the Central Bank of Tunisia, the donor agency and the companies.

Regarding the process of the application the company first has to apply for a promotion by the environmental fund. It thus submits an investment study to one of the commercial banks and to the FODEP for appraisal.

The bank, which is the entry point for the credit application of the company, decides on the applicant's credit-worthiness as well as on the financial contributions and the risks taken by the bank.

FODEP assesses the technical aspects and proposes the level of grant to be given. It then forwards the application to the commission and to the Ministry of the Environment, which takes the principal decision about the promotion.

Upon the Ministry's and the bank's positive decisions the donor agency (KfW-Entwicklungsbank) approves the release of grant funds (provided by German Financial Cooperation). If the grant shall exceed a given limit, it may also approve of a grant for individual sub-projects only.

It is then the central bank, acting as an APEX bank to all national banks, that releases the investment grant of up to 20 % of the total cost of the sub-project.

After a positive decision the company finally receives a credit and a grant to carry out its investment. It can receive a grant of up to 20 % of the overall cost and up to 50 % in form of a credit. At least 30% has to come from own sources.

### Evaluating the environmental fund Tunisia

The environmental fund was one of the first possibilities for companies to have access to long-term financing. This was a great improvement especially for SMEs which find it particularly difficult to secure long-term credits. In the beginning there was a great need to communicate/promote the new financing facility to gain the interest

and confidence of the participating banks. The strong legal framework and the transparency of grants and credits proved to be important elements for the success of the offer. Later, the demand was so great - although the process was time-consuming as the minister had to decide about every case - that the donor increased its financial engagement twice. Environmental improvements could actually be achieved.

### **Further information on the environmental fund Tunisia**

---

**Further information about the case study can be found:**

[http://www.kfw-entwicklungsbank.de/DE\\_Home/Laender\\_und\\_Projekte/Nordafrika35/Tunesien34/GPKD\\_00386\\_DE\\_Industrieller\\_Umweltfonds1.pdf](http://www.kfw-entwicklungsbank.de/DE_Home/Laender_und_Projekte/Nordafrika35/Tunesien34/GPKD_00386_DE_Industrieller_Umweltfonds1.pdf)

**For similar current projects in Egypt, Morocco, India, Chile, El Salvador:**

[http://www.kfw-entwicklungsbank.de/DE\\_Home/Laender\\_und\\_Projekte/index.jsp](http://www.kfw-entwicklungsbank.de/DE_Home/Laender_und_Projekte/index.jsp)

**For completed projects in Sri Lanka (2002), Philippines (2004):**

[http://www.kfw-entwicklungsbank.de/DE\\_Home/Evaluierung/Weitere\\_Informationen/Schlussprf90/index.jsp](http://www.kfw-entwicklungsbank.de/DE_Home/Evaluierung/Weitere_Informationen/Schlussprf90/index.jsp)

## Case Study: KfW – Environmental Programme Promotion with preferential credit terms

### What is the KfW-Environment Programme?

---

The objective of the programme is to significantly improve the environmental situation in Germany and in adjacent regions as well as the environmental performance of German firms abroad.

The programme is aimed at German and foreign companies including the service sector and self-employed professionals. The applicants must make their application at their home bank.

### How does the KfW-Environment Programme work?

---

A wide range of improvement measures are eligible for promotion, including among others reduction or avoidance of wastewater, solid waste, air emissions, energy savings or even the performance of an environmental audit.

KfW receives applications for final approval in accordance with the given criteria and finances the lending of the home bank. Via preferential financing 75% of the investment cost will be covered. The maximum amount is limited to 10 million Euro.

The advantages of such a financing include preferential interest rates (slightly below market rates), repayment periods of up to 20 years, financial security as the interest rates are fixed for up to 10 years and flexibility to the granting of a grace period.

### Evaluating the KfW-Environment Programme

---

With the concept of lending via the home bank a large and widespread network can be used.

Due to the criteria only projects will be financed which achieve improvement by means of environmental management (including e.g. product design or use of alternative energy sources) rather than just updating (environmental) end-of-pipe technologies.

There is also a high demand from SMEs which demonstrates that the lending features (long repayment period, possibility of a grace period, long fixation of interest terms) are adequate to the needs of the sub-borrower.

With the accumulated experience of KfW, application procedures could be streamlined such that credit arrangements can be fixed within a short time period. Moreover, SMEs also benefit from slightly better terms than larger firms.

An important success factor is a functioning domestic credit market.

### Further information on the KfW-Environment Programme

---

#### Further detailed information on this programme:

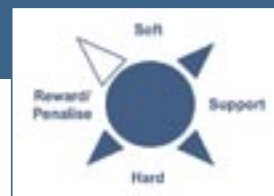
[http://www.kfw-foerderbank.de/EN\\_Home/Umweltschutz/KfWProgram.jsp](http://www.kfw-foerderbank.de/EN_Home/Umweltschutz/KfWProgram.jsp)

<http://www.kfw-foerderbank.de>

For similar programmes:

[http://www.kfw-foerderbank.de/EN\\_Home/Umweltschutz/index.jsp](http://www.kfw-foerderbank.de/EN_Home/Umweltschutz/index.jsp)





### 5. Green Public Procurement

#### Definition and objectives

Green public procurement usually means that the acquisition of goods or services by the public sector takes environmental elements into account (when considering how to create the best possible value for taxpayers).

Green public procurement is thus expected to encourage the market to produce and sell more environmentally sound products and services and thus to reduce their prices through economies of scale. As one of the largest purchasers, the public sector has substantial power to exert influence over the market: Public spending in the EU amounts to about 16% of GDP. It also enables governments to demonstrate commitment to protect the environment in concrete actions.

#### Mode of operation

Public procurement can be conducted by authorities and organisations (including state owned companies) at local, regional, national and international levels. It involves setting up detailed purchasing rules with clear parameters that prevent discrimination of bidders and ensure transparency. In green public procurement, the environment is counted as one of the parameters when purchasing products and services or contracting out public work. The environmental criteria can be applied to products or services that have environmental impacts relative to available alternatives, examples of which are shown in the box on the right hand side.

A typical procedure for setting up green public procurement schemes is illustrated below. The order of the procedure is not necessarily universal.

#### Examples of goods and services for green public procurement

- Energy-efficient office equipment and computers
- Stationary/ Office supplies
- Recycled paper
- Office furniture made of timber from sustainably managed forests
- Organic/fair-trade food in cafeterias
- Hybrid/ fuel-cell cars
- Environmentally friendly public transport
- Electricity stemming from renewable energy sources
- Energy-efficient buildings and construction

Step	Issues to consider
<b>Design policy</b>	Government or the contracting body sets general principles for green procurement.
<b>Train the purchasing staff</b>	The existing procurement staff cannot be expected to be environmental experts. The environmental department needs to co-ordinate with procurement staff or purchasing personnel in different departments and needs to organise appropriate training for integrating environmental criteria into purchasing decisions.
<b>Assess needs</b>	The purchasers first need to evaluate their needs for purchasing the item, as they might even be able to conclude that there is no need of purchasing in the first place. Also alternative ways should be assessed, e.g. leasing or renting as these function-oriented solutions have shown to improve resource efficiency considerably.
<b>Define the subject of the contract</b>	After identifying the needs, the purchasers need to conduct a market analysis on what environmentally sound alternatives are available for the item as well as their general price level, and define the subject of the contract (e.g. “energy-efficient building contract”, “environmental cleaning contract”).

<b>Define technical specifications</b>	The purchasers have to translate the subject of the contract into measurable technical specifications that can be applied directly in a normal procurement procedure. The specifications can be defined in a number of ways – setting performance targets, defining minimum requirements, applying national or international technical standards, and specifying (non-) usage of specific materials, and process or production methods. A wide range of private, national and international eco-labels can be utilised to define specifications.
<b>Selecting, awarding and monitoring the contract</b>	The procedure for calling for a tender and selecting the contract is the same as that of ordinary public procurement, but the purchasers need to ensure that the contractor has a capacity for delivery and to properly monitor whether it complies with the specified requirements.

Tab. 1: Steps and issues to be considered regarding green public procurement

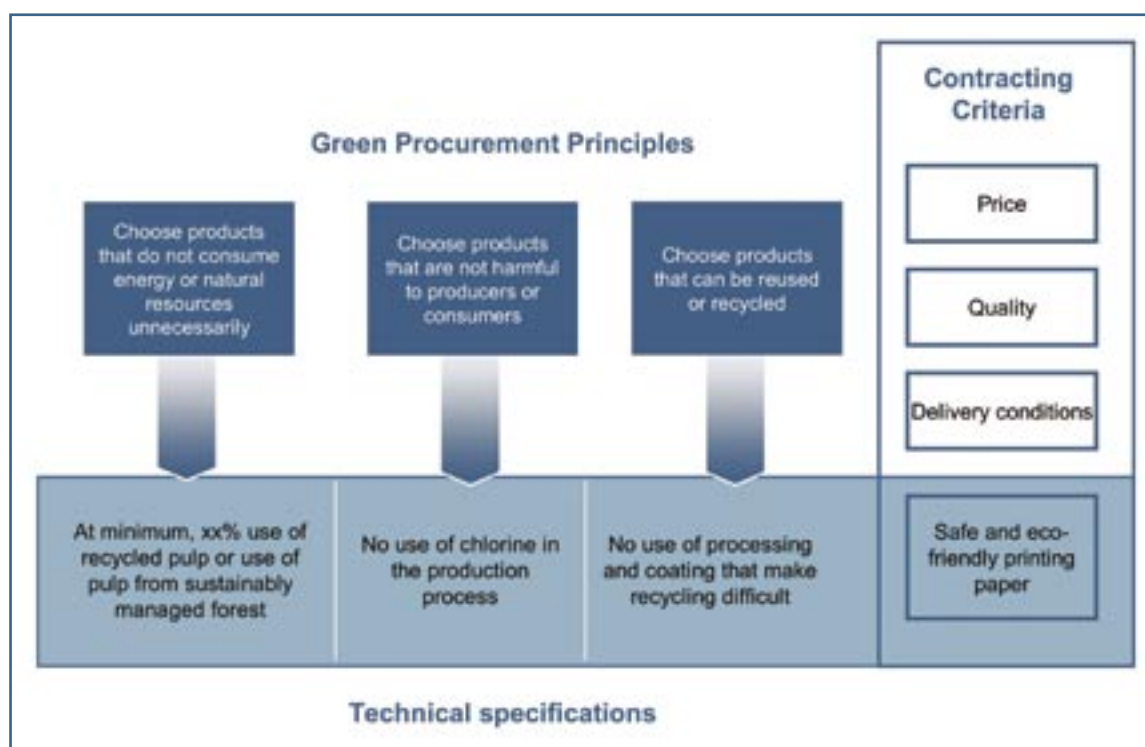


Fig. 1: An example of the procedure to apply environmental criteria for procuring office paper. Source: EC 2004

### Strengths & weaknesses

Green public procurement has certain strengths and weaknesses as an instrument promoting resource efficiency as summarised below:

Strengths	Weaknesses
<p><b>Show commitment and leadership</b></p> <p>By implementing green public procurement, public authorities can demonstrate commitment to environmental policies and lead the way towards sustainable consumption by setting an example. This will increase authorities' credibility when encouraging industry and consumers to change their consumption patterns.</p>	<p><b>Extra cost</b></p> <p>Environmentally sound goods and services tend to be more expensive than the conventional options. Public authorities may need to justify the additional cost to taxpayers. Higher administrative costs may occur as the setting of environmental criteria and subsequent evaluation needs more time. There is a tendency within public procurement to contract large amounts of different products with one tender, which makes it very difficult to set detailed specifications.</p>



**Large impact**

If many authorities adopt green procurement practices, its positive impact on the environment will be significant. Their green procurement standards may become a general standard for the entire market beyond their geographical boundaries, as did the US Energy Label for office electronics.

**Make the green market viable**

Green public procurement also provides the market with incentives to produce and sell more environmentally sound products and services. It is expected that the economies of scale that public authorities bring would lower the cost of such products and services faster and more substantially. The initial extra cost entailed with green procurement may lead to greater savings in the long term.

**Lack of reliable information**

Without reliable information on environmental characteristics of products and services, purchasers cannot prioritise their actions. Eco-labels and technical standards, if available, would greatly help to define specifications, but their criteria and definitions are often diverse depending on country, sector, company, product, and certification body. The lack of a unified approach has made it difficult for public authorities to adopt good practices.

**Unfavourable legal framework**

Existing legal frameworks in many countries are not necessarily favourable to green public procurement. The principles for conventional public procurement and international treaties include non-discrimination, best value for money and free movement of goods and services. They may not allow authorities in all cases to specify high environmental standards or discontent may be created amongst vendors.

Table 2: Strengths and weaknesses of green public procurement. Source: EC, 2004; Borg & Co., 2003

The cost incurred for implementing green public procurement is not necessarily significant as existing procurement procedures and frameworks can be utilised (see the table below). Where product information and standards on environmental aspects are already available the cost for developing technical specifications can be significantly reduced.

Category	Description	Faced by
<b>Formulation</b>	...for setting up the internal structure promoting and overseeing green procurement	Public body implementing green procurement
<b>Capacity building</b>	...for training the purchasing staff to understand the integration of environmental criteria into the regular procurement procedures	Government/Public body
<b>Developing standards</b>	...for setting up product standards and a database that can be utilised for technical specifications	Government/Public body/Standard-setting body/ Industry/ Consumer Advisory/ Protection Organisations
<b>Contracting</b>	...for selecting the contractors and monitoring their compliance	Public body

Table 3: Costs associated with green public procurement

**Success factors**

Success of green public procurement depends on a variety of factors that capitalise on the strengths and minimise the weaknesses described above:

Success factor	Explanation
<b>Set up frameworks for environmental information disclosure</b>	The availability of environmental information on products and services is one of the basic conditions to determine the success of green public procurement. The government needs to set regulatory or voluntary frameworks (or encourage others to set similar schemes) for companies to disclose environmental information on their products and services (e.g. eco-labelling, environmental management and performance certifications, green product database).

<b>Work together with other authorities and standard-setting organisations</b>	To ease implementing green public procurement, public authorities should be encouraged to act jointly in setting common policies and standards for technical specifications. They can also utilise existing product information platforms (e.g. European Green Procurement Database) and internationally recognised standards or certification schemes (e.g. Forest Stewardship Council).
<b>Co-operate between departments</b>	Green procurement requires various departments within the public body to exchange ideas and co-operate with respect to purchasing orders. By purchasing together, they can save the transaction costs as well as increase the economies of scale of green products.
<b>Provide a legal protection</b>	A legal framework that enables public purchasers to justify adding environmental specifications for procurement may be needed to avoid legal disputes with vendors. The EU adopted the new Public Procurement Directive in 2004 for this purpose.
<b>Involve industry and NGOs</b>	Green procurement would be most effective when public authorities engage stakeholders including industry/vendors, consumers and environmental organisations during the planning stage. Their views can help set sound but practical purchasing criteria as well as help taxpayers understand the value of buying green products and services. This can also stimulate green procurement in industry.

Table 4: Success factors for green public procurement. Source: EC, 2004; Borg & Co., 2003

## Key Literature and Case Studies

**European Commission (2004):** *Buying Green!: A handbook on environmental public procurement*, Brussels.

**ICLEI (2000):** *Green Purchasing Good Practice Guide*, Freiburg.

**Borg & Co. AB (2003):** *Harnessing the Power of the Public Purse: Final report from the European PROST study on energy efficiency in the public sector*, Stockholm.

Case Studies / Examples	Link
UNEP Sustainable Procurement Website:	<a href="http://www.unep.fr/pc/sustain/policies/green-proc.htm">http://www.unep.fr/pc/sustain/policies/green-proc.htm</a>
German Federal Environmental Protection Agency (UBA)	<a href="http://www.beschaffung-info.de">www.beschaffung-info.de</a>
The UK Waste & Resources Action Programme	<a href="http://www.uneptie.org/pc/sustain/design/green-proc.htm">http://www.uneptie.org/pc/sustain/design/green-proc.htm</a>
UNEP Sustainable Procurement Programme	<a href="http://www.uneptie.org/pc/sustain/design/green-proc.htm">http://www.uneptie.org/pc/sustain/design/green-proc.htm</a>



### 6. Subsidies

#### Definition and objectives

Governmental institutions can provide financial support to households or private enterprises to promote resource-efficient production and services. There are two main categories of financial aid:

- Direct subsidies such as financial grants or credits. These facilitate investments in resource efficient technologies by partly covering the costs incurred by businesses or households.
- Indirect subsidies in form of (i) differentiated tax rates or tax exemptions and (ii) provision of goods like power or water and services below real, i.e. market, price. Indirect subsidies are used to lower the price of resource efficient devices, items and services to improve their competitiveness and to enhance their commercialisation.

Subsidies are used either to promote innovations, or to facilitate the adaptation to new legal frame conditions (norms and standards) or to preserve environmentally sound structures and production processes.

#### Mode of operation

Depending on the objective and the target group to be addressed, there exist different types and approaches of subsidies.

Type	Description
<b>Financial contributions</b>	Enterprises receive a grant to develop, purchase or implement resource efficient technologies, if they fulfil certain requirements. Public grants are often programme based and have a limited duration. Grants for industrial research are quite common in OECD countries, however grants to enterprises for the purchase and implementation of equipment or machinery are more rare.
<b>Capital cost subsidies</b>	Capital cost subsidies comprise soft loans, favourable interest rates, liability guarantees and debt forgiveness for investments in resource efficient technologies and measures. Capital cost subsidies are given by state owned or publicly funded banks that can operate with interest rates for loans below the prevailing market rate.
<b>Tax subsidies</b>	Tax subsidies include tax credits, breaks, exemptions, allowances, exclusions and deductions, rate relief, tax deferrals, preferential tax treatment for investments and for consumer goods. They are often provided for a longer period of time and not linked to special programmes.
<b>Provision of goods and services below costs</b>	Governments can provide goods and services needed to improve resource efficiency at prices below real costs to stimulate resource efficiency. This might include certain types of technology, infrastructure (e.g. for waste treatment), energy, water and telecommunication services. Public research infrastructure and capacities, e.g. at universities, can be brought into collaborations with companies on research and development towards resource efficiency (see instrument description Research and Development).

Table 1: Types of Subsidies

The process of providing subsidies can be characterised by four distinctive steps:

Step	Issues to consider
<b>Preparation of subsidy programmes</b>	Programmes with a significant subsidy component should be subject to in-depth planning, comprising: <ol style="list-style-type: none"> <li>a) an analysis of the barriers for resource-efficient innovations and of the role of financial constraints;</li> <li>b) the identification of objectives to be achieved in the short, medium and long run;</li> <li>c) the identification of the beneficiaries of the programme, their profile and exact needs;</li> <li>d) the identification of possible organisations and authorities responsible for the programme; and</li> <li>e) the analysis of the risks, including fraud, linked with subsidies and the alternative options available;</li> </ol>

<b>Design of the programme</b>	Once it has been decided in principle to start a subsidy scheme, the programme must be designed in detail. This includes inter alia the definition of: <ul style="list-style-type: none"> <li>a) expected results, required measurement indicators and the measurement activities;</li> <li>b) necessary information from the clients or beneficiaries that will be applying for subsidies</li> <li>c) criteria for eligibility and the evaluation process</li> <li>d) the scope of measures to be subsidised</li> <li>e) the type and amount of subsidy</li> <li>f) the mode of delivery of the subsidies, the work processes, the managing units</li> <li>g) the monitoring and evaluation system.</li> </ul>
<b>Implementation Measures</b>	The acceptance and the outcome of subsidies largely depend on the efficiency of the administration, the quality of the marketing of the programme and the provision of professional support to clients in form of information, training and advice.
<b>Monitoring, Evaluation &amp; Revision</b>	Interim monitoring and evaluation measures examine and assess the progress of the subsidy scheme, whether the objectives are likely to be achieved, and what corrective interventions should be taken to improve the effectiveness of the subsidies. Monitoring and evaluation information provides direct feedback into the implementation process and thus helps to improve the quality of ongoing interventions. Moreover, since new programmes are often prepared long in advance, evaluations are an important source of information for the design of the next generation of a programme, new policy orientations, and so forth. Final evaluations analyse and assess the impacts, efficiency and effectiveness of the subsidies. They should also assess how sustainable the impacts are and the main factors behind success or failure of a subsidy scheme.

Table 2: Steps and issues to be considered regarding subsidies

A variety of parameters determines how subsidies contribute to the desired objective.

Parameter	Issues to consider
<b>Subsidy item</b>	Subsidies can be provided for measures, resources or goods. The item of the subsidy should be selected according to the objective of the subsidy, efficiency, and feasibility. For example, if sales of single goods cannot be monitored efficiently, subsidies for resource efficiency measures can be more appropriate.
<b>Amount of subsidy</b>	Setting the amount of subsidy right is crucial. The decision should depend on a comparison of the costs between resource-efficient and inefficient devices and processes, on the customers' habits and financial resources.
<b>Beneficiaries</b>	Subsidies can be provided at the level of businesses or private consumers. For example, tax breaks or reduced tax rates for certain fuels can be provided to companies or, as in the case of bio-diesel, to the consumer.
<b>Subsidy source</b>	Subsidies are financed either through general tax revenues or through special taxes or fees established for this specific purpose.
<b>Institutional setup</b>	Different governmental departments can be responsible for providing subsidies, monitoring compliance with programme requirements and sanctioning any fraud.

Table 3: Parameters determining the effectiveness of subsidies

## Strengths & weaknesses

Strengths	Weaknesses
<p><b>Uses financial interest of target groups</b> Subsidies are a potent economic instrument to influence investment and purchasing decisions, as they directly reduce expenditures and increase income and profitability of the production of goods and services. Subsidies make use of the financial interests of people and can be effective even when people are not convinced of the value of resource-efficient measures which are being subsidised.</p> <p><b>Immediate effectiveness</b> Subsidies act immediately as soon as they are provided. Loss of time to promote resource efficiency is comparatively low. The preparation of a well-managed subsidy scheme may take some time, but once it is established and awareness is raised, clients can be expected to take immediate advantage of the subsidy.</p> <p><b>Competitiveness advantage for enterprises</b> When awarded on a national or regional level subsidies offer enterprises advantages in international competition. They can contribute to creating on the medium term a powerful and internationally competitive industrial branch, and they can prevent companies from relocating their factories abroad.</p> <p><b>Support innovation at an early stage</b> Subsidies facilitate the market launch of innovation at an early stage as they reduce the costs of pioneering products and increase knowledge among customers quickly. Subsidies are often used as initial aid to build up new markets, when it is difficult to raise sufficient capital given the uncertain sales potential.</p> <p><b>Address financial needs of SMEs</b> Subsidies are especially advantageous for small- and medium-sized enterprises (SMEs) which have only limited financial capabilities to internally cross-subsidise new products with revenues from well-established products. Subsidies can also help SMEs to adapt production and service processes to new standards and norms. Without subsidies many of these enterprises may not be able to carry out necessary investments.</p>	<p><b>Interfere with market results</b> Subsidies interfere with normal market development. They alter the price situation on the market by lowering the price for certain products or services. In this manner, less profitable production and services can displace more economic products and services resulting in net welfare losses.</p> <p><b>Unequal treatment of enterprises</b> Subsidies create a group of beneficiaries but also a group of disadvantaged. Among the latter are often economically working enterprises that may feel discouraged as they finance their less economic competitors through taxes.</p> <p><b>Reduce innovation pressure</b> Subsidies weaken the motivation of beneficiaries to become more economical, as long as the subsidies guarantee sufficient revenue. In this way they can hamper the development and introduction of further innovations.</p> <p><b>Burden for public budgets</b> Subsidies burden public budgets. Especially in developing countries that have a small tax base and face difficulties in raising government revenues, subsidies reduce the availability of financial resources for core tasks of the state such as education, infrastructure, security etc. In extreme cases they can be a waste of tax revenues without meaningful benefit. Subsidies are often considered as unfair when taxpayers finance measures that are only beneficial for a selected group and are not of general interest.</p> <p><b>Vulnerability to illicit behaviour</b> Subsidies are susceptible to illicit behaviour and corruption. Companies can try to receive subsidies through falsification of records or engagement in corruption with government officials.</p>

Table 4: Strengths and weaknesses of subsidies

## Success factors

Using subsidies to stimulate resource efficiency requires specific governmental management capabilities at different stages.

Success factor	Description
<b>Set clear objectives</b>	During the planning stage it is important to precisely define the objectives of the subsidies to enable a review of the performance of the measure. The objectives should be supported by the majority of the taxpayers that finance the subsidies and should not be purely a result of lobby activities with a narrow set of interests.

<b>Timing subsidies</b>	Subsidies should be temporary to avoid that beneficiaries become dependent on financial aid. The size of the subsidy should decrease in a transparent manner and predictably over time, to promote innovation and efforts to improve the profitability of resource-efficient technologies and products. It also helps companies to adapt to a subsidy free market situation.
<b>Set appropriate scale</b>	The number of beneficiaries should be large enough to achieve a significant improvement of the resource efficiency in selected sectors but not too large so that they do not overload public budgets.
<b>Account for side effects of subsidies</b>	Subsidising goods and services, especially those based on the environment like water and energy, shall be undertaken with care not to undermine the efficient use of these resources.
<b>Transparency and openness</b>	The implementation of the subsidy scheme should be as transparent as possible to prevent misuse and corruption. This includes a functioning information system, allowing the responsible institution to determine the subsidy in a consistent manner and to avoid unequal treatment of applicants.
<b>Independent monitoring and evaluation</b>	The results and procedures of the subsidy scheme have to be independently evaluated regularly to decide whether the subsidies are still necessary and more effective than other measures. If these evaluations are not carried out accurately there is a high risk that subsidies continue to exist although the original purpose is no longer relevant or valid.

Table 5: Success factors of subsidies

## Key Literature and Case Studies

**Bundesbank, 2000:** *Die Entwicklung der Subventionen in Deutschland seit Beginn der neunziger Jahre.* Deutscher Bundesbank, Monatsbericht Dezember 2000. ([www.bundesbank.de/download/volkswirtschaft/mba/2000/200012mba\\_subvent.pdf](http://www.bundesbank.de/download/volkswirtschaft/mba/2000/200012mba_subvent.pdf))

**Bundesregierung, 2006:** *20. Subventionsbericht der Bundesregierung.* Deutscher Bundestag Drucksache 16/1020 (<http://www.bundesregierung.de/Anlage978296/Zwanzigster+Subventionsbericht.pdf>)

**Albrecht, John 1998:** *Environmental Consumer Subsidies and Potential Reductions of CO2 Emissions.* Paper presented at the GREENING THE BUDGET Conference, ifo Institut für Wirtschaftsforschung, München, May 11-12, 1998 ([www.feb.ugent.be/Fac/Research/WP/Papers/wp\\_98\\_59.pdf](http://www.feb.ugent.be/Fac/Research/WP/Papers/wp_98_59.pdf))

**Moor de, André, Calamai, Peter 1997:** *Subsidising Unsustainable Development: Undermining the Earth with public funds.* Commissioned by the Earth Council, San José, Costa Rica

Case Studies / Examples	Link
EEA Reports with a number of Case Studies on subsidies and subsidy reforms	<a href="http://reports.eea.europa.eu/technical_report_2005_">http://reports.eea.europa.eu/technical_report_2005_</a> <a href="http://reports.eea.europa.eu/eea_report_2006_1/en">http://reports.eea.europa.eu/eea_report_2006_1/en</a>

## Case Study: Promotion of Solar Home Systems in Bangladesh<sup>1</sup>

### What is the Promotion Programme of Solar Home Systems?

Only 30% of the Bangladeshi population has access to grid electricity which deprives the vast majority of households and small enterprises of conventional electricity. In rural areas biomass in form of crop residues, animal waste and firewood meets 73% of the energy consumption with considerable negative impacts on the environment. Even enterprises and households connected to the grid suffer from energy problems. Energy shortages and unreliable supply are common and impose a high cost on the economy. Extensive load shedding disrupts industrial production and other economic activities and entrepreneurs are compelled to invest in stand-by generators which increases production costs. The power system in Bangladesh almost entirely depends upon fossil fuels which cause serious environmental problems. In response to this situation, the non-profit company Grameen Shakti is carrying out a programme to install solar PV systems in houses, enterprises and offices. The programme mainly targets areas which have no access to conventional electricity and little chances of being connected to the grid within a 5 to 10 year time frame. The programme is supported by several donors which allows a subsidisation of the installation of the solar systems in several ways.

### How does the programme work?

Grameen Shakti sells and installs the photovoltaic systems in rural and remote areas. It also ensures after-sales maintenance and service. Grameen Shakti provides free maintenance service for up to three years after installation of solar home systems. Staff of the company check installed systems and provide necessary maintenance service during visits to collect monthly instalment payments.

The company imports PV-panels from Japan tax free. It produces its own charge controllers in small workshops. Batteries and lamps are bought from local producers. All components are assembled in Grameen Shakti workshops. The solar home systems are distributed to 120 EUR outlets in rural areas where they are sold to the customers. Prices range between 230 EUR for a 40 Wp system with two 6 W fluorescent lamps to 664 EUR for a 120 Wp system with 10 6 W fluorescent lamps. Grameen Shakti provides a warranty of 20 years for panels, 5 years for batteries and 3 years for charge controllers.

Grameen Shakti offers four financing options for customers as shown below:

Option	Down Payment of total price	Payment made by monthly equal instalments	Service charge per annum
<b>Option 1</b>	15%	36 months	12%
<b>Option 2</b>	25%	24 months	8%
<b>Option 3</b>	15%	36 months	10%
<b>Option 4</b>	100% cash payment with 4% discount	100% cash payment with 4% discount	100% cash payment with 4% discount

<sup>1</sup> The present text is based on publications of Grameen Shakti especially the brochure "An integrated Approach to Rural Energy Service" by Dipal C. Barua

For each system sold Grameen Shakti receives a subsidy of approximately 38 EUR. Of this 30 EUR is for the product and 8 EUR to maintain and extend the company structure and services. In addition Grameen Shakti receives grants for the following:

- To train local technicians in after-sales services
- To train customers in the use of the solar systems
- To carry out awareness and marketing activities (demonstration meetings, speaking to village and business leaders, distribute brochures, go from door to door from enterprise to enterprise)
- To organise workshops and seminars on renewable energy
- To invite print and electronic media to explain the programme and progress

The implementation of the programme is supervised by the state owned “Infrastructure Development Company (IDCOL)”. IDCOL receives 13 EUR per system sold to monitor and evaluate the solar home system programmes of the sales companies and organisations and to provide training programmes.

### Evaluating the programme

Grameen Shakti has sold more than 65 000 PV systems producing more than 3,5 MW (as of April 2006) in Bangladesh. More than 2 000 systems have been installed each month and it is expected that sales will increase to 3 000 systems per month.

Grameen Shakti installed solar home systems have had a positive impact on rural business. Working conditions have improved, business hours have been extended and new business and employment opportunities have been created.

Use of solar PV-technology has produced a positive impact on the rural economy of Bangladesh. Villagers have reduced their dependence on imported oil such as kerosene and diesel. This has reduced the effect of harmful carbon dioxide emissions from kerosene lamps and other conventional energy sources, which contribute towards global warming. The internal home and work environment of SHS users has greatly improved by eliminating the dangerous smoke and soot from kerosene lamps that cause respiratory and eye problems. This has reduced health risks and reduced health related costs.

Grameen Shakti’s strategy for reaching people and enterprises in remote areas involves a) soft credit through instalments which makes solar home systems more affordable, b) a marketing strategy based on local participation, intense promotion and awareness building and c) product diversification and adaptive research to reach people with quality products at minimum cost and maximise their income generating potentiality.

The programme was supported by several subsidies, such as:

- tax exemptions for the import of solar panels
- product subsidies reducing the price of the solar systems for customers by 5-15%
- subsidies for the sales structure (outlets) of the company
- subsidies for training, awareness raising, marketing campaigns etc.

Subsidies for the programme proved to be successful and fulfil most of the success factors mentioned in the instrument description. All subsidies are handled in an open, transparent way. The results of the programme are evaluated independently regularly to ensure an efficient and proper use of the funds.

### Further information

Project Website: [www.gshakti.org](http://www.gshakti.org)





## 1. Research and Development

### Definition & objectives

Research and development (R&D) can be defined as “systematic investigatory work carried out to increase the stock of knowledge and the use of such knowledge to devise new products and processes”. R&D includes basic research, applied research and experimental development conducted by governmental departments, universities, research institutes, private companies, and non-governmental research bodies, in many cases forming the first stage of the development and application of new technologies and organisational innovations (SciDev.net, 2006).

R&D is an essential part of economic and social development in any country. New technologies realised through R&D can help raise the productivity and competitiveness of companies and create employment by producing new products as well as improving production processes. Even though many developing countries may be able to acquire knowledge and technologies needed for development from industrialised countries, they still need to nurture ‘indigenous’ capacities to adapt and utilise technologies within the local conditions. They may also need new technologies different from those of industrialised countries (e.g. utilisation of biomass energy). To realise resource efficiency, R&D is particularly relevant not only to make the existing products and processes more efficient but also, more fundamentally, to innovate new ways of delivering products and services in a less resource-consuming manner (Dormann and Holliday, 2002).

Business may drive the development of new products and processes, but many of the key innovations that society takes for granted have their origin in publicly funded research. It often takes time to convert a scientific discovery into practical applications, but the private sector tends to focus its R&D investments on short-term incremental changes to existing technologies for obtaining a quick financial return. This may result in not only underinvestment in basic research but also sacrificing environmental and social performance of new technologies for immediate private commercial success. The government therefore needs to intervene in order to support R&D activities whose initial financial return may be low but long-term public benefits are potentially significant. (OECD, 2004; Jefferson, 2000).

The government can help through a coherent ‘R&D policy’ to foster domestic R&D activities needed to build a comprehensive national scientific and technological capacity on resource efficiency. It is becoming increasingly important for such a policy to support the whole process of innovation that is created by a diverse range of organisations rather than focus on individual R&D activities, by encouraging collaboration within and between the public and private sectors, sometimes beyond national boundaries (SciDev.net, 2006).

### Mode of operation

Governmental agencies can provide both financial and non-financial incentives to promote R&D in the public and private sectors. The following table provides a list of R&D policy measures that can be taken on governmental incentives:

Type of policy intervention	Explanation
<b>Financial</b>	
<b>Direct financing</b>	The government can directly finance R&D efforts at public scientific bodies such as universities, government research institutes and science parks.
<b>Grants</b>	The government can directly fund private R&D efforts through awarding financial grants (both for-profit and not-for-profit). Grants allow the government to target the projects with high social returns.

	<b>Tax incentives</b>	Tax incentives represent an indirect form of support to private R&D efforts by providing tax relief that lowers costs. This measure gives more autonomy to the private sector but makes it difficult to target projects.
	<b>Removing subsidies</b>	The government can also remove subsidies for environmentally harmful products (e.g. fossil fuels) to create a level playing field for R&D on resource-efficient technologies.
	<b>Long-term investments</b>	The government can provide R&D for resource-efficient technologies with long-term, low-rate investment in companies or encourage loans by venture capital and other financial organisations.
<b>Non-financial</b>	<b>Protection of intellectual property rights</b>	The creation of a legal environment that protects patents and relaxes anti-trust activities can increase the likelihood of generating an acceptable return from R&D investment.
	<b>Demonstration projects</b>	The trials of new technologies are essential to prove technical viability at a commercial scale for technologies for which it is difficult to attract private sector financing. Demonstration projects are also needed to tailor developed technologies to fit specific contexts.
	<b>Human resources development</b>	The availability of university graduates influences the potential number of research scientists and engineers. Education policies lead to a match with the requirements of industry (see also instrument 'Education and Training').
	<b>Industrial standards</b>	The provision of standardisation in products and processes can not only reduce the costs of production by providing clearly specified requirements but also speed up competition for upgrading of products (see also instrument 'Eco-labelling').
	<b>Co-ordination bodies</b>	The creation of co-ordinating agencies or advisory councils can improve the flow of information between government departments, research organisations and industry, fostering learning processes, indigenous innovation and technological diffusion (see also instrument 'Information Centres').
	<b>International collaboration</b>	The government can facilitate the formation of international joint ventures and other international collaborative efforts to encourage resource-efficient technology transfer and innovation. Some development aid has been allocated to encourage international co-operation in R&D.

Table 1: Types of policy intervention for research and development

Financial incentives are only likely to be successful in stimulating domestic innovation if the government treats non-financial incentives as complementary supporting measures. R&D policies need to be adapted to the needs of a country at its particular stage of technological development. For developing countries that are users and adapters of imported technologies, more emphasis should be placed on non-financial measures (SciDev.net, 2006).

The focus on resource efficiency in R&D can be incorporated into the overall R&D policy framework. For example, the EU has placed "sustainable development, global change and ecosystems" as one of seven priority thematic areas in the Sixth Framework Programme for Research and Technological Development (2002-06), allocating approximately 12% of the total budget of 17.5 billion euros. The other way round, the Canadian government's Sustainable Development Strategies 2000-03 identified "capacity building in R&D and skills" as one of three key measures to raise Canadian industry's productivity through resource efficiency.

## Strengths & weaknesses

R&D policy has certain strengths and weaknesses as an instrument promoting resource efficiency as summarised below:

Strengths	Weaknesses
<p><b>Provide innovative solutions</b> R&amp;D can lead to identifying new leapfrogging technological solutions to resource efficiency, not only improving efficiency in the existing production processes.</p> <p><b>Increase national competitiveness</b> New products and processes developed through R&amp;D can create a significant competitive advantage for the country. The ability to adapt the latest technologies can also ease access to international markets.</p> <p><b>Build up capacities for further development</b> The technological capacities and human resources developed through R&amp;D can create a virtuous cycle that leads to further new innovation.</p>	<p><b>Free riders</b> Imitators of new products may prevent R&amp;D investors from enjoying the full benefits of their efforts. Others may claim a tax credit by classifying routine costs including quality control and testing as R&amp;D expenditures.</p> <p><b>Risk of failure</b> R&amp;D efforts do not always result in successful applications. The government needs to be prepared for the risk that it may be criticised as wasteful diversion of taxpayer's money from more urgent or productive uses.</p> <p><b>Difficulty in prioritisation</b> It needs time for the government and the private sector to find out the outcome and effectiveness of R&amp;D activities. The government frequently lacks appropriate information about the market and new technological developments. This may lead to misdirecting the country's technological development and adaptation.</p>

Table 2: Strengths and weaknesses of research and development for resource efficiency

The costs incurred for implementing R&D policy are relatively significant. However, developing countries may be able to mitigate costs by focusing their resources on non-financial measures and inducing effective technology transfer (see the table below).

Category	Description	Faced by
<b>Formulation</b>	...for building up R&D policy to co-ordinate a system of innovation in the country	Government
<b>Capacity building</b>	...for educating and training people to gain professional knowledge and skills needed for R&D	Government/Industry
<b>Investment</b>	...for providing financial means to encourage public and private R&D efforts	Government/Industry
<b>Co-ordination</b>	...for providing a legal framework to encourage innovation and co-ordination between sectors	Government/Industry

Table 3: Costs associated with research and development for resource efficiency

## Success factors

Success of R&D policy depends on a variety of factors that capitalise on the strengths and minimise the weaknesses identified above. The following factors are drawn from experiences of existing practices:

Success factor	Explanation
<b>Education</b>	The tertiary education needs to ensure creating a large number of environment-minded quality scientists and engineers. The government needs to pay attention to not only quantity but also quality of education to achieve better results in R&D. The students also need other competences such as foreign languages than the expertise, while the infrastructure and equipment in schools play a key role of improving quality of education.
<b>Balanced protection of intellectual property rights</b>	Intellectual property rights give innovators market power over competitors, but at the same time, access to basic or essential products needs to be secured for poor populations. The government needs to ensure a balance between commercial and public interests, as well as keep research outcomes resulting from publicly funded R&D widely available.
<b>Define performance</b>	The development of resource-efficient technologies would be encouraged by setting clear goals that specify efficiency and emission characteristics of technologies.
<b>Public-private partnerships</b>	It can be more appropriate for the government to remain in the role of defining broad objectives and timetables for technological innovation and back up these objectives with incentives. The private sector can play the major role in exploring the main technological choices and making the investments needed to meet these objectives. Such an arrangement not only encourages the exchange of information but can also facilitate risk sharing and enhance administrative flexibility.

Table 4: Success factors of research and development for resource efficiency

### Key References and Case Studies

**Dormann, J. and Holliday, C. (2002)** *Innovation, Technology, Sustainability and Society*, World Business Council for Sustainable Development (WBCSD), Geneva.

**www.SciDev.net (August 2006)**

**UN Millennium Project (2005)** *Innovation: Applying Knowledge in Development*, a report of the Task Force on Science, Technology and Innovation, Earthscan, London.

**UNDP (2001) Human Development Report 2001:** Making new technologies work for human development, UNDP, New York.

Name	Link
Science and Development Network: News, views and information about science, technology and the developing world	<a href="http://www.scidev.net/">http://www.scidev.net/</a>
The Earth Institute – Mobilizing the Sciences and Public Policy to Build a Prosperous and Sustainable Future	<a href="http://www.earthinstitute.columbia.edu/research/index.html">http://www.earthinstitute.columbia.edu/research/index.html</a>
Wuppertal Institute on Environment, Climate, Energy - FACTOR FOUR - Doubling Wealth, Halving Resource Use	<a href="http://www.wupperinst.org">http://www.wupperinst.org</a>

## Case Study: Environment-driven Business Development in Sweden

### What is the Environment-driven Business Development programme?

The Swedish Agency for Economic and Regional Growth (NUTEK) ran the Environment-driven Business Development programme between 2001 and 2004. This programme aimed to strengthen the competitiveness of domestic small and medium-sized enterprises (SMEs) through stimulating product and business development from sustainability perspectives. It was undertaken according to two different themes: “environmentally sound products as a competitive device” (Theme I) and “operational development focusing on continuous improvements” (Theme II). A total of 390 SMEs took part in the programme. All of them were already active in environmental management but were looking for ways to create new market values through environmental innovation. As a government agency, NUTEK co-financed SEK 28 million (approx. 2,8 million) for a wide range of projects in total. The input of the participating companies in terms of time and money amounted to around SEK 50 million (approx. 5 million).

### How does the programme work?

The programme focused on developing new environmentally sound products and on improving leadership, management, stakeholder engagement and communication of companies. The programme was implemented as follows:

#### Preparation

NUTEK called SMEs for project proposals on two occasions. They received and assessed 161 project ideas and conducted a preliminary study for 54 proposals. The preliminary study was undertaken from the viewpoints of how the project concepts meet the companies’ needs and how a buy-in could be obtained from potential co-operating partners and financing organisations. NUTEK provided each preliminary study with a grant of SEK 80,000 (approx. 8,000) and, as a result, decided to finance 34 full-scale projects.

#### Implementation

The programme was run with involvement of various actors: regional development organisations, municipalities, consultants, universities and other research institutions. An average of 12 companies participated in each project. The participating companies received various supports and services from NUTEK and other actors such as:

- Counselling on development of environmentally sound products by industrial designers
- Research on customer needs and requirements
- Application of the Quality Function Deployment, a method for sustainable product and service development
- Assistance of acquiring Certified Environmental Product Declarations (EPDs) from the Swedish Industry Association (SINF)
- Application of the Joint Leadership, a method to stimulate co-operation between staff and management
- Establishing practical environmental goals all staff in the companies can work towards in a simple routine
- Drawing up an internal manual containing indicators that enable the benefits of environmental work to be recognised within companies

Companies taking part in Theme I received assistance from NUTEK to develop new working methods and tools that helped them to incorporate environmental, economic and social aspects into their product development processes. Through meetings, training courses and expert support, participants learnt how to think through the entire life cycle of products from an environmental perspective. In this way, they became able to take into account alternative and more environmentally sound materials, reduction of the number of components, improvement in the product’s durability and the product’s impact on the working environment.

For example, the company HTC Sweden developed floor-grinding machines for concrete floors. The company's machines already enjoyed an environmental advantage as they can create a completely smooth surface that is easy to clean without need of strong chemicals. Owing to the participation in the project, the company succeeded in developing an even more efficient and environmentally sound product: a remote-controlled floor-grinding machine that works twice as fast as the previous models, contains less components and weighs less.

NUTEK funded up to 50% of the costs of each project (the average was 32%). Every company had to invest at least SEK 5,000 (approx. 500). Other funding was received from other companies, county administrative boards, etc. NUTEK also jointly revised the targets and indicators for the programme's monitoring and evaluation to motivate and engage all of the 34 projects, through holding a training and discussion day with all project managers and a clarification process.

### **Outcomes**

Through the programme, about 60 products and services have been made more environmentally sound and more than 100 companies have ensured a system of continuous improvement. The project results and instruments generated were documented and disseminated among other networks through websites, industry associations, seminars and publications.

### **Evaluation**

---

The process of preliminary studies was helpful to identify committed companies and to minimise the risk of project failures and delays. This contributed to favourable results while ensuring effective use of public resources. More than half of the participating companies indicated an increase in their competitiveness by working on environmental issues more strategically. Full-scale projects were those based on needs of participating companies and their customers as well as those where companies had a high degree of commitment and enthusiasm for the initiative.

### **Further information**

---

NUTEK Website: [www.nutek.se](http://www.nutek.se)



## 2. Education and Training

### Definition and objectives

Education and training for resource efficiency aims to build capacity on resource efficiency by education and training programmes. All approaches must ensure that the training participants are able to address environmental challenges from their own disciplinary perspective and their own level. More specifically, the design of education programmes and training courses should address the following objectives:

- └ Develop an understanding and problem solving capacities of a range of sustainability, environmental and resource efficiency concepts
- └ Encourage reflection on the effects of personal values and lifestyle choice; and
- └ Promote skills, concepts and methods for critical thinking and practical, effective action.

### Mode of operation

Education and training for resource efficiency is to be understood as a continuous task throughout the educational curriculum of people that ultimately induces life-long learning about opportunities for environmental protection and increases understanding of the economic benefits that can be achieved through resource efficiency measures. There exist different stages of education/training in which the issue of resource efficiency can be integrated:

Stage	Description
<b>Primary/ Secondary schooling</b>	Primary education plays a key role in shaping mindsets towards environmental protection and the efficient use of resources. During this phase individuals establish a value set that enables them to make informed choices in the future that can increase quality of life while protecting the environment and supporting resource efficiency. Basic techniques, including literacy and math, enable people to engage in continuous learning throughout their lives. Understanding basic ecological, scientific and social facts and relationships is a crucial prerequisite for acquiring further knowledge and capabilities for resource efficiency.
<b>Technical and Vocational</b>	The phase of technical and vocational education and training (TVET) plays a crucial role in providing knowledge, methods and tools to adolescents that help them to design and implement practical solutions on resource efficiency as they enter the world of work. <sup>1</sup> Through awareness raising on needs and challenges of resource efficiency among future professionals and providing students with latest techniques and tools to implement efficiency measures they become well equipped to develop solution oriented and pro-active resource efficiency activities.
<b>Higher Education</b>	Universities prepare future decision-makers of society for their entry into the labour market. Such preparation includes training of future teachers, who play an important role in providing education at both primary and secondary levels. Including the topic of resource efficiency in higher education is also relevant for students in engineering, management, economics and public administration amongst others.
<b>Life-long / on the job</b>	Education and training for resource efficiency are continuous processes that can be offered to employees and society at large at every stage of job career or life. For example, training measures can be applied to employees, so as to raise awareness at the workplace about resource efficiency potentials and solutions. Such an awareness raising on environmental issues and resource efficiency might further result in changes of personal consumption habits and life-style towards sustainability.

Table 1: Resource efficiency throughout the different stages of education and training

<sup>1</sup> [http://portal.unesco.org/education/en/ev.php-URL\\_ID=34374&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/education/en/ev.php-URL_ID=34374&URL_DO=DO_TOPIC&URL_SECTION=201.html)

There does not exist one single prescriptive model of how the concept of resource efficiency can be integrated into education and training. A number of mechanisms can be applied for the delivery of education and training. Basically, three main strategies can be followed to include the topic of resource efficiency into educational curricula: Specialisation, integration or mainstreaming. Which strategy to choose and how to combine strategies depends on the nature and capabilities of the educational system as well as on the desired overall objective to be achieved.

	Specialisation	Integration	Mainstreaming
Key Features	Creation of special careers devoted to resource efficiency and related topics	Integration of resource efficiency courses into standard curricula	Mainstreaming of resource efficiency into all activities covered by different curricula
Scope	Small - reaches only a fraction of people	Middle - depending if courses are obligatory or optional	High - reaches all students involved in the curriculum concerned
Benefits	Generates experts with in-depth knowledge and capabilities on resource efficiency	Generates experts with a 'traditional' disciplinary background	Resource efficiency gets linked to career's core issues, strong linkage to 'standard' curricula

Table 2: Comparison of different ways of integrating resource efficiency into education and training

The development of successful education and training measures for resource efficiency is a continuous process. The steps below present a development cycle:

Step	Issues to consider
<b>Initial check</b>	<ul style="list-style-type: none"> <li>■ The current status of the integration of resource efficiency in education and training activities, considering different thematic and disciplinary dimensions as well as the different options for providing education and training throughout educational careers.</li> <li>■ Knowledge and skills required to better integrate resource efficiency into education and training.</li> <li>■ Consulting main stakeholders (e.g. NGOs and companies) on their needs, perspectives and experiences.</li> <li>■ Analysis and identification of specific knowledge needs for resource efficiency that take into account the current and expected market demand for such specific knowledge.</li> <li>■ Physical, human and organisational resources to improve resource efficiency education and training (e.g. teaching material, teacher's preparedness, public and private funds, training facilities).</li> </ul>
<b>Plan activities</b>	<ul style="list-style-type: none"> <li>■ Prioritisation of issues and phases of curricula (also by consulting stakeholders) where resource efficiency topics are most valuably integrated.</li> <li>■ Set clear objectives for resource efficiency education, research and training activities.</li> <li>■ Options to implement objectives, allocate resources and responsibilities</li> <li>■ Partnerships to make efforts more effective.</li> </ul>
<b>Implement activities</b>	<ul style="list-style-type: none"> <li>■ When implementing agreed measures, people involved in implementation should be made aware of the objectives and justifications to create a common understanding of and motivation for resource efficiency. A common understanding of the objectives and concrete implementation activities is of high importance for successfully and coherently achieving progress to meet the set targets</li> <li>■ Measures to improve marketing and sales capabilities of educated and trained personnel should be included in educational and training activities. The aim is to provide 'add-on' knowledge on how to best offer and sell specific knowledge in the market after receiving the training / education.</li> </ul>
<b>Monitor and evaluate</b>	<ul style="list-style-type: none"> <li>■ Monitoring whether educational objectives are achieved can help to identify corrective actions.</li> <li>■ Best practice cases and key experiences can inspire further efforts for education and training.</li> </ul>

Table 3: Steps and issues to be considered regarding education and training for resource efficiency



## Strengths & weaknesses

Strengths	Weaknesses
<p><b>Long-term effectiveness</b> Education and training are an effective means of creating the capacities to foster long-term efforts of implementing resource-efficient systems of production and consumption.</p> <p><b>Innovation creation</b> Knowledge on implementation methods and tools for resource efficiency promote innovative production and management processes.</p> <p><b>Spill-over effects</b> Knowledge and skills created to foster resource efficiency can be useful in other areas, e.g. implementation skills, life-cycle thinking and project management.</p> <p><b>Reduce dependency on external skills</b> Building capacities in developing countries can help to achieve resource efficiency improvements autonomously, reducing expenditures for foreign knowledge and skills.</p>	<p><b>Need to qualify teachers and training providers</b> Teachers and trainers need to have profound knowledge on resource efficiency before education and training measures can be implemented.</p> <p><b>Weak educational systems</b> Introducing a relatively new topic such as resource efficiency can be challenging in countries that have a weak educational system, e.g. lacking proper vocational training.</p> <p><b>Available level of education and training</b> Missing basic skills (especially literacy) can make education and training ineffective.</p> <p><b>Incentive to participate</b> The incentive to participate in training and education for resource efficiency depends on the acceptance in the labour market and priorities set by employers.</p> <p><b>Public budget restraints</b> Education and training priorities often depend on the availability of public budgets, if this is very low, getting commitment for funding resource efficiency education and training might be difficult.</p>

Table 4: Strengths and weaknesses of education and training for resource efficiency

Integrating the topic of resource efficiency into educational curricula and vocational training careers can add additional costs to general education expenditures by governments. However, there exist a variety of options for cost sharing and mixed modes of financing. For example, government can engage the business sector to provide vocational and on-the-job learning. Furthermore, governments can obtain development cooperation support for integrating resource efficiency issues into education and vocational training. Setting specific objectives and adequate planning can help to control costs. The following table provides a generic overview on costs that can occur in the course of integrating resource efficiency in education and training:

Category	Description	Faced by
<b>Initial check</b>	Costs for background studies and stakeholder engagement to define educational agenda	Governments / Training Providers
<b>Activity planning</b>	Costs for setting up education and training programmes	Governments/ Training providers
<b>Implementation of activities</b>	Costs for human resources, premises, etc. to undertake trainings Costs for attending the training (materials, transport, lost work time)	Participants
<b>Monitoring and evaluation</b>	Costs for evaluating education and training results	Governments / Training Providers

Table 5: Costs associated with education and training

## Success factors

The following success factors contribute toward increasing the effectiveness of resource efficiency education and vocational training activities:

Success factor	Explanations
<b>Early involvement</b>	A preferred approach is that all students participate in an environmental and sustainability oriented unit early in the curriculum. This will carry the mindset through the rest of the course. It is important for students to understand whether and how their discipline interacts with the environment and sustainability.
<b>Flexibility</b>	Designing training and education with lifelong learning in mind can enable participants to find answers to the multitude of challenges they will encounter when implementing resource efficiency in practice.
<b>Customisation</b>	One-fits-all solutions may not suffice; hence, training contents should be customised and adapted to the challenges at hand, the participants' backgrounds, and the specific training situation. Special attention should be paid to cultural, social and economic characteristics of training participants.
<b>Interdisciplinary</b>	Resource efficiency is not only a technical problem, but needs to be addressed by involving a multitude of disciplines and applying various approaches. Training programmes should seek a co-evolution between technological and social knowledge, dealing also with issues like behavioural change and attitudes.
<b>Embeddedness</b>	Existing and already accepted educational institutions might be utilised rather than creating new ones. Partnerships between resource efficiency training providers and traditional institutions provide a form of integrating new topics into classical curricula and can increase the overall scope of resource efficiency training programmes.
<b>Student-centred and implementation oriented learning</b>	Student-centred learning involves resource-based teaching, enquiry and discovery learning, values clarification and analysis, problem-based learning, simulation games and role-play, and learning through community problem solving (UNESCP 2002).
<b>Address trade-offs</b>	Training and education should not be narrow-minded or offer 'easy fixes', but should show the multitude of challenges and barriers existing in real life situations and how these might be addressed. Resource efficiency as a concept provides an opportunity to show how solutions can be found that are sensitive to environmental and economic imperatives.

Table 6: Success factors of education and training for resource efficiency

## Key Literature and Case Studies

**UNESCO (2002):** *Education for Sustainability: From Rio to Johannesburg: Lessons learnt from a decade of commitment.*

**Aspen Institute, World Resources Institute:** *Beyond Grey Pinstripes: Preparing MBAs for social and environmental stewardship.* [www.beyondgreypinstripes.org](http://www.beyondgreypinstripes.org)

Name	Link
United Nations Decade of Education for Sustainable Development website:	<a href="http://portal.unesco.org/education/en/">http://portal.unesco.org/education/en/</a>
UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production – Training on SCP and environmental management systems	<a href="http://www.scp-centre.org">http://www.scp-centre.org</a>
Cleaner Production (CP) Activities and Trainings	<a href="http://www.uneptie.org/PC/cp/home.htm">http://www.uneptie.org/PC/cp/home.htm</a>



### 1. Technology Transfer

#### Definition and objectives

Technology transfer is the process of acquiring technologies themselves as well as the necessary knowledge and skills to apply them from foreign parties. It thus involves the parties (abroad) that develop(ed), hold, and currently use environmentally sound technologies, and counterparts (domestic) that wish to apply the environmental technology within their business.

Governments can have an intermediary or brokerage role by initiating and supporting technology transfer. This process has been supported since 2005 by a number of development agencies that have been active in promoting the transfer of successful and resource-efficient technologies from industrialised to developing countries. Companies investing in developing countries may also support the transfer of existing technologies not only to their subsidiaries but also to local companies operating in the area where the company is channelling its investments. By utilising such opportunities, governmental agencies can actively support local enterprises to obtain the latest resource-efficient technologies. Although technology transfer mostly refers to the export of technology from industrialised to developing countries ('North-South transfer'), there are increasing technology transfer activities taking place among developing and transformation countries ('South-South transfer').

#### Mode of operation

Realising technology transfers generally involves both public and private partners, and requires contributions by both national and foreign actors. There exist different opportunities for North-South and South-South transfers and existing learning experiences can be utilised to increase the availability and operation of resource-efficient technologies in developing countries. The following table provides an overview of possible technology transfer options:

Type	Role in the process
<b>Bi- and/or multilateral agreements</b>	A number of developing countries have entered into bi- and/or multilateral agreements with industrialised countries to promote the transfer of environmental technology, including trade rules. These agreements provide a legal framework to promote specific investments for effective and successful technology transfers.
<b>Cooperation with international development cooperation agencies</b>	Development cooperation agencies tend to have a long track record on participating in technology transfer. They often possess in-depth knowledge on latest state-of-the-art environmental technologies in their home countries, and often provide support for building up local knowledge and technology platforms.
<b>Establishment of technology transfer institutions</b>	Institutions dedicated to promote technology transfer can provide and diffuse information on environmental technologies and enhance international environmental technology exchange (GTZ 1999). Such an institution might be set in the context of a bi- or multilateral agreement and can involve public and/or private actors. Involving regionally and locally established institutions such as universities, industry and trade chambers and business associations can significantly reduce the costs of technology transfer and increase the uptake of technology by capitalising on the reputation and network of these institutions.

<b>Promotion of foreign direct investments</b>	Many industrialised and some developing countries have promoted industry sectors specialising in the development of environmental technologies, building a network of businesses that develop, use and/or maintain environmentally sound technologies. These companies possess extensive technological knowledge and should play a key role in the course of investing or participating in technology transfers.
<b>Creation of local markets for environmental technology</b>	Strong local markets for environmental technology can attract companies to market their technologies in the country. Governments can take action by strengthening market institutions, especially by protecting property rights, and reducing transaction costs, e.g. through promoting information and communication technologies or pooling of orders and activities to achieve economies of scale.
<b>Support of pilot projects</b>	Publicly supported pilot projects can illustrate the feasibility and profitability of applying environmental technology in a country, also providing the project with a higher profile and higher visibility.

Table 1: Options of technology transfer

Governments that want to support technology transfer might consider the steps given in the following table. During the initial check the government might also evaluate the possibilities of promoting the development of locally appropriate resource-efficient technologies. It can further strengthen local capabilities by investing continuously into research and development activities, e.g. by universities (see instrument ‘Research & Development’).

Step	Issues to consider
<b>Initial check</b>	<ul style="list-style-type: none"> <li>■ Analysis and evaluation of existing and available resource-efficient technologies that are already applied by domestic companies and identification of suitable private companies to be involved in technology transfer.</li> <li>■ Gap analysis and identification of missing technologies that are needed to improve resource efficiency in domestic companies by consulting businesses and other stakeholders (e.g. associations, non-governmental organisations).</li> <li>■ Assessment of local market for new technologies and creating incentives for promoting promising new technologies.</li> <li>■ Assessment of available resource-efficient technologies in the international markets and identification of options to acquire these.</li> <li>■ Assessment of domestic framework conditions and identification of necessary interventions for successfully realising a technology transfer.</li> </ul>
<b>Planning of activities</b>	<ul style="list-style-type: none"> <li>■ Prioritisation of environmental technologies that need to be acquired and setting up of objectives and procedures for the technology transfer activities.</li> <li>■ Decision on type of technology transfer (see table above).</li> </ul>
<b>Implementation of activities</b>	<ul style="list-style-type: none"> <li>■ Implementation of the measures and activities agreed on.</li> </ul>
<b>Monitoring and evaluation</b>	<ul style="list-style-type: none"> <li>■ Continuous monitoring if technology transfer objectives are achieved and readiness to take corrective actions.</li> </ul>

Table 2: Steps and issues to be considered regarding technology transfer

## Strengths & weaknesses

Strengths and weaknesses of technology transfer are summarised in the table below:

Strengths	Weaknesses
<p><b>Direct impact</b> Technology co-operation can lead to visible and tangible results in resource efficiency improvements in a relatively short period.</p> <p><b>Knowledge spill-over</b> Knowledge that is created within the supporting networks can spill-over into other areas of economic activities and induce further innovation processes for improving resource efficiency at a national level.</p> <p><b>Creation of new market opportunities</b> A number of countries have experienced rapid growth in their environmental technology markets after successful technology transfers and this strategy is likely to continue to be successful in the future.</p> <p><b>Long-term impact</b> Enhancing and fostering local capacities for knowledge and use of resource-efficient technologies are likely to have a long-term impact on continuous improvement and national economic growth.</p>	<p><b>Profitability not addressed</b> Above mentioned measures only work if it is profitable for businesses to apply new environmental technologies. Fiscal policies can support this.</p> <p><b>Reliance on foreign partners</b> If local technological capabilities are low, technology transfer can be heavily dependent on support and willingness of foreign partners, likely reducing local economic and social benefits.</p> <p><b>Low initial level of capacities</b> If activities start from a relatively low knowledge level of environmental technologies, building up local capacities for long-term change can take time.</p> <p><b>Lack of information on cost-effectiveness</b> Often sufficient information on the cost-effectiveness of new technologies is not available. This might hinder the broad take-up of new and resource-efficient technologies.</p> <p><b>Lack of awareness of socio-cultural dimension</b> Technology transfer programmes might be ineffective if they neglect socio-cultural issues regarding the appropriateness of new technology in a local context, and corresponding impacts on the willingness and competence to embrace the technology as well as the costs for maintaining the technology.</p>

Table 3: Strengths and weaknesses of technology transfer

Financial costs related to technology transfer generally exist in the following cost categories:

Category	Description	Faced by
<b>Initial check</b>	Costs for background studies and stakeholder engagement to define the scope of technology transfer.	Government
<b>Planning of activities</b>	Costs for setting up technology transfer programme	Government
<b>Implementation of activities</b>	<p>Costs for implementing technology transfer programme</p> <p>Costs for participating in technology transfer events or for acquiring information and skills through other information channels</p> <p>Costs for licensing and consultancy fees to technology owners</p> <p>Costs for the adaptation of technologies to local conditions</p>	Businesses
<b>Monitoring and evaluation</b>	Costs for evaluating technology transfer results and follow up activities.	Government

Table 4: Costs associated with technology transfer

## Success factors

Successful technological co-operation programmes depend on a variety of variables. Governments and the private sector involved in technology transfer should attempt to capitalise on the strengths and avoid the weaknesses:

Condition	Justification
Adapting to local circumstances	Technical solutions might not be directly transferable without adaptations. Undertaking technology assessments in developing countries can yield results different from those obtained in countries where the technology was first applied due to different circumstances and priorities. Local capacities are required to assess and adapt existing technologies to local environmental, financial and socio-cultural needs and conditions (see instrument 'Research and Development – R&D').
Capacity building on demand side	Technology transfer should be accompanied by efforts to build knowledge and skills on environmental technologies in local businesses, including capacities for assessing the environmental, financial and socio-cultural impacts of technologies. Governments can create support and information centres on environmental technologies (see instrument 'Information Centres') or encourage education and training (see instrument 'Education and Training')
Setting incentives for adoption of environmental technology	Technology transfer should build on public policies that set incentives for the uptake of these technologies, e.g. by applying norms and standards, establishing liability or using economic instruments (see respective instruments)
Balancing technological and social development	Balancing technical change and social adjustment using purely technical solutions is likely to fail. Promoting equal access to technologies so as not to reinforce economic and social inequalities will be important.
South-South transfer	Technology transfer between developing countries can harness the experience gained with environmental technology in a developing country context and avoids having to adapt industrialised countries' technology to conditions in developing countries.

Table 5: Success factors of technology transfer for resource efficiency

## Key Literature and Case Studies

**EU (2002):** *Environmental technology for sustainable development – Report from the commission*. COM (2002) 122 final, Brussels 2002

**EU (2004):** *Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union*. Communication from the Commission to the Council and the European Parliament, COM(2004) 38 final, Brussels 2004

**UNEP (2005):** *International environmental governance: Bali Strategic Plan for Technology Support and Capacity-building, Note by the Executive Director*. Annex UNEP/GC.23/6/Add.1, United Nations Environment Programme

Case Studies / Examples	Link
UNEP-DTIE International Environmental Technology Centre (IETC)	<a href="http://www.unep.or.jp/ietc/index.asp">http://www.unep.or.jp/ietc/index.asp</a>
United Nations Framework Convention on Climate Change (UNFCCC) – Transfer of Technology Department	<a href="http://ttclear.unfccc.int/ttclear/jsp/">http://ttclear.unfccc.int/ttclear/jsp/</a>
Tecno-Point – Ideas and technologies for micro, small and medium enterprises	<a href="http://www.tecno-point.com/en/">http://www.tecno-point.com/en/</a>



### 2. Voluntary Agreements

#### Definition and objectives

Voluntary agreements aim to encourage single firms, groups of companies or industrial sectors to improve their resource efficiency and environmental conduct and performance beyond existing environmental legislation and regulations. Basically, voluntary agreements encompass two dimensions: 1) Business and/or industry participate voluntarily, and 2) there is an interaction between public authorities and business/industry.

Voluntary agreements range from initiatives where participating parties set their own targets and often conduct their own monitoring and reporting, to initiatives where a contract is made between a private party and a public body or stakeholder groups such as local communities and/or non-governmental or environmental groups. By publicly making such commitments, voluntary agreements are expected to “stop a race to the bottom” and to “raise the bar” towards continuous improvement in environmental performance of the industry. Further, voluntary agreements facilitate the formulation of policies that address environmental aspects beyond the compliance of laws. They are an important instrument to stimulate the environmental dialogue aiming to achieve sustainable consumption and production.

#### Mode of operation

According to the degree of interaction between companies and stakeholders, three main types of voluntary agreements can be distinguished, which also comprise different modes of operation:

Type of agreement	Description
<b>Unilateral commitments made by industry</b>	Unilateral commitments consist of environmental improvement programmes set up and communicated by firms to their stakeholders (employees, shareholders, clients, etc.). In unilateral commitments companies internally establish their own environmental goals either individually or jointly with other companies (often from the same sector) or industry associations. They independently determine when and how goals will be reached, and control any monitoring or public reporting process. The initiatives taken by leader companies can help raise industry standards and provide benchmarks for other companies that are not party to the agreements.
<b>Agreements between industry and public authorities</b>	<p>Public authorities (national or local) and a group of companies or industry bodies jointly develop these voluntary agreements. They usually involve some form of negotiation and the sharing of management responsibilities such as monitoring and evaluation. The agreement generally consists of sustainability targets to be met by the industry within a specified time frame.</p> <p>The level of enforcement of such agreements can be diverse. The most common distinctions made are between those voluntary agreements which are non-binding and those, which are contractual and contain specific control measures (e.g. monitoring and reporting requirements) and might involve sanctions (e.g. implicit threat of regulations through public authorities).</p> <p>The targets set in the agreements can be either general, qualitative goals (e.g. continuous improvement) or specific quantitative targets relative to previous performance (e.g. reduction of material usage) or absolute targets (e.g. zero emissions).</p> <p>While industry commits to meeting the targets and methods agreed upon, government commitments may include: a) Postponing new legislation or regulatory measures; b) Providing information, incentives, technical assistance and public recognition; c) Removing market barriers which prevent cost effectiveness.</p>

<b>Voluntary agreement schemes set up by public authorities</b>	Public voluntary schemes are programmes devised by a public authority in which individual firms are invited to participate. Normally in this case a public authority or international agency develops a voluntary code, guidelines, and standards in which individual companies are invited to take part. The final participation is a choice left to individual companies.
---	---

Table 1: Types of voluntary agreements

Within the three main types of voluntary agreements between industry/business and public authorities there are also different focus areas for voluntary agreements:

**Product versus process oriented:** Whereas process oriented agreements aim at improving production processes (e.g. the reduction of emissions which damage the environment), product oriented voluntary agreements aim at environmental characteristics of the final good.

**Target-based versus implementation based:** Voluntary agreements can either set pollution abatement or resource efficiency targets, or define the implementation procedure how to achieve them.

**Individual versus collective liability:** This criterion underlies the fact that voluntary agreements can be either concluded with single firms or with an industry association or sector (OECD 2003).

Where a public authority aims to set up a voluntary agreement through negotiation with an industry and/or individual business there are a number of important steps and aspects that need to be considered during different phases of the process of setting up such an agreement. The following table provides a selection of key aspects to consider during the voluntary agreement set-up process:

Phase	Issues to consider
<b>Preparation &amp; Launching Phase</b>	<ul style="list-style-type: none"> <li>■ Clear definition of the environmental concern the voluntary agreement focuses on</li> <li>■ selection of a partner industry sector or key company</li> <li>■ Development of an action strategy</li> <li>■ Organisation of a co-operative process</li> <li>■ Identification of “win-win” situations and their communication to all participants (Convincing all participants of the agreement of “win-win” situation)</li> <li>■ Pin-point alternative regulation measures to a voluntary agreement (regulatory threat)</li> <li>■ Creation of incentives to motivate participation in the negotiation process</li> </ul>
<b>Negotiation Phase</b>	<ul style="list-style-type: none"> <li>■ Open and transparent target setting for stakeholders</li> <li>■ Definition of a clear and quantifiable environmental target (including interim targets)</li> <li>■ Definition of a clear time frame</li> <li>■ Consideration at all political levels (national, regional, local) and setting their role in implementing the agreement</li> <li>■ Integration of measures, monitoring, incentives and sanctions</li> <li>■ Setting a framework for collecting monitoring/ evaluation data</li> <li>■ Examination of the potential for combining the voluntary agreement with other policy instruments</li> </ul>
<b>Implementation Phase</b>	<ul style="list-style-type: none"> <li>■ Assessment of likely environmental effectiveness</li> <li>■ Creation of a monitoring and evaluation procedure</li> <li>■ Regular reporting of progress and results</li> <li>■ Set-up of working groups for information exchange</li> <li>■ Adaptation and modification of measures</li> </ul>

Table 2: Phases of implementing voluntary agreements



## Strengths & weaknesses

Voluntary agreements bear a number of strengths and weaknesses, the most common of which are highlighted in the following table:

Strengths	Weaknesses
<p><b>Provide greater flexibility than regulations</b> Voluntary agreements can offer more ambitious goals than regulations, while lowering administrative and enforcement costs and enabling faster implementation.</p> <p><b>Encourage proactive and precautionary attitudes in industry</b> Voluntary agreements can shift business' mindsets from reactionary, end-of-pipe, and financial-cost attitudes to proactive, cleaner production and economic savings behaviour.</p> <p><b>Improve dialogue and trust between industry and stakeholders</b> Through the process of developing voluntary agreements, the industry, public authorities and the public can build up more co-operative relationships and understand each others' concerns and needs.</p>	<p><b>Difficult to apply in areas with little business self-interest</b> Voluntary agreements are limited to those areas in which the industry has a business interest in voluntarily changing their behaviour (e.g. cost effectiveness, public recognition, avoidance of future regulations). When the costs of achieving the targets are found to be very high, the targets tend not to be enforced strictly (OECD 2003).</p> <p><b>Existence of "free riders"</b> Voluntary agreements are unable to incite all companies to invest in environmental protection and cannot, on their own, deal with negligent or consistently poor performers.</p> <p><b>Difficult to ensure global application</b> Voluntary agreements need to be developed and applied differently in different cultural and social-economic contexts. This makes it difficult to ensure that voluntary environmental agreements are equally met for global challenges.</p>

Table 3: Strengths and weaknesses of voluntary agreements. Source: UNEP-DTIE (1998) and OECD (2003)

The costs of preparing and negotiating a voluntary agreement differ from case to case (see the table below). If many different parties are directly involved in the negotiation and development process of a voluntary agreement, if the legal status of the agreement is ambiguous, and/or if detailed technical analyses of potential abatement options need to be carried out, the costs can be rather high. For a small-scale, simpler or less ambitious agreement, the costs can be significantly lower.

Category	Description	Faced by
<b>Preparation</b>	...for gathering information about the current environmental performance of companies and the scope for potential improvement.	Public authorities/Industry body/ Companies
<b>Design</b>	...for negotiating the targets and contents set in agreements	Public authorities/Industry body/ Companies/Interest groups
<b>Administration</b>	...for informing companies about the agreements and supporting them to achieve the targets.	Public authorities/Industry body/Interest groups
<b>Implementation</b>	...for improving environmental performance to achieve the targets.	Companies
<b>Enforcement</b>	...for collecting the performance data, monitoring and evaluating the implementation, and issue sanctions if necessary.	Public authorities/Industry body

Table 4: Costs associated with voluntary agreements. Source: OECD (2003)

## Success factors

The following table provides a selection of key success factors that can be relevant in different phases of organising voluntary agreements:

Success factor	Issues to consider
<b>Conduct comprehensive preparatory analysis to set-up baseline</b>	The likelihood of a voluntary agreement providing any environmental improvements beyond “business as usual” tends to depend strongly on their level of preparation in developing a baseline to which performance can be compared. This preparation has to be based on detailed analysis of the current performance and the scope and conditions for improvement. This will help identify a meaningful and achievable level of environmental improvement in the agreement.
<b>Provide incentives for participation</b>	Public authorities can encourage companies to take their own voluntary actions by presenting voluntary agreements as incentives for avoiding introduction of tougher and costly legislation. They can also give participating companies recognition by, for example, offering public recognition.
<b>Design agreement in a way that it leads to concrete results</b>	It is important to design an agreement that helps to realise concrete improvements in the performance of participating companies. Setting clear, quantifiable targets and monitoring and reporting the performance are the most critical elements for the success of the agreement. If appropriate, sanctions against non-compliance can also be introduced.

Table 5: Success factors for voluntary agreements

## Key Literature and Case Studies

**OECD (2003):** Voluntary approaches for Environmental Policy: Effectiveness, Efficiency and Usage in Policy Mixes, Paris.

**UNEP-DTIE (1998):** Voluntary Initiatives, In: Industry and Environment Review, Volume 21, No. 1-2, Paris.

**Saur, Petr et al. (2001):** Voluntary Agreements in Environmental Policy, Prague.

**UNEP (2000):** Voluntary Initiatives: Current Status, Lessons Learnt and Next Steps, UNEP Discussion Paper, Paris.

Case Studies / Examples	Link
The OECD Report Voluntary Approaches for Environmental Policy contains a number of case study descriptions	<a href="http://www.foundationpartnership.org/pdf/oecd.PDF">http://www.foundationpartnership.org/pdf/oecd.PDF</a>
Voluntary Initiative in Sustainable Production, Trade and Consumption Chains in Chile	<a href="http://www.apecvist.cl/">http://www.apecvist.cl/</a>

## Case Study: Voluntary Commitments in Chile

### What are Voluntary Commitments in Chile?

Since 1998 the “voluntary commitments for cleaner production” (Acuerdos de Producción Limpia, APLs) have been an integral part of Chilean economic policy. Their objective is to motivate enterprises of different sizes in different sectors to institutionalise internal environmental protection measures and to improve the use of resources and thus raise environmental performance in participating businesses and service providers; in many cases there is still no legal basis for such action. To facilitate this process of adaptation, the Ministry of Economy has developed a large number of financial incentives. These include a fund for promoting advisory services and a fund for enhancing management capacities for implementing APLs. A special environmental credit line has been created to promote investment.

The idea of the APLs was initiated and is overseen by the Ministry of Economy, which has set up a “National Council for Cleaner Production” for this purpose. Its members are representatives of the state (environmental, health and sanitary authorities), representatives of the most important industrial associations and a representative of the national federation of trade unions.

The APLs are targeted at businesses and their associations.

### How do APLs in Chile work?

The APLs are proposed either by the members of the National Council or on the initiative of individual companies. The minimum number of companies required for setting up an APL is six. When this number is reached, a process of negotiation can begin between the initiators on the content of the measure, with the aim of jointly defining binding and reachable objectives. These objectives relate to environmental aspects as well as production, health and safety issues and the working environment. The aim is not only to implement statutory environmental regulations in a cost-effective way, but also to jointly identify and implement solutions for non-standardised areas of internal corporate activity in order to systematically promote environmentally sound production. These objectives form the basis for the binding agreement on the APL which is concluded between the state and the companies concerned. The APL includes a schedule for reaching the objectives. The first phase of implementation will last approx. three years. Achievement of the objectives is evaluated by external experts who are accredited by the National Council in accordance with statutory standards. If a company can prove that it has completely fulfilled all the objectives, it is awarded a “Certificate” from the National Council. This certificate is used for marketing purposes. However, the certificates are only recognised in Chile.

### Evaluating APLs in Chile

#### Lessons learned

Expanding the National Council by adding other actors in society such as scientific institutions, universities and the organised environmental movement could provide new impulses in relation to technology development, product design, etc.

#### Strengths

The APLs are an integral part of economic promotion policy. A national centre for cleaner production (CNPL) was set up by the state in 2000 to provide back-up for this process. In recent years export-oriented industries in particular, ranging from salmon farming to viticulture, have made a significant contribution to the introduction of environmentally friendly production methods. The number of industries taking part in the APLs and the number of companies involved has risen steadily. To date more than 4,000 companies have signed an APL.

For many companies, the implementation of an APL represents preparation for later certification under ISO 14 001.

- The National Council, whose work is supported by a team of experts, is funded directly by the Ministry of Economy.
- The APLs are voluntary by nature and the companies involved have joined them because they are convinced of their benefits. They are therefore active participants and eager for the APLs to succeed and be known throughout the country.

#### **Weaknesses**

- No legal sanctions can be taken against non-compliance with the agreed objectives.
- Often, environmental standards are negotiated for an APL which do not yet have any legal basis. It cannot be ruled out that the interests of the relevant sector of industry will influence how these standards are set down in law.
- APLs are business-oriented initiatives. Members of the scientific community or from environmental or social movements are not represented in the National Council. However their input both in terms of knowledge and support would be crucial for promoting the principle of “cleaner production” in the sense of efficient resource management and establishing it within society as a whole.
- Furthermore, successful participation in an APL is not being supported by other innovative state incentives such as favouring businesses/service providers that are APL-certified in (green) public procurement policy.

#### **Further information on APLs in Chile**

---

All the APLs are described (in Spanish) on the websites <http://www.cp.cl> and <http://www.pl.cl> along with further documents about the Council and the industries involved.

For further information please contact: Ms. Karin Gauer, email: [kgauer@plegos.cl](mailto:kgauer@plegos.cl)



## 1. Eco-Labeling

### Definition and objectives

An Eco-Label is a type of label displaying information regarding the environmental performance of a certain product or service, in order to provide information to consumers, procurement officials and other stakeholders, e.g. retailers<sup>1</sup>.

Labels can be positive in nature, identifying superior environmental performance throughout the entire life cycle of a product or only stages of it or negative, such as hazard warning labels. The primary function of a 'positive' eco-label is to stimulate both supply and demand of products with improved environmental performance. Thereby, they shall minimise the product-related environmental impacts and improve resource efficiency through environmentally conscious innovation. With respect to supply, a positive eco-label has the objective of encouraging businesses to produce and sell greener, eco-labelled products. Eco-labels support "green" companies, i.e. businesses that manufacture products or offer services that have little negative or even positive impacts on the environment, by providing them with a reliable and often widely known and trusted "brand", which can be a very valuable marketing tool. On the demand side, eco-labels provide consumers with a means to make informed environmental choices when purchasing.

### Mode of operation

Eco-labels can be differentiated by the role different stakeholders play during initiation, set up, certification and promotion. Involved parties can be businesses, governments, NGOs and consumer associations, and independent third parties such as for example research institutes. Who is involved in an eco-label in what way can have repercussions on acceptance both on consumer and business side. ISO has issued standards for three types of eco-labels as described in Table 1.

Type	Description
<b>Type I</b>	Multiple-criteria based, third party certified label that awards a license authorising use of environmental labels on products indicating overall sound environmental performance of a product within a particular product category based on life cycle considerations. This label is usually intended to apply to a small number of environmentally preferable products within a given sector.
<b>Type II</b>	Informative environmental self-declaration claims by manufacturers, importers distributors or retailers of products.
<b>Type III</b>	Informative quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party, and verified by that or another qualified third party. These types of labels are often intended to provide information for commercial or institutional procurement processes.

Table 1: Voluntary Environmental Performance Labelling - ISO Definitions

Eco-labels can be concerned with different issues along the life cycle of products as listed in Table 2. The different issues and labels might also be combined, e.g. focusing on a specific issue along the life cycle. Labels for organic food are particularly common, also responding to consumer concerns about product quality and pesticide residues. Sometimes, social issues are added leading the way towards 'sustainability labels.' This includes labels for fair trade products, i.e. those products produced under improved conditions especially concerning community development.

Type	Description
<b>Life-cycle wide</b>	Eco-labelling covering the complete life-cycle is based on an assessment of the environmental impacts (input and output) related to the product throughout its entire life cycle, covering raw material extraction, production, distribution, consumption and end-of-life phase.

<sup>1</sup> Labels conveying information regarding the environmental performance of organisations (e.g. EMAS) will not be considered here.

<b>Life-cycle step specific</b>	Some eco-labels focus on a specific step in the life cycle of a product, e.g. the raw material or agricultural phase. Examples include labels for wood from sustainably managed forests (e.g. the Forest Stewardship Council seal).
<b>Issue-specific</b>	Eco-labelling can also be concerned with specific environmental issues. This can be the content of recycled material in the product, its toxicity, the presence/absence of a particular substance of concern or the capacity for recycling. Examples are recycled paper or clothing free of pesticide residues.
<b>Use-phase efficiency</b>	Eco-labelling based on use-phase efficiency allows consumers to estimate the costs they will bear while using the product, e.g. energy consumption of electric appliances. Energy- and (less so) water efficiency labels have become standard in many countries in recent years.

Table 2: Different types of eco-labels

The following issues have to be considered when implementing an eco-label:

Key Steps	Issues to consider
<b>Assign responsibilities</b>	Clearly assign who is responsible for defining criteria, certifying products and generally administering the programme.
<b>Selection and determination of product categories</b>	Selection of product categories and determination of certification criteria for these categories. Accumulation of proposals for certification criteria and categories from industry, science, trade, consumers, environmental and other public organisations (stakeholder-process).
<b>Development of criteria, standards or guidelines</b>	Once product categories are selected the next step is the establishment of requirements that an applicant must meet to be approved by the eco-labelling programme. Criteria for granting an eco-label to a product or service can be absolute without limit as to the number of products that qualify for the label or relative, where only a given fraction of the top performing products will qualify for the label. The group responsible for setting the criteria may include scientific and technical experts from both government and the private sector. Feedback and comments with interested stakeholders might subsequently be undertaken to reach the final criteria list (periodical verification).
<b>Certification and licensing</b>	Producers, service providers, suppliers/ retailers, distributors, importers and other legitimated institutions may apply for certification. The awarding process includes testing and compliance verification, applicant licensing and monitoring (periodically examination 2-5 years). Applicants usually have to pay an application fee, the costs of verification and an annual fee for use of eco-Label (depends on annual product turnover).

Table 3: Steps and issues to be considered for establishing an eco-label (Porrini 2005, Huppes/Simonis 2000)

## Strengths and Weaknesses

Efforts to measure effectiveness of eco-labels are not yet fully developed. Nonetheless, positive responses of industries and consumers suggest that eco-labels are perceived as useful tools and generally accepted informative instruments to steer environmentally sound consumer choices. The following strengths and weaknesses have been identified:

Strengths	Weaknesses
<p><b>Stakeholder participation</b> Negotiating detailed awarding criteria takes place between public and private experts and a number of further stakeholders</p>	<p><b>Many different labels</b> Increased number of environmental product labels (with different guiding standards) can lead to consumer confusion.</p>
<p><b>Reward leadership</b> Eco-labelling programmes reward environmentally ambitious companies with public recognition, thus encouraging companies to take a pro-active attitude towards the environment.</p>	<p><b>Potential trade effects</b> Eco-labels can raise trade concerns when criteria include production related criteria which discriminate against imported products. Transparency of criteria development and consultation with importers is critical to avoid potential trade barriers.</p>

**Increased environmental awareness**

Through their public visibility, eco-labels are likely to raise awareness among consumers about environmental issues.

**Diffusion of best available technology**

Ambitious eco-labels can help to make the best available technology clearly recognisable and widely applied.

**Provision of economic incentives**

For manufacturers labels provide benchmarking information and information on the situation in the marketplace, and can help to green the corporate image and serve as a communication tool.

**Demand driven policy instrument**

As consumers have the 'ultimate voice' through purchasing decisions, eco-label criteria are likely to reflect consumers' preferences and concerns.

**No continuous innovation incentive**

When criteria are not continuously evaluated and updated, no incentive exists for companies to improve performance beyond the specifications of the current criteria.

**Effectiveness is difficult to assess**

Efforts to measure effectiveness are incomplete, e.g. there are difficulties in assessing the impact of eco-labels on the overall performance of companies.

**Not always clear preferences**

Labels mainly address domestic economic and environmental priorities, selected criteria may not be relevant to broader environmental and societal issues.

**Criteria depend on public perception**

Environmental issues reflected by the criteria might reflect more public, sometimes irrational concerns, than sound scientific evaluations.

**Appropriate framework conditions**

Testing procedures require adapted technologies, infrastructure and expertise that is not always given in every country, especially not for producers in the South

Table 4: Strengths and weaknesses of eco-labels (Source: GEN 2004)

Category	Description	Faced by
<b>Formulation</b>	...for setting up the eco-label as outlined above	Government or establishing body
<b>Promotion</b>	...for ensuring awareness and support for the eco-label among consumers and the private sector alike	Government or establishing body
<b>Research &amp; development</b>	...for adjusting existing or developing new products and services that comply with the eco-label criteria	Private sector
<b>Certification</b>	...for measuring and verifying product performance	Private sector

Table 5: Costs associated to eco-labels

## Success factors

The following table provides a selection of key success factors that can be relevant during different phases of the set-up process.

Success factor	Issues to consider
<b>Openness and transparency</b>	To ensure trust in the eco-label, transparency should be assured through all steps of programme development and operation. This includes information on methodology, criteria and the certification procedure. Still, all information identified as confidential shall be kept as such, for example production process information.
<b>Independent certification and assurance</b>	The credibility of a label increases considerably when it is awarded only after successful independent third party certification. As a general rule, involving independent organisations without conflict of interest during label development and implementation can foster public trust. An independent body can also oversee and direct the programme's delivery activities, including technical, marketing, and administrative aspects. The level of involvement in delivery may range from co-ordinating functions and liaising with different delivery agencies to performing the actual day-to-day operational tasks.

<b>Low entry barriers</b>	In order to encourage a wide application of the label, it should be open to all potential applicants, carry a low administrative burden and low participation costs and fees, which should be applied equitably to all participants. Governmental programmes could help to support SMEs in the certification process to prevent market barriers. These measures would also help to avoid unintended trade barriers as interested parties from other countries may apply for the label and thus benefit from the advantages associated with the label.
<b>Wide-spread participation</b>	Involving a wide range of stakeholders through all steps of the programme development and implementation can ensure validity of methodology and criteria applied, as well as secure societal support for the eco-label.
<b>Private sector support</b>	Industry and commercial sector awareness, interest and direct involvement are essential to programme success. They serve to formulate criteria for certification and licensing that are credible and practical in the market place.
<b>Sufficient promotion</b>	The intensity of information provided through different media and communication channels plays an important role. Consumer associations and other civil society groups should contribute to generating public trust into eco-labelling programmes.
<b>Sound criteria development and evaluation</b>	To ensure both industry and consumer support, and to safeguard the environmental effectiveness of eco-labelling, the criteria applied should: <ul style="list-style-type: none"> <li>■ be based on sound scientific and engineering principles</li> <li>■ adequately reflect consumer preferences</li> <li>■ distinguish leadership and give allowance of innovation</li> <li>■ be credible, relevant, attainable, and measurable/verifiable</li> <li>■ be flexible and allow to respond to technological and market requirements</li> </ul>

Table 6: Success factors regarding eco-labels. Source: GEN 2004

## Key Literature and Case Studies

**Global Ecolabelling Network (GEN) (2004):** *Introduction to Ecolabelling. Information Paper.* [http://www.gen.gr.jp/pdf/pub\\_pdf01.pdf](http://www.gen.gr.jp/pdf/pub_pdf01.pdf)

**Kern, Christine; Kiessling-Näf, Ingrid; Landmann, Ute; Mauch, Corinne (2001):** *Ecolabelling and Forest Certification as New Environmental Policy Instruments – Factors which Impede and Support Diffusion.* Paper Prepared for the ECPR Workshop on „The Politics of New Environmental Policy Instruments“ Grenoble, April 2001.

**Allison, Charles; Garter, Anthea (2000):** Study on different types of Environmental Labelling (ISO Type II and III Labels): Proposal for an Environmental Labelling Strategy. DG Environment, European Commission. <http://europa.eu.int/comm/environment/ecolabel/pdf/studies/erm.pdf>

**Porrini, Donatella (2005):** *Environmental policies choice as and issue of information efficiency.* Working Paper, Università degli Studi di Milano

Case Studies / Examples	Link
EU Eco-Label	<a href="http://www.eco-label.com">http://www.eco-label.com</a>
The Consumers Union Guide to Environmental Labels	<a href="http://www.eco-labels.org">http://www.eco-labels.org</a>
The German Blue Angel Label	<a href="http://www.blauer-engel.de">http://www.blauer-engel.de</a>
The Forest Stewardship Council Labelling Programme	<a href="http://www.fsc.org/en/">http://www.fsc.org/en/</a>
The Soil Association	<a href="http://www.soilassociation.org">http://www.soilassociation.org</a>
The Marine Stewardship Council	<a href="http://www.msc.org">http://www.msc.org</a>



## Case Study: European Union Energy Label

### What is the EU Energy Label?

The European Union (EU) Energy Label rates electric household appliances from A (the most energy efficient) to G (the least energy efficient) within a class of products and provides additional information such as the volumetric capacity of the refrigerator or freezer and the washing and spinning performance of washing machines. The label must be shown on all refrigerators, freezers, refrigerator-freezers, washing machines, tumble dryers, washer dryers, dishwashers and light bulb packaging by law. The EU Energy Label is a mandatory label for selected household appliances with application to products also sold for non-household uses.

The objective of the EU Energy Label is to inform consumers about the energy performance of products. The publication of information on the consumption of energy and of other essential resources by household appliances allows consumers to choose appliances on the basis of their energy efficiency.

### How does the EU Energy Label work?

Household appliances offered for sale, hire or hire-purchase must be accompanied by a fiche and a label providing information relating to their consumption of energy (electrical or other) or of other essential resources. The following picture (Fi. EU.I) provides an example of such a product fiche for a washing machine:

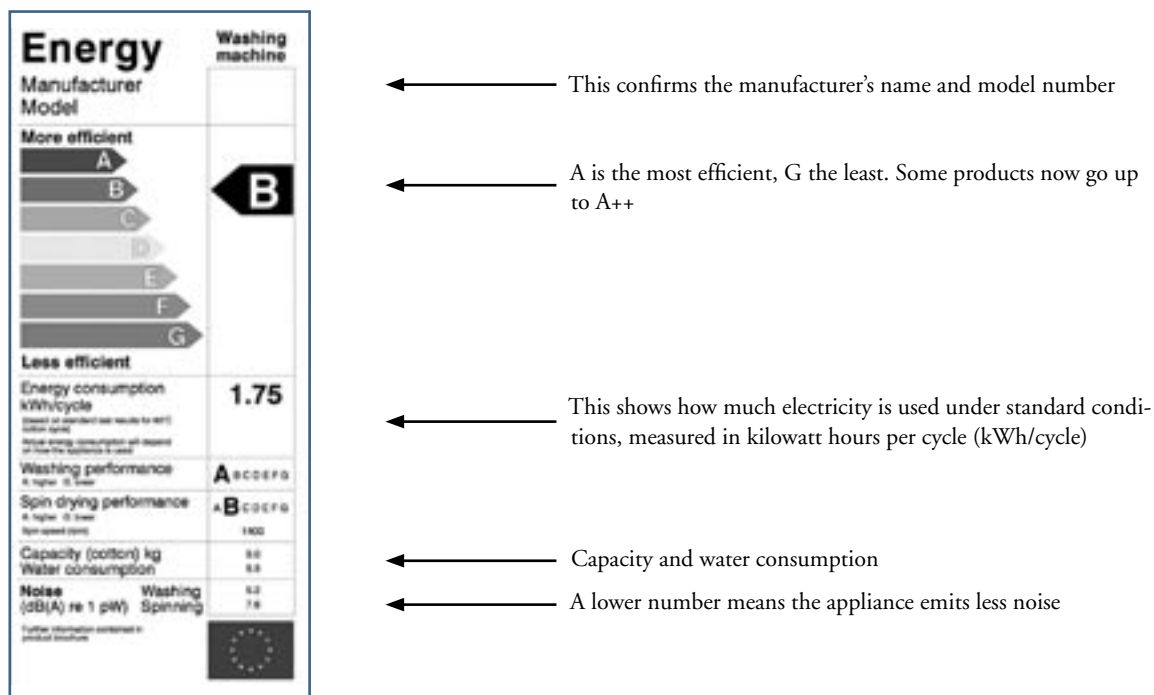


Fig. EU.I: Example of an EU Energy Label for a washing machine

The supplier has to ensure that the eco-label is used correctly. He must provide technical documentation sufficient to assure the accuracy of the information contained in the label and the fiche. This documentation must include: 1) a general description of the product; 2) the results of design calculations, where necessary; 3) test reports and 4) where values are derived from those obtained for similar models, the same information for these models. Further, suppliers must provide:

- a free label, to be attached to the appliance by the dealer in the appropriate position and in the relevant language;
- a product fiche, included in all brochures relating to the product or, where these are not provided, in all other literature provided with the appliance.

Suppliers are responsible for the accuracy of the information contained in the labels and fiches that they supply and are deemed to have given their consent to the publication of the information. Where appliances are offered for sale, hire or hire-purchase by catalogue or by other means whereby the potential customer is unable to see the appliance displayed, the essential information contained in the label or fiche must be provided to the potential customer before purchase.

### **Evaluating the EU Energy Label**

---

The application and implementation of the EU Energy Label is widespread in European Countries, largely due to the mandatory character of the label. The easy to understand and eye-catching character of the EU Energy Label has significantly contributed to increased European consumer awareness on energy efficiency. The market share of energy efficient household appliances has increased together with increased energy prices and consumers are paying more and more attention to buying energy efficient products because of cost saving potentials during the use phase of the products.

### **Further information on the EU Energy Label**

---

European Commission: Household appliances and energy consumption labelling

<http://europa.eu/scadplus/leg/en/lvb/l32004.htm>

International Energy Agency (IEA), 2000: Energy Labels and Standards.

<http://www.iea.org/textbase/nppdf/free/2000/label2000.pdf>

## Case Study: Forest Stewardship Council Label (FSC)

### What is the FSC Label?

Forest certification is a particular form of eco-labelling. It is a voluntary and in most cases non-governmental scheme providing an incentive for improved forest management through awarding a certificate and product label. The FSC-label does not address the environmental impact of a product over its entire life-cycle. It is only concerned with the primary production process to which environmental, social and economic criteria are applied. Further processing operations are only checked to prevent false claims as to the certified origin of handled products.

FSC has been fully operational since 1996 when the trademark was introduced. By April 2006 817 forest management certificates have been awarded covering more than 73 million hectares of forest in 72 countries. The FSC-label can be found on a variety of products from garden furniture and flooring to charcoal and paper. Although still a fraction in overall market share, it has become visible in certain market segments and is promoted by key industrial players such as IKEA, Home Depot, B&Q, SCA and others.

There are national FSC initiatives in 37 countries developing national standards, promoting certification and supporting its implementation.

The objective of FSC is to promote environmentally appropriate, socially beneficial, and economically viable management of the world's forests by establishing a worldwide quality benchmark of recognised and respected forest stewardship standards. FSC pursues this goal by overseeing an international certification scheme for responsible forest management and awarding a trademark and label for products originating from certified enterprises.

FSC certification is directed at forest enterprises worldwide ranging from small family-owned operations, forests owned and managed by communities to large-scale industrial enterprises. In each case the certification process is initiated by the owner of the forest enterprise.

FSC is an international non-governmental membership organisation open to organisations and individuals with environmental, social or economic interests. Each of these three interest groups or 'chambers' carries equal voting weight. It is governed by a Board of Directors elected by the membership and it is managed by a secretariat.

### How does the FSC Label work?

FSC has set up a forest certification scheme consisting of three main elements: a) forest stewardship standards, b) accreditation of independent third-party certification and c) chain-of-custody verification and product labelling.

FSC has developed a set of internationally applicable "Principles and Criteria of forest stewardship" covering legal, social, environmental and economic aspects. These constitute a global framework for the development of locally adapted and auditable standards. The process of adaptation is carried out by national multi-stakeholder groups, which follow the three-chamber structure of the international organisation. It also involves wide-ranging consultations with interested parties, field-testing and harmonisation processes with FSC initiatives in neighbouring countries. FSC officially endorses those national standards that fulfil FSC's requirements regarding conformity with its Principles and Criteria as well as certain procedural rules followed during their development. Up to now FSC has officially endorsed national FSC standards in 12 countries.

The FSC scheme oversees independent, third party certification of individual forest enterprises or groups of enterprises according to the FSC standards. FSC does not carry out the certification itself, but has established an accreditation programme, which accredits independent certification companies on the basis of ISO regulations. Important elements of every FSC-accredited certification are stakeholder consultations as part of the certification process and a summary report of each successful certification which is made publicly available.

The FSC system is designed as a market mechanism that allows consumers to make a responsible choice informed by a product label. This necessitates the setting up of a tracing system that guarantees the correctness of the FSC-label. This so-called verification of the chain-of-custody is carried out by independent certification bodies that certify each link in the supply chain.

## Evaluating the FSC Label

---

The process of national standards development encourages the setting up of national multi-stakeholder fora in which all interested groups enter into a dialogue and work on a consensus on how forest resources should be managed. This contributes to solving conflicts between groups and to advancing the knowledge about best practices with impacts beyond those enterprises that opt for certification.

The certification assessment of a forest operation often provides a valuable learning experience for the forest managers as the auditors evaluate every single aspect of forest management and discuss with the managers shortcomings that need remedying in order to comply with the standards.

The certificate and product label act as an incentive and reward for the commitment to comply with the standards. Though not guaranteeing a premium price the product label can help gain or maintain market access.

One limitation of this voluntary mechanism is the challenge of fierce price competition in a market distorted by supplies of timber from exploitative or even illegal production. Furthermore market benefits are not necessarily automatically filtering down the supply chain to the producers implementing the standard. Moreover, a market mechanism that strongly focuses on ethically conscious markets, i.e. mainly North America and Europe, is limited to products traded to those markets.

FSC certification does not include any social or environmental criteria for subsequent processing, manufacturing or trading of products labelled FSC. This poses a risk for consumer confidence.

The Programme for the Endorsement of Forest Certification schemes (PEFC) is becoming serious competition for FSC. Like FSC it offers a product label and works in a very similar way.

The management practices of smallholders and communities in developing countries – despite being sustainable – are often not easily certifiable. The logic of the FSC Principles and Criteria might not represent communities' approach to land and resources management.

## Further information on the FSC Label

---

**Nussbaum, R., Simula, M. (2005):** The Forest Certification Handbook. Second Edition. Earthscan

**Nussbaum, R., Jennings S., Garforth, M. (2002):** Assessing forest certification schemes: a practical guide. Proforest.

**Burger, D., Hess, J., Lang, B. (2005):** Forest Certification: An innovative instrument in the service of sustainable development? Programme Office for Social and Ecological Standards, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)

Websites:

[www.fsc.org](http://www.fsc.org), [www.pefc.org](http://www.pefc.org), [www.lei.or.id](http://www.lei.or.id), [www.mtcc.com.my](http://www.mtcc.com.my), [www.gtz.de/forest-certification](http://www.gtz.de/forest-certification)



## 2. Sustainability Reporting

### Definition & objectives

Sustainability reporting can be defined as the public disclosure of information about an organisation’s ‘non-financial performance’ (also termed ‘triple bottom line’) – its management policies, activities, and the result of activities on economic, environmental and social issues. It can be applied for any type of organisation such as companies and public authorities to communicate their contributions towards and impacts on sustainable development over a specified period, usually one financial year, to their stakeholders.

#### Resource efficiency in sustainability reports

Sustainability reports can contain data relating to resource efficiency such as total use of materials, energy, water, emissions and waste, as well as to energy efficiency of products. Some companies voluntarily disclose the data of resource efficiency improvements in major products (e.g. “Factor” measurement).

Information disclosure has been increasingly recognised as one of the most important mechanisms to stimulate organisations to operate in a more sustainable and responsible manner. Responding to the growing pressure and expectations from customers, business partners, investors and the wider community, sustainability reporting is expected to help organisations identify intangible risks and opportunities connected to their operations through measurement and management. An increasing number of governmental departments and local authorities have also begun publishing sustainability reports.

### Mode of operation

The government is only one player in the promotion of sustainability reporting. Various types of organisations in both the public and the private sectors have been playing their roles in different ways according to their political and cultural dynamism as seen below:

Type of promotion	Mode of operation
<b>Governmental regulations</b>	The government can make disclosure of non-financial performance mandatory for public agencies and private companies. Some countries including Denmark, the Netherlands and Portugal ask large companies to report either environmental or social (i.e. labour and community) elements of their activities to the government. There is even an effort for mainstreaming sustainability reporting by requesting non-financial disclosure as part of mandatory annual financial accounts (e.g. the New Economic Regulations in France).
<b>Governmental guidance</b>	The government can promote sustainability reporting by providing guidelines that standardise report contents. Most guidelines include a list of sustainability issues to be dealt with and quantitative and qualitative indicators to be measured and reported, along with guidance on the process of producing reports. So far, several countries including Austria, the UK, Japan and Australia have issued reporting guidelines that have focused on environmental aspects alone. The use of these guidelines is voluntary.
<b>Voluntary initiatives</b>	Internationally, the Global Reporting Initiative (GRI)’s Sustainability Reporting Guidelines are rapidly becoming the accepted international voluntary framework for sustainability reporting. By July 2006, over 870 organisations from 57 countries have used the GRI Guidelines to produce their sustainability reports.
<b>Listing requirements</b>	Stock markets and financial regulators have increasingly called for more accountability and disclosure on corporate governance. South Africa’s Johannesburg Securities Exchange is spearheading this development by requesting all listed companies to disclose non-financial performance.

<b>Business membership requirements</b>	Conditions of the membership of the World Business Council for Sustainable Development (WBCSD) include a clause stating that members should “publicly report on their environmental performance within three years of becoming a member and aspire to widen their reporting to cover all three elements of sustainable development – economic, environmental and social”.
<b>Shareholder/ stakeholder activism</b>	In the US, an increasing number of socially responsible investment (SRI) firms are using their voting power as large shareholders in order to improve the non-financial disclosure of companies in which they invest by filing shareholder resolutions.

Table 1: Types of promoting sustainability reporting

### Sustainability rating

Some important investors, such as pension funds in major European and North American markets, are now taking sustainability evaluations of companies into consideration when making investment decisions. Specialised sustainability rating agencies provide investors, banks, fund managers and securities brokers with ratings of companies' environmental and social performance. The two major stock exchange players, Dow Jones and FTSE, have created sustainability indexes of listed companies – Dow Jones Sustainability Index and FTSE4Good, respectively – based on the evaluations of rating agencies.

Rating organisations often compare environmental and social performance of the competitors within the same sectors. For example, Sustainability Asset Management (SAM), a Swiss rating agency, analysed performance of firms in the automotive industry based on their preparedness for climate change (SAM and WRI, 2003). Such evaluations will drive a technological competition between companies towards higher fuel and resource efficiency as investors' interest in sustainability issues increases.

Box 1: Sustainability rating. Source: Heemskerk et al. (2003)

## Strengths & weaknesses

Sustainability reporting has certain strengths and weaknesses as an instrument promoting resource efficiency as summarised below:

Strengths	Weaknesses
<p><b>Highlight the scope for improvement</b></p> <p>Evaluating environmental performance as part of the development of a sustainability report can highlight the scope for improving resource efficiency in the organisation's operations. The government can identify the companies that actively commit compliance and reduce environmental and social impacts.</p> <p><b>Attract investment</b></p> <p>By integrating sustainability performance into its management processes a company can identify linkages between the variables of sustainable performance and the drivers of shareholder value. A quality report can show what measures the company is taking to reduce risks and seize opportunities, which may increase the company's attractiveness for investment.</p> <p><b>Issues and Reputation Management</b></p> <p>Sustainability reporting can be an important tool for the company to demonstrate that it is actively dealing with the issues that may potentially become difficult for its reputation in the future. A sustainability report can directly influence the reputation of the company and is therefore becoming increasingly important for the overall corporate communication strategy.</p>	<p><b>Limits to growth</b></p> <p>At present, sustainability reporting is mainly a voluntary process. The efforts of pioneer organisations exert a pressure on others to follow their example and also raise the expectations of interested parties. However, the cost and time required for producing reports and lack of support for capacity building have prevented most small and medium-sized enterprises (SMEs) from taking part in reporting activities.</p> <p><b>Little comparability</b></p> <p>As the current sustainability reports have different scopes and formats, comparability on performance between organisations is poor despite the fact that many reports are based on similar guidelines such as the GRI Guidelines.</p> <p><b>Risk of “green-wash”</b></p> <p>Companies may be more motivated to produce sustainability reports for improving their images and evading criticism than demonstrating transparency and creating stakeholder dialogue, resulting in mere corporate “green-washing”.</p> <p><b>Regulations lead to the lowest standards</b></p> <p>Mandatory reporting could lead the organisations towards compliance with the lowest possible standards rather than promote best practices. Companies argue that the “one-size-fits-all” regulatory approach would stifle creativity and experiments.</p>

**Engage with its stakeholders**

Reporting is also a good way for an organisation to communicate openly about its values, objectives, principles and performance in relation to sustainable development. This makes it easier to build trust with its stakeholders, which is important for continued support.

**Little reference to the whole life cycle**

Most of the existing sustainability reports deal with information on the whole organisation, or country- or site-level of its operations. From the perspective of profiling and promoting resource efficiency, data on each product or product group throughout its life cycle is essential. However, this type of information has not been provided extensively in sustainability reports to date.

Table 2: Strengths and weaknesses of sustainability reporting

Typical costs incurred for promoting sustainability reporting are profiled as follows. By encouraging other actors to be active in the promotion, the financial burden on the government can be minimised.

Category	Description	Faced by
<b>Setting framework</b>	...for developing a voluntary reporting guideline or setting up legislation for mandatory reporting	Government/Industry association/International organisation
<b>Capacity building</b>	...for developing manuals and tools and providing firms with training	Government/Industry association/International organisation
<b>Encouragement</b>	...for organising an award scheme or benchmarking reports	Government/Media/NGOs

Table 3: Costs associated with sustainability reporting

**Success factors**

Success of sustainability reporting depends on a variety of factors that capitalise on the strengths and minimise the weaknesses listed above. The following factors were drawn from experiences of current sustainability reporting practice:

Success factor	Issues to consider
<b>Provide capacity building</b>	In parallel to providing guidelines on report contents, it is critical for the government to provide companies, particularly SMEs, with practical manuals and training on producing reports or encourage civil society or the industry to do so.
<b>Give “carrots”</b>	Some governments and other organisations set up awards or benchmarking schemes to commend best reports and encourage others to follow.
<b>Share promotional roles</b>	There does not seem to be a single answer on whether mandatory or voluntary reporting is more effective in promoting sustainability reporting. Policy makers need to judge benefits and disadvantages of both approaches carefully taking into account national circumstances. It would be effective for them to involve other actors promoting sustainability reporting (listed in Mode of Operation).
<b>Seek convergence of guidelines</b>	The existence of different national and international reporting guidelines has often created confusion. Governments need to work towards convergence, or at least ensure that national regulations and guidelines are compatible with other reporting provisions so as to improve comparability.
<b>Request product-based information</b>	From a viewpoint of promoting resource efficiency, policy makers can encourage companies to include comparable product-based performance in their sustainability reports as well as to expand the reporting boundaries to address the life cycle of products.

Table 4: Success factors concerning sustainability reporting

To date, around 2,000 companies worldwide – mainly large companies in developed nations – regularly issue sustainability reports along with standard financial statements or annual reports (ACCA and CorporateRegister.com, 2004). A handful of public agencies in Australia, New Zealand, Hong Kong, Finland, Sweden and the United Kingdom also publish their own sustainability reports.

### Key Literature and Case Studies

**Global Reporting Initiative (2002)** *GRI 2002 Sustainability Reporting Guidelines*, GRI, Amsterdam. (The new revised version will be released in October 2006.)

**GRI, Triple Innova and Wuppertal Institute (2004)** *High 5!: Communicating your business success through sustainability reporting*, GRI, Amsterdam.

**Heemskerk, B., Pistorio, P. and Scicluna, M. (2003)** *Striking the Balance: Sustainable development reporting*, World Business Council for Sustainable Development (WBCSD), Geneva.

**KPMG Global Sustainability Services (2005)** KPMG International Survey of Corporate Responsibility Reports 2005, KPMG International, Amsterdam.

**Pleon Kohtes Klewes GmbH (2005)** Accounting for Good: the Global Stakeholder Report 2005. The Second World-wide Survey on Stakeholder Attitudes to CSR Reporting. Download: [http://www.pleon.com/fileadmin/downloads/Pleon\\_GSR05\\_en.pdf](http://www.pleon.com/fileadmin/downloads/Pleon_GSR05_en.pdf)

**SustainAbility and UNEP (2004)** Risk & Opportunity: Best practice in non-financial reporting, SustainAbility, London.

Case Studies / Examples	Link
Corporate Register: A List of published Sustainability Reports	<a href="http://www.corporateregister.com">www.corporateregister.com</a>
Canada Sustainability Reporting Program	<a href="http://www.sustreport.org">www.sustreport.org</a>
Centre for Public Agency Sustainability Reporting	<a href="http://www.publicagencyreporting.org">www.publicagencyreporting.org</a>
Dow Jones Sustainability Index	<a href="http://www.sustainability-index.com">www.sustainability-index.com</a>
FTSE4Good	<a href="http://www.ftse.com">www.ftse.com</a>



## Case Study: The Global Reporting Initiative (GRI)

### What is the Global Reporting Initiative?

The Global Reporting Initiative (GRI) was set up with the vision that “reporting on economic, environmental, and social performance by all organisations becomes as routine and comparable as financial reporting”.

In order to achieve this vision, the GRI published the current GRI Sustainability Reporting Guidelines in 2002, while the updated third version will be released in October 2006. The Guidelines provide a framework for companies and other organisations for reporting their environmental and social performances along with their economic performances.

The Global Reporting Initiative is a membership-based organisation, which started as a project of a Boston-based NGO, the Coalition for Environmentally Responsible Economies (CERES) in 1997. Its present formal status as an independent non-profit institution (UNEP Collaborating Centre) was adopted in 2002 and headquarters were set up in Amsterdam, the Netherlands.

The GRI describes itself as a multi-stakeholder network consisting of the board, which is the highest decision making body, the secretariat as the executive body, a stakeholder council that elects and advises the board, a technical committee giving guidance on technical issues and an unlimited number of organisational stakeholders worldwide that are the foundation of the Initiative (see Fig. GRI.I).

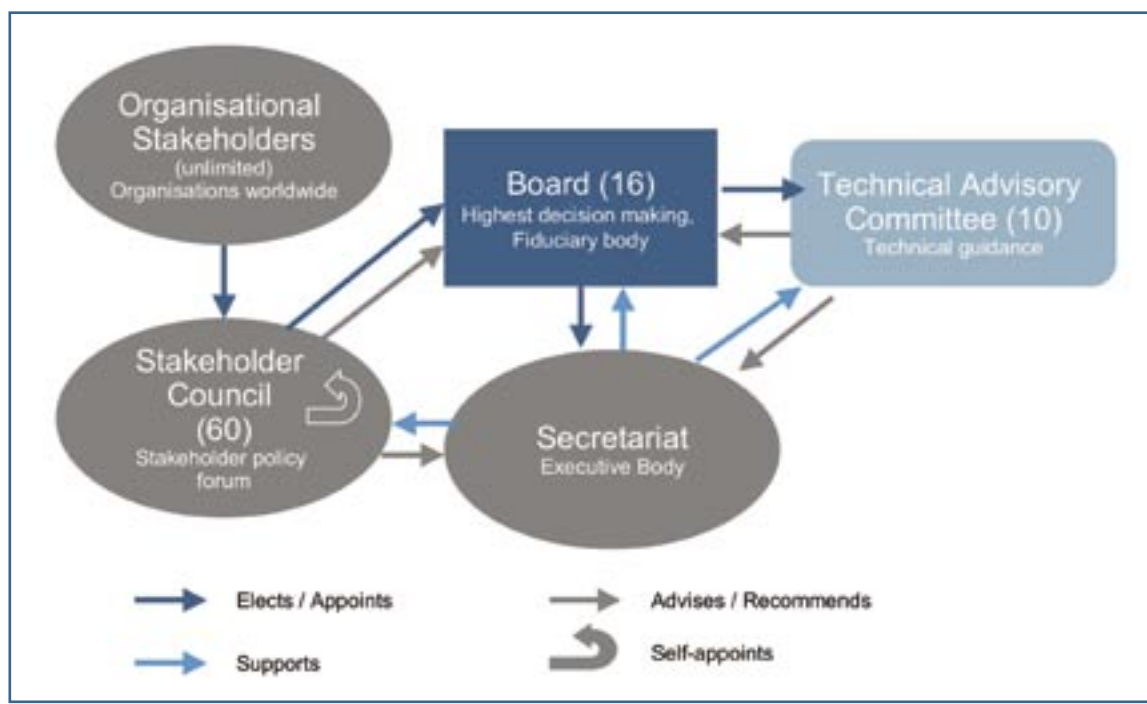


Fig. GRI.I: Organisational Structure of the Global Reporting Initiative

The work of the GRI is targeted at private companies of all sectors and sizes, which are interested in reporting non-financial aspects of their business activities, and other organisations such as public institutions. In addition to the Guidelines that are generally applicable to all businesses alike, supplements that provide guidance specific to particular sectors have also been developed.

### How does the Global Reporting Initiative work?

The GRI Sustainability Reporting Guidelines are the result of a continuous process of consultation with its stakeholders such as organisations using the Guidelines and other experts.

Organisations can use the Guidelines as an informal support for compiling a sustainability report or publish their report “in accordance” with the Guidelines, which may be stated clearly in the report.

The Guidelines consist of three parts. The first part contains the principles of sustainability reporting with regards to the content and scope of the report. The reporting organisation is expected to develop its sustainability reports based on certain principles including relevance, completeness, accuracy and transparency.

The second part gives a list of relevant indicators on the economic, environmental and social performance of the company or organisation. As the Guidelines are a voluntary standard, the reporting organisation does not need to report on all of these indicators. However, as more and more companies report according to the Guidelines, the set of indicators may become “state-of-the-art”. The Guidelines list 13 indicators for economic performance including economic value generated, spending on locally based suppliers and indirect economic impacts. 35 indicators describe the environmental performance of the organisation, e.g. with regards to water, energy, biodiversity and other important environmental media. Finally, the 49 social indicators include statements about management practice and child labour as well as corruption and community involvement.

The third part of the Guidelines gives advice on more general questions, for example how to use the Guidelines and how the credibility of a report can be ensured.

### **Evaluating the Global Reporting Initiative**

---

The GRI Sustainability Reporting Guidelines can be a useful tool for making organisations think about their environmental impacts and analyse them according to the environmental indicators. However, its influence on their resource efficiency is only indirect.

The tool is mainly useful for larger corporations, which are required by law or by public pressure to disclose information on their non-financial performance. The GRI is attempting to make the Guidelines more attractive for small and medium-sized enterprises (SMEs), but has not been very successful so far.

It can be concluded that the GRI Guidelines are not a means in themselves to increase resource efficiency, but are a useful instrument for assisting organisations in analysing and publicising their environmental (and social) performance as the first step towards greater resource efficiency.

Sustainability reports can become an important source of information for decision makers to draw policy measures to improve environmental performance of companies and other organisations, especially once the number of companies using the Guidelines has increased and the comparability of the non-financial performance of businesses has improved.

### **Further information on the Global Reporting Initiative**

---

Global Reporting Initiative <http://www.globalreporting.org>

Centre for Public Agency Sustainability Reporting <http://www.publicagencyreporting.org>



### 3. Information Centres

#### Definition and objectives

Information centres provide information on resource efficiency and related topics to actively promote the concept. Their main target group is private companies, including SMEs that often lack access to the latest information and do not have the capacity to keep up to date with every technological development in the market. Information centres thus play an important role for improving the technological competence of enterprises and for providing up-to-date, customer-oriented knowledge of resource efficiency. They sometimes also provide advice and training for company employees, government officials and consultants.

#### Mode of operation

Each information centre is unique in its nature thanks to the specific needs of local target groups and the national and local context. The following four types of information centres are only the most common ones. The public authority's role, extent of involvement, and necessary capacity and resources depend on the centre's mode of operation. Information centres may also be managed by organisations other than the public sector including NGOs and business associations. However, all types of information centres are generally concerned with making resource efficiency financially rewarding for enterprises.

Type	Features
<b>Centres operated by public authorities</b>	Public authorities can host the centre, providing corporate members and government officials with informational materials on resource efficiency as well as handling technical enquiries. Setting up a well-funded nation-wide centre can demonstrate leadership and commitment by public authorities to promote resource efficiency. To operate such a centre, the public authority needs technical in-house expertise or may subcontract to a professional organisation.
<b>Centres operated by private organisations</b>	Private organisations such as business chambers or private consultants can also run an information centre. Encouraging chambers of commerce or private consultancies to function as information catalysts is an attractive option because of the close relationship between these actors and local businesses. Private centres can often build up technical expertise better than their public counterparts, because salaries are market-oriented.
<b>Public-Private Partnership</b>	Public authorities and industry sometimes jointly set up information centres to complement each other's resources, e.g. finance, knowledge, training, networks. Both actors can contribute to the centre by using their networks to encourage local businesses to participate in resource efficiency activities.
<b>International efforts</b>	Some international agencies also organise information centres on resource efficiency. The Cleaner Production Network of UNEP and UNIDO is one of the most prominent examples with nearly 35 centres operating to date. They are partly funded by bilateral and/or multilateral donors.

Table 1: Types of information centres

An information centre can provide its members and clients with one or a combination of the following types of services. They can be offered either as separate services or incorporated into the other existing information services and media.

Types of services	Features
<b>Reference publications, newsletters</b>	Examples: ■ Introductory guides for awareness raising ■ Case studies and best practice guides ■ Technical notes, datasheets and databases ■ Updates on legislation ■ News bulletins, technical magazines ■ Online information platforms

<b>Helpline/Expert Networks</b>	Serve as the first point of contact for advice. Companies that aim for resource efficiency are given brief advice by experts and guidance for further information. This means that information centres should have a pool of internal and external experts that companies or individuals seeking advice can refer to.
<b>Information clearing-house</b>	The internet can complement other means of information and encourage an exchange of practices between members and others at very low cost.
<b>On-site visit and audit</b>	Companies may obtain further assistance from an on-site visit by experts. The visit is designed to identify potentials to improve resource efficiency and provide hands-on advice on how to improve. Centres might be involved in one-day-checks only and leave more detailed and lengthy audits to external consultancies.
<b>Seminar, workshop, symposium</b>	Best practice seminars and workshops offer an occasion to find out about resource efficiency and to discuss opportunities and methodologies.
<b>Fair and exhibition</b>	Introduce the advantage and examples of resource efficiency in a visual and public way for awareness raising and promotion of resource-efficient products. Fairs can also be used to promote business contacts, e.g. for environmental technologies.
<b>Demonstration</b>	Test and demonstrate resource efficiency measures whose effects are yet to be proven or widely recognised. It is an important task of information centres to encourage pioneer companies to spread their experience.
<b>Fact-finding tour</b>	Companies can visit pioneers practicing resource efficiency (sometimes in foreign countries) and see best practices with their own eyes.
<b>Localisation</b>	Encourage local companies and organisations to set up their own networks, to share best practices and to aim at improving resource efficiency together.

Table 2: Types of services offered by information centres

## Strengths & weaknesses

Information centres have certain strengths and weaknesses as an instrument promoting resource efficiency as summarised below:

Strengths	Weaknesses
<p><b>Provision of information on resource efficiency</b> Information centres can provide access to essential information on resource efficiency to a large number of customers. The provision of information is often a first entry point for customers who wish to familiarise themselves with the services of an organisation before committing themselves to time- or cost-consuming exchanges.</p>	<p><b>Lack of incentive for implementation</b> The mere sharing of information does not necessarily lead to implementation of resource efficiency measures in companies. Additional incentives and stimulation as well as environmental standards and control may be required.</p>
<p><b>Promotion of knowledge and technology transfers</b> Information centres often act as knowledge brokers by facilitating linkages between information seekers and knowledge sources. Information and knowledge dissemination often provide an entry point for further training and consultancy work through trainers, advisers, and experts.</p>	<p><b>Proprietary information</b> Certain information is not freely available especially if private companies are not willing to share it due to its proprietary and competitive nature.</p>
<p><b>Activate enterprises on resource efficiency issues</b> Under appropriate and supportive framework conditions information centres can be an effective means to raise awareness and establish capacity among a large number of enterprises as well as to ensure long-term support for resource efficiency.</p>	

Table 3: Strengths and weaknesses of information centres

Costs are a crucial issue, especially when the centre is supposed to recover its running costs. The services of the centre have to be attractive to the target group. It should not be a target to offer services at minimal costs but to provide services most attractive to the needs of the target group (this includes quality and type of services as well as costs and other factors). However some services as e.g. raising public awareness can only be provided if there is some financial contribution towards this end. To be able to finance the provision of its services, the centre needs to obtain financial support from governments, larger businesses or donor organisations. In all cases, the costs summarised below have to be covered.

Category	Description	Covered by
<b>Set-up</b>	Identify local priorities and opportunities as well as resources available to run the centre Set up the centre together with the partners and provide initial funding Agree on a mission and the strategic focus of the centre	Government
<b>Running of centre</b>	Fixed costs including personnel, office space, maintenance, etc.	Centre
<b>Knowledge acquisition</b>	Acquire information on best practices Provide adequate training to the centre's staff Collect, adapt and where necessary develop information and training materials	Centre
<b>Knowledge management</b>	Identify areas and targets of knowledge and set up the necessary instruments such as internet, library, databases, etc.	Centre
<b>Promotion</b>	Make the centre publicly known and promote and advertise its services as well as special events and trainings Establish links with business associations, continuously improve services according to the needs of the customers	Centre

Table 4: Costs associated to information centres

Experience shows that most centres do not work without public support. Average financial support/ subsidies is/are in the range of 50-60% of the centre's costs (examples: CITET Tunisia, APCTT India, Cleaner Production Centre Chile). The exception are centres that offer services for which financial instruments exist, e.g. Brazil: companies, when demanding services from the cleaner production centre, can cover the costs by retrieving a part of previously paid taxes. This example highlights the importance of an intelligent policy mix when initiating measures to support resource efficiency.

## Success factors

The following factors for the success of information centres are drawn from experiences of existing centres:

Success factor	Issues to consider
<b>Adaptation to local circumstances</b>	The content and level of information and assistance given to the target group should be determined by the knowledge, available infrastructure and equipment in the area where the centre is set up. The needs and interests of local information users need to be thoroughly analysed before the centre's establishment as well as during its operation.

<b>Provision of customised services</b>	The information provided by the centre should be customised to the customer's specific problems and should offer appropriate solutions instead of ready-made advice, which in many cases might not prove to have been very helpful.
<b>Quality management</b>	Clients expect good services without exaggerations or empty promises. The service has to fulfil the clients' expectations and requirements. Hence, the services should be provided promptly and without delay. Further, the information should be reliable, comprehensive and take into account the specific challenges of the client. To ensure that information centres fulfil these requirements an efficient quality management is necessary.
<b>Profile development</b>	To maximise its influence and provide high quality and suitable services, the centre should aim to obtain a high and formal recognition from the government and industry for example by joining an established international network.
<b>Educational capacity and R &amp; D</b>	In order for the centre to induce resource efficiency improvements, a good number of high quality experts are needed. Through cooperation and interaction with educational institutions, industrial R&D departments and consultants, the centre can reach and train more experts and direct public R&D in a more practice oriented way.
<b>Continuous development</b>	Becoming self-sustainable is critical for many centres since initial funding will normally run out after some years. They need to keep evolving to sustain income-generating activities by responding to demands from (potential) clients, while becoming more adept at obtaining donor funding for less profitable activities (e.g. helping SMEs, policy dialogue).
<b>External financing and technical assistance</b>	Countries with few financial resources and expertise can utilise opportunities from donor countries to establish a centre and obtain informational materials and technical assistance. However it is advisable to set up a business plan so that they may become independent from international contributions.

Table 5: Success factors for information centres

## Key Literature and Case Studies

**UNIDO/UNEP Guidance & Training Manual: *How to establish and operate cleaner production centres***  
[www.unepie.org/pc/cp/library/training/howtoCPC/manual\\_cdrom/mainmenu.htm](http://www.unepie.org/pc/cp/library/training/howtoCPC/manual_cdrom/mainmenu.htm)

**GTZ (2004): Resource efficiency Centres: Problems and prospects**, OE 4413 Energy, Transport and Resource efficiency, Internal study

	Case Studies / Examples	Link
<b>Government-led</b>	Envirowise (UK) National Center for Environmental Innovation (USA) Cleaner Production Germany	<a href="http://www.envirowise.org">www.envirowise.org</a> <a href="http://www.epa.gov/innovation">www.epa.gov/innovation</a> <a href="http://www.cleaner-production.de">www.cleaner-production.de</a>
<b>Business-led</b>	World Business Council for Sustainable Development (WBCSD) International Council on Mining and Metals (ICMM)	<a href="http://www.wbcsd.org">www.wbcsd.org</a> <a href="http://www.icmm.com">www.icmm.com</a>
<b>UN-led</b>	UNIDO/UNEP National Cleaner Production Centres (NCPCs) International Cleaner Production Information Clearinghouse (ICPIC)	<a href="http://www.unep.fr/pc/cp/ncpc">www.unep.fr/pc/cp/ncpc</a> <a href="http://www.emcentre.com/unepweb">www.emcentre.com/unepweb</a>
<b>Regional</b>	North Rhein-Westphalian Efficiency Agency (Germany)	<a href="http://www.efanrw.de">www.efanrw.de</a>
<b>NGO-led</b>	Global Network of Environment and Technology (GNET)	<a href="http://www.gnet.org">www.gnet.org</a>
<b>National</b>	CITET Tunisia Indonesian Cleaner Production Centre	<a href="http://www.citet.nat.tn">www.citet.nat.tn</a> n.a

## Case Study: Effizienz-Agentur NRW (EFA)

### What is the Effizienz-Agentur NRW?

The Effizienz-Agentur NRW – abbreviated as EFA – is the first contact for small and medium-sized manufacturing enterprises (SME) in the German state of North Rhine-Westphalia (NRW) for all questions regarding resource efficiency. The objective of the agency is to achieve comprehensive strategic and technical improvements in the fields of sustainable production, resource and eco-efficiency through information provision on new business strategies, innovative technology and ecologically oriented measures.

The agency was founded in 1998 as part of an initiative set up by the Ministry of the Environment, Nature Conservation, Agriculture and Consumer Protection of North Rhine-Westphalia. EFA has set up four regional information offices that offer consulting and information services. Over the years EFA has continually and successfully extended its services. The consultants of the agency and its regional offices strive to reach out to as many small to medium-sized companies in NRW as possible to inform them about the economic benefits of intelligent resource management and efficiency measures.

The Effizienz-Agentur NRW does not only serve as a partner for medium-sized enterprises, it also acts as an intermediary between industry, science, politics, the media and the public. As an authority for optimised knowledge transfer and target-oriented project activities, EFA coordinates services from developers, providers, funding bodies and users of highly advanced innovations. As a result, more and more SMEs are continuously increasing their resource efficiency in production processes, products and services. This innovative learning process is making them highly competitive in national and international markets.

### How does the EFA work?

The Effizienz-Agentur NRW provides supporting services for SMEs in the field of resource and eco-efficiency through consultancy, sponsoring and the provision of concrete implementation tools and practical guidance documents. The main tools offered for improving resource efficiency in SMEs are the “PIUS Check” and the “Resource Cost Accounting -RCA” method.

Tool	Description
<b>PIUS-Check</b>	<p>With the ©PIUS-Check for cleaner production, the Effizienz-Agentur NRW (EFA) provides companies in North Rhine-Westphalia with a tested and applied instrument for the development of new business opportunities. With the check, the relevant material flows and the current level of production technology are recorded and the possible resource- and eco-efficiency improvements in production are identified. The ©PIUSCheck concentrates on different lines of business by developing various measurements, textbooks and catalogues for industry sectors such as the automotive, chemical, food, pulp &amp; paper, textile and biotechnology industries. The total time involved from the initial meeting up to the planning of eco-efficiency measures usually amounts to between three and six months. EFA takes up to 70% of normal consulting fees, plans and directs the project and supports companies during the implementation. In addition to this, EFA also supports the companies in securing appropriate financing programmes for planned measures.</p> <p>The ©PIUS-Check is also published as a best practice example in a Guideline “Cleaner Production – Basic principles and area of application” issued by the Association of German Engineers (VDI). Based on this guideline the ©PIUS-Check is used more and more in other German states.</p>
<b>Resource Cost Accounting (RCA)</b>	<p>Resource Cost Accounting (RCA or ©RKR for German: Ressourcenkostenrechnung) is an environmentally oriented extension of normal business cost accounting. It is an instrument for the recording and identification of the resource-related cost-reduction potential in a company. Through RCA, technical and business information can be linked and the incurred cost factors identified. With this tool, the whole company, individual business units or particularly relevant production areas can be examined. EFA offers small and medium-sized enterprises the introduction of the RCA tool as a cooperation project.</p>

In addition to consultancy services and the provision of resource and eco-efficiency improvement tools, EFA has organised several information forums for users, businesses, associations and decision makers focusing on different sustainable production topics including water, energy and natural resource management as well as the potential for efficiency gains through biotechnology and nanotechnology.

Further, the Effizienz-Agentur NRW frequently presents itself at international events because of the growing demand for their knowledge. Besides the export of their own knowledge, there is also the opportunity for EFA to benefit from the know-how and experience of international contacts to transfer this information directly to the SMEs in NRW.

### **Evaluating the EFA**

---

The Effizienz-Agentur NRW is continuously improving resource and eco-efficiency in small and medium sized enterprises. The provision of consultancy and information services to SMEs and the application of concrete instruments (e.g. ©PIUS-Check and ©RKR) has helped to engage currently more than 500 enterprises in sustainable production activities. A major success factor of the EFA is that it supports the SMEs to receive public subsidies for the realisation of concrete projects to improve their resource efficiency. The ©PIUS-Check in particular is a flexible and easy to handle instrument for improving production processes that helps companies focus on self-estimated relevant aspects of their business and therefore reaching individual tailored solutions. The advantage of the ©PIUS-Check is the technical analysis that leads to necessary improvement measures. In many cases this results in the installation of new production equipment. Hence, many improvements contribute to technological innovation and diffusion of already existing technologies.

However, after the ©PIUS-Check many companies also take other related measures, such as organisational innovation, hence it contributes to greater sensitivity among SMEs regarding resource and eco-efficiency.

### **Further information on the Effizienz-Agentur NRW**

---

Website of the Effizienz-Agentur NRW and the PIUS-Internet-Portal  
<http://www.cleanerproduction.info> ; [www.pius-info.de/en](http://www.pius-info.de/en)





## 4. Consumer Advice Services

### Definition and objectives

Consumer advice services are a very important component of a consumer protection system. With regards to environmental protection, consumer advice services offer support in the following three dimensions: precaution (consumer advice services), after-care (liability) and control (laws).

In general consumer advice services offer advice and information on consumer protection issues (e.g. products and services), provide assistance with legal problems and represent the interests of consumers. Information provided to consumers can include basic overviews of market conditions for products or services, safety issues, prizes and awards for products and service providers as well as information on technical and environmental performance (e.g. energy consumption, toxic or hazardous materials). It is crucial that the information provided to consumers is objective and independent from commercial interests. For example information provided by companies that may seek to influence the information consumers receive should be handled very carefully. Even though it is not their first priority, there is a significant potential for consumer advice services to promote more environmentally friendly and sustainable consumption patterns. This can be achieved firstly by providing consumers with relevant background information and therefore encourage them to make responsible, sustainable choices and secondly by putting pressure on producers to consider not only consumer needs and safety issues but also sustainability issues.

The main driving forces for setting up consumer advice services are usually either consumer organisations (often NGOs) or governmental organisations such as ministries or government operated agencies. Often consumer issues are combined with consultation on health and safety issues. Where governments operate consumer advice services, consumer protection legislation should form a basis for the activities of the organisation. To ensure independent and unbiased information for consumers, it is important that the consumer advice service organisation is politically and financially independent and operates on a non-profit basis. Financial considerations should not influence advice provided to consumers. Resource efficiency issues can be supported by consumer advice services in a number of areas, including the promotion of sustainable consumption (fair trade, organic products) and sustainable behaviour in households (energy and water consumption, mobility) as well as providing information on sustainable household appliances, food safety, agriculture (organic agriculture, genetically modified organism, GMOs) and health (chemicals). In many cases, the activities and information provided by consumer advice organisations have led to new or better legislation and have encouraged producers to rethink and consequently improve their products and production processes towards greater sustainability.

### Mode of operation

There is a broad range of consumer advice services. Therefore, the following table illustrates only the most common and effective services in industrial countries. A common feature of all the presented models is that they operate entirely independently of political or commercial interests and do not rely on commercial or trading firms for financing their operations. This requirement is absolutely necessary to secure credibility in the eyes of consumers. Nevertheless, government provides funding for most services and in some industrial countries fees are collected from users of certain services.

Type	Features
<b>Consumer Organisations</b>	<p>Consumer Organisations are active on two levels:</p> <ul style="list-style-type: none"> <li>■ Lobbying and advising politicians and policy-makers concerning consumer-policy issues</li> <li>■ Advice to consumers</li> </ul> <p>They play a crucial role in the field of consumer protection and for the implementation of consumer advice services. They can be financed by government, fees for membership in the organisation, support from foundations, support from international organisations (e.g. UNEP, WHO) and fees for various services.</p>

**Government** Government ministries and federal offices generally take responsibility for consumer protection legislation. They also provide information for consumers, offer information hotlines, internet web pages, and organise campaigns in support of issues such as sustainable consumption, regional products or nutrition issues. In many countries they promote their own eco-labels. However their main role is to secure the legal aspects of consumer protection, the definition of guidelines and policies and to finance consumer organisations and consumer advice services.

**Private Initiatives** Private consumer initiatives are groups/NGOs that are mostly founded for special reasons and interests and are also active in consumer protection issues. They often provide similar services as consumer organisations, but generally have a special focus depending on their (often quite personal) motivation and history. Areas of expertise may include sustainability issues such as health aspects of fair trade, organic products and social responsibility and they can offer substantial amounts of information on these topics. Private initiatives are often funded by contributions from members (both individual and institutional), and fees for various services.

Table 1: Types of consumer advice services by operator

The following table presents possible consumer services and activities which can be provided by various actors.

Type of services	Features
<b>Consumer Centres</b>	Consumer centres are independent, predominantly state-financed non-profit institutions and are usually run by consumer organisations. The goal of their work is to inform, give advice and support consumers with regards to private consumption issues. They provide an overview of the market and help consumers understand complex market conditions. They also identify health and environmental aspects that could influence purchasing decisions. Consumer centres also generate their own income through charges for consultation services and through sales of consumer advice guides. Consumer centre staff deal with inquiries and work on legal issues, nutrition, energy, products, consumer loans & debts and retirement provisions. They work in both local and regional contexts. Consumer centres in European countries have provided consumers with information related to eco- and resource efficiency issues with respect to reducing energy consumption in buildings and households and waste separation, recycling and reduction.
<b>Lobbying and representing consumer interests</b>	<ul style="list-style-type: none"> <li>■ Undertaking legal action on behalf of consumers concerning issues such as misleading advertising and unacceptable sale contract clauses</li> <li>■ Representing consumer interests at municipal and federal state levels</li> <li>■ Informing media and the public about important consumer issues</li> <li>■ Carrying out campaigns and organising projects and exhibitions relevant to consumers</li> <li>■ Working with schools and other institutions to provide training for both young people and adults.</li> </ul>
<b>Information help lines or hotlines</b>	Telephone and online advice on topics such as credit legislation, debtor arbitration and declarations of insolvency, banking and investment, insurance, health services and patient rights, passenger rights (e.g. for rail or airline travel), building finance, energy, nutrition, household, leisure, telecommunications. In some instances there can be charges for these services.
<b>Testing</b>	If consumer organisations want to test and compare products (e.g. critical or toxic contents) and services neutrally, they work together with testing institutes or organisations. The Stiftung Warentest (Foundation for Product Testing) consumer information service in Germany tests products and services using comparative investigations in Germany and the European market. It informs the consumer in a neutral and generally understandable fashion via the journals "test", "FINANZtest" and other special publications. The similar consumer information service "Ökotest" (Ecotest) has a focus on environmental aspects of products. Results and information are published via the internet and the journal "Ökotest" on a wide range of products and services including travel, construction and buildings, banking, food and health. Both institutions have started to analyse and test products and services with respect to their ecological, social and economic sustainability.

<b>Entrepreneurial Initiatives</b>	<p>Quality Assurance Associations (QAA) are a marketing instrument for producers and service providers with a positive spill-over for public welfare regarding environmental and health aspects. Positive effects can include enhanced consumer protection and education, product and service quality improvement, and reduction of external effects including public and occupational health and safety as well as other social and environmental aspects connected to the respective products and services.</p> <p>QAAs are often established through cooperation between private entrepreneurs and expert institutions that test and assess products and services according to quality criteria and award quality labels to member firms that voluntarily meet the quality standards set by the QAA.</p> <p>A QAA safeguards the appropriate use of the label in order to maintain the label as a reliable signal for high product or service quality. The QAA promotes the quality label in the market by making the quality aspects transparent to customers and thus enhance awareness among consumers. (See case study for an example of QAAs)</p>
<b>Reference publications, newsletters</b>	<p>Publications such as guidelines, consumer information on specific topics are critical for consumers. Publications and newsletters are available for a wide range of issues including the use of genetically modified organisms in the food industry, pesticides in agriculture, and toxic elements in household products or toys to name but a few.</p>

Table 2: Types of consumer advice services by activity

## Strengths & weaknesses

Even though consumer advice services do not necessarily focus on resource efficiency or sustainability topics, they offer the potential to promote sustainable consumption patterns because they are often closely linked with health, safety and consumer protection issues.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>■ Independent consumer advice</li> <li>■ Provision of transparent information</li> <li>■ A wide array of services under diverse structures to meet specific consumer needs</li> <li>■ A variety of services and approaches to reach a broad range of consumers</li> </ul>	<ul style="list-style-type: none"> <li>■ Credibility can depend on financing and supporting institutions</li> <li>■ If funded by government, objectivity can be difficult to maintain</li> <li>■ As the number of services offered increases there can be difficulties in maintaining focus, which can be important to avoid confusing or overloading consumers.</li> <li>■ It is difficult to gain access to objective information on products that might be relevant for consumers as the companies do not want to share their knowledge unabridged and neutrally.</li> <li>■ Lack of legal protection for consumers. Consumer advice systems cannot replace the legislative foundation of consumer rights and protection.</li> </ul>

Table 3: Strengths and weaknesses of consumer advice services

Most consumer advice services are funded by state governments and income generated from consultation fees and the sale of consumer advice guides. Experience shows also that private initiatives can work without public support, but they are often supported by NGOs with similar political targets. The costs for consumer advice services can vary significantly and will strongly depend on human and material resources but also on types of information generated.

## Success factors

Consumer advice services can be offered and organised in many ways and different success factors have to be considered for each individual service model. One key element supporting success is the presence of an umbrella organisation to define targets for consumer policies, develop consumer guidelines, represent consumer interests and needs towards politicians and industries and coordinate the work of the different “advice-channels”. The following table provides some general success factors that are considered relevant for all consumer advice services.

Success factor	Issues to consider
<b>Legal background</b>	Ideally, government institutions should support consumer advice services and establish a consumer protection policy.
<b>Financing</b>	To reach the number of consumers required for effectiveness, services for consumers should be offered without charges to the maximum degree possible. Funding is an important aspect necessary to secure credibility. Commercial partners and political parties should not be directly involved in order for consumer advice services to remain autonomous.
<b>Required resources</b>	The resource needs will depend on the services and information offered. Consumer centres generally require more human resources than information hotlines or services provided via internet. On the other hand services requiring high personnel resources can be realised with very limited technical resources and in developing countries consumer centres may have a greater capacity to reach consumers than internet or written information sources.
<b>Transparency</b>	To strengthen the credibility of consumer advice services a high level of transparency should be assured not only regarding the information on offer but also the work of the organisation itself.

Table 4: Success factors of consumer advice services

## Key Literature and Case Studies

The following links contain information about law, history, articles and links to relevant organisations (NGOs and governmental).

Consumer advice services	Name	Link
<b>Government-led</b>	Federal Office of Consumer Protection and Food Safety (Germany) Federal Ministry of Food, Agriculture and Consumer Protection (Germany) Consumer Direct (telephone and online consumer advice service, supported by the Office of Fair Trading) (UK)	<a href="http://www.bvl.bund.de">www.bvl.bund.de</a> <a href="http://www.bmelv.de">http://www.bmelv.de</a> <a href="http://www.consumerdirect.gov.uk/">http://www.consumerdirect.gov.uk/</a>
<b>EU-led</b>	European Commission EU BEUC, European Consumers' Organisation European Association for the Co-ordination of Consumer Representation in Standardisation	<a href="http://ec.europa.eu/consumers/index_en.htm">http://ec.europa.eu/consumers/index_en.htm</a> <a href="http://www.beuc.org">www.beuc.org</a> <a href="http://www.anec.org">http://www.anec.org</a>
<b>Regional</b>	Federation of German Consumer Organisations (vzbv) (Germany)	<a href="http://www.vzbv.de/go/home/index.html">http://www.vzbv.de/go/home/index.html</a>
<b>International</b>	Consumers International (CI) (Worldwide)	<a href="http://www.consumersinternational.org/">www.consumersinternational.org/</a>
<b>Private Organisations</b>	Verbraucher Initiative e. V. (Germany)	<a href="http://www.verbraucher.org/">http://www.verbraucher.org/</a> <a href="http://www.label-online.de/">http://www.label-online.de/</a>
<b>Testing institutes</b>	Ökotest/Ecotest (Germany) Stiftung Warentest (Germany)	<a href="http://www.oekotest.de/">http://www.oekotest.de/</a> <a href="http://www.stiftung-warentest.de/online/">http://www.stiftung-warentest.de/online/</a>

## Case Study: Quality Assurance Association of the Dry Cleaners in Hamburg, Germany

### What is the Quality Assurance Association?

---

In the mid 1980s, the dry cleaners in Hamburg came under considerable public pressure concerning the use of halogenated solvents (PERC), which had turned out to penetrate through the walls into neighbouring apartments, workplaces, and food stores. The media reported negatively, citizens' action committees against dry cleaners emerged, and some supervising authorities formed a case against the dry cleaners with exorbitant claims.

Therefore, the Centre for Energy, Water and Environment Technology (ZEWU), founded in 1985 by the Hamburg Chamber of Crafts and Trade to promote cleaner production in small and medium sized companies, together with the dry cleaners guild of Hamburg initiated the foundation of a proactive self-help organisation. Aim of the association was to improve the environmental performance of the dry cleaners in Hamburg and to regain the trust of the community, customers, and authorities. In April 1988, the Registered Association for Environmental Protection in Dry Cleaning in Hamburg (Verein für Umweltschutz im Textilreiniger Handwerk e.V.), VUT, was formally founded and registered with a quality label.

### How does the Quality Assurance Association work?

---

ZEWU had advised the guild to choose a pro-active strategy as a reaction to the sudden public pressure on the dry cleaners in Hamburg and guided the guild through the formal procedures. According to the Association's constitution, a quality label is now awarded annually to each member company that has successfully passed a test conducted by ZEWU. At first end-of-pipe technologies were developed as technical solution to reduce the halogenated solvent emissions from dry cleaners. While the label was introduced into the market, ZEWU kept on researching for better solutions and eventually integrated technologies were developed that reduce the amount of halogenated solvents used in dry cleaning. ZEWU as independent expert institute provides a range of services to the members in the name of the Association, including training, consultancy and technical analysis and support.

Since 1988, awareness regarding environmental issues has risen considerably within the guild of dry cleaners. This has led to a reduction of solvent consumption and emissions, and the demand for further consultancy, e.g. regarding new dry cleaning buildings and soil analysis, has increased. In the first year, about 80% of the dry cleaners in Hamburg became members of VUT. The label "Environment and Cleaning" is widely known and recognized in and around Hamburg and some large client companies only give orders to dry cleaners carrying the label.

In 2001, VUT decided to enlarge its marketing activities. This included a poster campaign on public busses and in other places and a competition. Thus, the dry cleaners turned the public strain into an offensive marketing strategy, including substantial service improvements and market communication.

This could only work with rigorous quality assurance and control. The board of VUT has expelled 13 dry cleaning companies from the membership because of repeated breaches against the constitution of VUT. About 30 dry cleaning companies left VUT due to high cost pressure (investments, member fees etc.) or bankruptcy.

Since VUT was founded, the number of dry cleaning companies in Hamburg has decreased by almost 30%. This is a much higher decrease than in other commercial branches in the German city state. At the same time, the number of VUT member companies increased from 60 to 73. This suggests a positive effect of higher environmental protection and occupational health standards on a company's viability.

Encouraged by this successful example, quality assurance associations within other crafts guilds have also been initiated. Examples include producers of cooling devices and the horticulture & landscaping sector.

## Evaluating the Quality Assurance Association

---

### Strengths

- Intensive research and development to reduce environmental impacts from dry cleaning was carried out and the knowledge of environmental impacts from dry cleaning has increased considerably.
- The environmental standards developed and applied by VUT have raised the state-of-the-art and have become legal standard in the entire dry cleaning sector in Germany. The QAA still continues for further improvement of the quality in the sector and implementation in the market. The environmental performance has considerably improved without government involvement or expenditure of public money.
- Other QAA systems have emerged in Hamburg after the work of VUT demonstrated the success of the approach.
- The credibility of the label is very high, as members are rigorously scrutinised and firms failing to meet the standards are not tolerated in the Association.
- Environmental and health awareness among dry cleaning companies has been enhanced and has changed behaviour in terms of chemical management, occupational health, and emission control.

### Weaknesses

- Companies who could not afford membership and necessary investments into environmental precautions lost their competitiveness and some of them left the market. Government could potentially support such companies with soft loans, and the guild could provide business consultancy to minimise such dislocations.
- Without the enormous public pressure as consequence of increased public information on the hazards from dry cleaners the improvement of environmental performance initiated by the producers might not have taken place. This requires public information and education on environment and health issues. Therefore, NGOs should be supported in their work to promote public awareness on environmental issues and/or government could carry out similar related activities.

## Further information on the Quality Assurance Association

---

<http://vut-hamburg.de>

<http://www.zewu.de>

## Case Study: Consumer Information and Protection in India

### What is Consumer Information and Protection in India?

Consumer information and protection are becoming increasingly important on the political agenda in India. Public interest in the environment, health and resource-efficient product development has also continuously intensified in the past years. However, this new awareness of environmental and health issues has not as yet resulted in meaningful changes in consumer behaviour.

This can in part be explained by the lack of independent, product-related information, especially regarding environmentally friendly consumer goods. Currently the situation with many goods is such that an unknown quantity of goods fails to meet official requirements and may even cause diseases or other health problems because there is no sufficient control of legal standards from regulatory authorities. Furthermore, even the information that is available rarely reaches the interested consumer due to the lack of professional and consistent information and consumer advice services.

At present consumer protection in India is the responsibility of special consumer protection courts and independent NGOs offering information and advice. As cooperation between these NGOs is poor, services are rather inefficient and the quality of advice varies greatly. In order to improve both the scope and the quality of consumer advice and protection, a system is needed that is coordinated by government and that assures that information and services provided meet certain quality standards.

GTZ-ASEM has been asked to support the Indian Ministry of Consumer Affairs to build up such a system. The main target groups are Indian consumers with a special focus on socially disadvantaged consumers. This project aims to improve access to consumer information and advisory services and to enhance and improve awareness about the quality of products and service providers. There is a special focus on women, as they are mainly responsible for the purchase of day-to-day goods.

### How does Consumer Information and Protection in India work?

The project “Consumer Information and Protection in India” aims to strengthen consumer protection institutions at the local level and will contribute to the improvement of the institutional and legal framework on the national level. For example, the Ministry of Consumer Affairs is supported by consultation and training measures to close gaps in the legal and institutional consumer protection framework, to decentralize the system and to consider precautionary elements of consumer information and consultation more strongly.

In general the system will work twofold:

It will enhance consumer protection through improving the performance of consumer courts, modernising and increasing the amount of testing facilities, encouraging cleaner production and therefore reducing potentially harmful emissions, finally empowering consumers by raising their awareness and giving them the information they need to make responsible decisions.

Therefore the second pillar of the new system in India will focus on advising and informing consumers.

This will be done for example by launching awareness campaigns and more importantly by setting up an exemplary system of consumer information centres in selected administrative districts. A support model for the information centres will be developed; facilitators will be trained for consumer consultation and consulting contents in the selected focal areas will be developed.

Once an increasing number of consumers are “empowered” it is hoped that the demand for environmentally friendly products will increase, putting pressure on industries to deliver such products or punishing those producers with particularly bad environmental performance through a drop in revenues.

An important tool for every consumer protection system is comparative product testing using environmental parameters and publishing the test, which will raise public awareness. In addition to comparative product testing, specific concepts for different target groups will be developed, including environmental education in schools.

The important prerequisites and components for this are an efficient communications strategy and publicity. Consumer organisations shall be enabled to provide coordinated and effective advice services. Their capacities for such services shall be increased through instruments for organisational development and networking. This will also be linked up with governmental and private sector agencies.

### **Evaluating Consumer Information and Protection in India**

---

As the project was launched only recently, an evaluation at this stage is difficult. However regarding the general effects, it should be expected that industries will start producing in a more resource-efficient way only when there is a demand for such products. Therefore advising consumers on environmental issues and providing them with reliable information about products and services and the way they are generated is the first step towards encouraging resource-efficient behaviour amongst businesses.

Due to the fact that the project is involving national as well as local institutions it should eventually prove a successful tool to strengthen consumer information and protection in India and encourage cleaner production.

### **Further information on Consumer Information and Protection in India**

---

Dr. Juergen Bischoff, GTZ-ASEM, A-33 Gulmohar Park, New Delhi 110049, India





### 5. Environmental Quality Targets and Environmental Monitoring

#### Definition and objectives

Environmental quality targets are science-based indicators of environmental quality approved by public authorities. They serve as instruments for the quantitative performance measurement in the implementation of the concept of sustainable development. In this context environmental quality monitoring is the regular and systematic analysis and assessment of the state of the environment and its trends based on carefully constructed metrics for pollution control and natural resource management<sup>1</sup>.

The aim of environmental quality targets is to define an accepted state of the environment both in terms of quantity and quality. For example, a quantitative target can be established to govern water extraction from rivers to ensure minimum water flows needed to protect fish whereas quality targets might be based on physio-chemical, biological and morphological parameters. Air quality standards in cities are also a good example for environmental quality targets.

Environmental monitoring systems shall contribute to achieving targeted, resource-efficient and economic solutions to environmental problems. They serve the following objectives:

- 1) Assessment of environmental quality in a given region to identify risks to human health as well as risks to nature and the environment.
- 2) Baseline information to contribute to the establishment of local or national environmental quality targets.
- 3) Identification of long-term environmental pollution trends starting from baseline assessments.
- 4) Information for concerned individuals in the public and establishment of information channels to warn the public of increased health risks caused by environmental pollution.
- 5) Development of policies, regulations, action plans and/or management strategies to achieve environmental targets.
- 6) Assessment of impacts and evaluation of policies, regulations, action plans and/or environmental quality management strategies.

Environmental quality monitoring systems are established according to environmental quality legislation and specified technical rules set by government and devolved specialised agencies for collecting, evaluating and documenting environmental quality information. These main implementation actors can cooperate with the relevant government administration at local, regional and national levels. The technical management of environmental quality monitoring initiatives may be entrusted to public agencies, private companies, scientific units or industrial and infrastructural facility managers (e.g. airports, harbours, industrial estates), however, the collected data need to be directed to a central archive. In many countries, specialised agencies are entrusted with environmental monitoring. Examples include the German Federal Environment Agency (UBA), the United States Environmental Protection Agency (US EPA) and US Council on Environmental Quality. The target groups for providing environmental quality information include the public, political leaders, environmental quality analysts and policy specialists, and emission control technical experts.

#### Mode of operation

Environmental quality is to be ensured by a targeted combination of both emission and immission (transfer of pollutants to receiving media) monitoring and reduction of emissions at source. Public involvement is a major factor in environmental quality management and public opinion has proved to be a major force in developing

<sup>1</sup> Esty, D. C., T. Srebotnjak, C. H. Kim, M. A. Levy, A. de Sherbinin, B. Anderson Pilot 2006 Environmental Performance Index, Yale Centre for Environmental Law & Policy, New Haven 2006 <http://www.yale.edu/esi/>

advanced environmental quality standards. The availability of reliable emission and immission data to the public has contributed to reaching a consensus on policy and other measures needed to reduce emissions. This is valid both for the enforcement of emission reduction measures in industry as well as the reduction of non-point sources related to transport, households or agriculture.

The following steps outline how an environmental monitoring system can be developed, how environmental quality targets can be established and how action plans can be developed:

Step	Issues to consider
<b>Establishment of environmental monitoring systems</b>	The public sector initiates the establishment of environmental monitoring systems and environmental targets. Priorities for environmental monitoring should be established in consideration of national and international requirements. Policy makers should establish a continuous dialogue with those who implement monitoring systems. Monitoring results should be widely published in consultation with interested stakeholders. The resources devoted to establishing and operating environmental monitoring systems should be reviewed and monitored with respect to the benefits it provides and the costs it imposes.
<b>Develop the institutional framework</b>	A workable institutional structure including (a) designated institution(s) for environmental monitoring needs to be established. For this, it might be necessary to further develop legal frameworks, and/or to develop adequate financing systems (see below).
<b>Development of environmental quality targets and action plans</b>	At the political level the general targets, norms and standards for environmental quality management should ideally be established by politically accountable decision makers. They should consult experts and relevant stakeholders including the private sector and the general public. Where required standards are not met, environmental management or action plans should be developed and implemented. Action plans need to be set up in a participatory manner, to ensure that interested actors have an opportunity to be involved in the development and implementation of policy.
<b>Implementation of action plans</b>	Action plans should be developed in consultation with concerned stakeholders in order to improve environmental quality where environmental quality targets are not met to assure acceptable long-term environmental pollution levels.

Table 1: Steps and issues to consider when implementing environmental monitoring measures

The above steps should be seen as cyclic, continuous processes because changes in emissions and/or immissions can result in new risks for health and the environment. Those risks may require an adaptation of strategic planning and the implementation of activities with regard to national environmental policy and/or regional and local quality planning.

It is established practice in Europe and North America as well as in a number of Asian countries to require an assessment of local and regional environmental quality (especially for water and air quality) to provide baseline information before plans to reduce environmental pollution are developed. This ensures that policy makers have the capacity to measure the relative success or failure of measures that may be implemented under the plans. The European Directives on Air Quality and on Water Quality Management in particular define a set of instruments and procedures which link environmental quality with regulatory activities and provide guidance for the improvement of environmental quality in the case of non-compliance.

#### **Financing environmental monitoring systems**

Generally environmental monitoring should be considered a public task, however environmental permits and/or discharge fees paid by firms are one means to finance monitoring activities of public agencies as well as representing a manifestation of the “polluter pays principle”. To achieve sound environmental monitoring structures concepts have been developed in many countries to invite or even force the generators of environmental pollution to participate in establishing and financing environmental monitoring networks.

## Strengths and Weaknesses

The strengths and weaknesses of environmental monitoring and environmental targets are:

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>■ The impact of emission sources on the state of the environment (immissions) and the resulting risks to human health, nature and cultural heritage can be demonstrated.</li> <li>■ Environmental quality targets can set a benchmark that is to be striven for through environmental action plans.</li> <li>■ The assessment of risks caused by pollutants can be based on objective, traceable and reliable information which also enables policy makers to rationally respond to individual complaints of unacceptable environmental conditions (e.g. odour, noise, health effects).</li> <li>■ A solid quantitative foundation is created for identifying priorities for policy intervention, for establishing environmental targets and for developing environmental policy measures and action plans. Quantitative information collected over time can enable an evaluation of environmental regulations from a financial perspective (e.g. cost per unit of pollution reduced).</li> <li>■ Environmental monitoring offers information to the public and is the basis for public support for more advanced resource efficiency policies.</li> </ul>	<ul style="list-style-type: none"> <li>■ Immission and emission monitoring requires human and financial resources. In the context of a developing country those resources can often be limited. In such cases, innovative financing schemes involving both the public and private sector need to be further developed.</li> <li>■ There is a necessity to monitor long-term trends with high time resolution to avoid coincidental or misleading assessments/findings. This in turn can make monitoring programmes costly.</li> <li>■ Environmental impact chains are often quite complex. Meteorological circumstances or other natural phenomena can influence environmental data which significantly complicates interpretation of data. Communicating monitoring results can be particularly problematic in the instance of non-experts such as the public or political leaders.</li> </ul>

Table 2: Strengths and weaknesses of environmental monitoring

## Success factors

The following table provides an overview of a number of factors that will support the successful implementation of environmental quality targets and an effective environmental monitoring system:

Success factor	Issues to consider
<b>Engaging stakeholders from civil society</b>	Public interest in environmental quality and environmental pollution reduction should be supported by continuous public communication about the state of the environment and its impact on human well-being, productivity and nature conservation. Engaged citizens and civil society may play a central role in stimulating a public debate on environmental standards and demanding action.
<b>Availability of technical and organisational infrastructure</b>	Availability of technical infrastructure and trained staff/ personnel for immission and emission monitoring equipment including sampling, laboratory and analytical infrastructure, statistical analysis & interpretation and evaluation with respect to control measures greatly influences the quality of data and therefore information obtained.
<b>Existence or set-up of central monitoring institution</b>	All activities such as filing/archiving, evaluation and publication of monitoring results should be coordinated by one national centre or central administration <sup>2</sup> . Environmental Quality Indices (or Environmental Performance Indices/EPI) which integrate a number of indicators into a single index number can be very useful for publication and communication as complex data are reduced to an understandable index. Despite a strong interest in developing globally applicable and comparable indices, there can be good reasons to develop national or regional indices in addition to the global initiatives, which may reflect specific regional and local circumstances.

<sup>2</sup> As the Air Quality Monitoring Group for example is for the US Environment Agency as a whole, see: [http://en.wikipedia.org/wiki/\\_note-4](http://en.wikipedia.org/wiki/_note-4); Another example is the US Council on Environmental Quality: <http://www.whitehouse.gov/ceq/aboutceq.html>

<b>Sufficient knowledge and implementation capacity</b>	The implementation of findings or pollution reduction measures requires on the one hand a clear national strategy, legal framework and enforcement instruments. On the other hand technical competence and capacity is required at the local level, specifically an environmental authority dedicated to promoting environmental management and enforcing environmental legislation.
<b>Involvement of the private sector</b>	The private sector should be prepared to cooperate with government agencies and civil society organisations and also be prepared to direct resources toward innovation and implementation of cleaner technologies.
<b>Linking targets and monitoring to eco- and energy-efficiency</b>	Better pollution reduction results can usually be achieved if enforcement of pollution reduction measures are combined with eco- and energy-efficiency initiatives supporting resource-efficient economies in, for instance, industry, households and the transport sector.

Table 3: Success factors

### Key Literature and Case Studies

**Burden, F; I. McKelvie; U. Forstner; A. Guenther (2002):** Environmental Monitoring Handbook. McGraw Hill

**Esty, D. C., T. Srebotnjak, C. H. Kim, M. A. Levy, A. de Sherbinin, B. Anderson (2006):** Pilot 2006 Environmental Performance Index, Yale Centre for Environmental Law & Policy, New Haven <http://www.yale.edu/esi/>

**Gilbert, R. O. (1987):** Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold: New York

Case Studies / Examples	Link
Co-operative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe	<a href="http://www.emep.int">http://www.emep.int</a>
The US Council on Environmental Quality	<a href="http://www.whitehouse.gov/ceq/">http://www.whitehouse.gov/ceq/</a>
La Fédération des Associations Agréées de Surveillance de la Qualité de l'Air (Good example for financing environmental monitoring systems)	<a href="http://www.atmo-france.org/fede_pres.php">http://www.atmo-france.org/fede_pres.php</a> (French)

- AEA Technology (2004):** *The Direct and Indirect Benefits of the European Ecolabel* – Final Report produced for DG Environment at the European Commission.
- Albrecht, John (1998):** *Environmental Consumer Subsidies and Potential Reductions of CO2 Emissions*. Paper presented at the GREENING THE BUDGET Conference, ifo Institut für Wirtschaftsforschung, München, May 11-12, 1998 ([www.feb.ugent.be/Fac/Research/WP/Papers/wp\\_98\\_59.pdf](http://www.feb.ugent.be/Fac/Research/WP/Papers/wp_98_59.pdf))
- Allison, Charles; Garter, Anthea (2000):** *Study on different types of Environmental Labelling (ISO Type II and III Labels): Proposal for an Environmental Labelling Strategy*. DG Environment, European Commission. <http://europa.eu.int/comm/environment/ecolabel/pdf/studies/erm.pdf>
- Aspen Institute, World Resources Institute:** *Beyond Grey Pinstripes: Preparing MBAs for social and environmental stewardship*. [www.beyondgreypinstripes.org](http://www.beyondgreypinstripes.org)
- Association of Chartered Certified Accountants and CorporateRegister.com (2004):** *Towards Transparency: Progress on global sustainability reporting 2004*, Certified Accountants Educational Trust, London.
- Australian Greenhouse Office (1999a-d):** *National Emissions Trading: Establishing the boundaries*. Discussion paper Series (1-4), Commonwealth of Australia, Canberra.
- Baumol, W. and W. Oates (1988):** *The Theory of Environmental Policy*, Cambridge, UK: Cambridge University Press.
- Beder, S. (1996):** *The Promotion of Price-based Measures for Pollution Control*, *Ecological Economics* 16, pp51-63
- Bleischwitz, Raimund (2002):** *Governance of Eco-Efficiency in Japan: An Institutional Approach*, in: Internationales Asienforum/International Quarterly for Asian Studies (Nov. 2002), Wuppertal Papers 124, July 2002, Wuppertal Institute for Climate, Environment and Energy.
- BMU (2004):** *The Ecological Tax Reform: Introduction, Continuation and further Development to an Ecological Financial Reform*, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Available online at: ([http://www.bmu.de/files/pdfs/allgemein/application/pdf/oekost\\_en.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/oekost_en.pdf))
- BMZ (2004):** *Sektorkonzept Finanzsystementwicklung, Bonn, Germany*, p. 19ff
- Borg & Co. AB (2003)** *Harnessing the Power of the Public Purse: Final report from the European PROST study on energy efficiency in the public sector*, Stockholm.
- Boyer Marcel/Porrini, Donatella (2002):** *The Choice of Instruments for Environmental Policy: Liability or Regulation? In Swanson, Timothy ed: An Introduction to the Law and Economics of Environmental Policy; issues in Institutional design*, Research in Law and Economic Series Vol. 20, 2002.
- Bundesbank (2000):** *Die Entwicklung der Subventionen in Deutschland seit Beginn der neunziger Jahre*. Deutsche Bundesbank, Monatsbericht Dezember 2000. ([www.bundesbank.de/download/volkswirtschaft/mba/2000/200012mba\\_subvent.pdf](http://www.bundesbank.de/download/volkswirtschaft/mba/2000/200012mba_subvent.pdf))
- Bundesregierung (2006):** *20. Subventionsbericht der Bundesregierung*. Deutscher Bundestag Drucksache 16/1020 (<http://www.bundesregierung.de/Anlage978296/Zwanzigster+Subventionsbericht.pdf>)
- Burden, F; I. McKelvie; U. Forstner; A. Guenther (2002):** *Environmental Monitoring Handbook*. McGraw Hill
- Coase, Ronald H. (1960):** *The problem of Social Cost*, *Journal of Law and Economics* 1-44 (1960). Available online at <http://www.sfu.ca/~allen/CoaseJLE1960.pdf>
- Cole, Daniel H., Grossman, Peter Z. (2002):** *Toward a Total-Cost Approach to Environmental Instrument Choice*. In: T. Swanson, ed., *An Introduction to the Law and Economics of Environmental Policy: Issues in Institutional Design*, 20 Research in Law and Economics 223-241 (2002).
- Commission of the European Communities (2000):** *White Paper on Environmental Liability*, COM(2000) 66 final, Brussels, 9.2.2000

**Dormann, J. and Holliday, C. (2002):** *Innovation, Technology, Sustainability and Society*, World Business Council for Sustainable Development (WBCSD), Geneva.

**EACR (2003):** *Economic Instruments for Environmental Protection and Conservation: Lessons for Canada*. Available online at ([www.pco-pcb.gc.ca/smartreg-regint/en/06/01/su-11.htm#exec](http://www.pco-pcb.gc.ca/smartreg-regint/en/06/01/su-11.htm#exec))

**EEA (2006):** *Using the market for cost-effective environmental policy. Market based instruments in Europe*, European Environment Agency (EEA), Copenhagen, Report No 1/2006

**Esty, D. C., T. Srebotnjak, C. H. Kim, M. A. Levy, A. de Sherbinin, B. Anderson Pilot (2006):** *Environmental Performance Index*, Yale Centre for Environmental Law & Policy, New Haven 2006 <http://www.yale.edu/esil/>

**ETC/RWM (2006):** *Economic instruments to promote material resource efficiency*. Main report from phase 1, ETC/RWM working paper 2006/1

**ETEI (1999):** *Emissions Trading Handbook*. Emissions Trading Education Initiative, Milwaukee

**EU (2002):** *Environmental technology for sustainable development – Report from the commission*. COM (2002) 122 final, Brussels 2002

**EU (2004):** *Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union*. Communication from the Commission to the Council and the European Parliament, COM (2004) 38 final, Brussels 2004

**European Commission (2004):** *Buying Green!: A handbook on environmental public procurement*, Brussels.

**Gilbert, R. O. (1987):** *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold: New York

**Global Ecolabelling Network (GEN) (2004):** *Introduction to Ecolabelling. Information Paper*. [http://www.gen.gr.jp/pdf/pub\\_pdf01.pdf](http://www.gen.gr.jp/pdf/pub_pdf01.pdf)

**Global Reporting Initiative (2002):** *GRI 2002 Sustainability Reporting Guidelines*, GRI, Amsterdam. (The new revised version will be released in October 2006.)

**GRI, Triple Innova and Wuppertal Institute (2004):** *High 5!: Communicating your business success through sustainability reporting*, GRI, Amsterdam.

**GTZ (n.a.):** *Resource efficiency Centres: Problems and prospects*, OE 4413 Energy, Transport and Resource efficiency, Internal study

**GTZ (1995):** *Market Based Instruments in Environmental Policy in Developing Countries: Framework for Policy Planning and Institutional Development in the Environment*, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, 1995 (<http://www.gtz.de/de/dokumente/en-instruments-environmental-policy-1995.pdf>)

**GTZ (1998a):** *The Environment Technology Markets in Asia India, Indonesia and Thailand*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn 1998

**GTZ (1998b):** *Strengthening Environmental Technological Capability: The Role of Information Fora and Networks – Conceptual Considerations*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn 1998

**GTZ (1999):** *Guide to Technology Transfer Institutions in Environment: Focusing on Technology Transfer to India, Indonesia and Thailand*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, 1999

**GTZ (2004):** *Environmental Fiscal Reform for Sustainable Development and Poverty Reduction: Workshop Proceedings and Country Case Studies*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn 2004

**Harrington, Winston/Morgenstern Richard D. (2004):** *Economic Incentives versus Command and Control: What's the best approach for solving environmental problems?* Fall/Winter 2004, Resources for the Future (RFF) ([http://www.rff.org/Documents/RFF\\_Resources\\_152\\_ecoincentives.pdf](http://www.rff.org/Documents/RFF_Resources_152_ecoincentives.pdf))

- Heemskerk, B., Pistorio, P. and Scicluna, M. (2003):** *Striking the Balance: Sustainable development reporting*, World Business Council for Sustainable Development (WBCSD), Geneva
- Huppes, Gjalt/Simonis, Udo. E (2000):** *Environmental Policy Instruments in a New Era*, CML- SSP Working Paper 2000.002, November 2000, Centre of Environmental Science (CML), Leiden University (<http://www.leidenuniv.nl/cml/ssp/publications/wp2000-002.pdf>)
- ICLEI (2000):** *Green Purchasing Good Practice Guide*, Freiburg.
- IEA/OECD (2000):** *Energy Labels & Standards*, International Energy Agency/Organisation for Economic Co-operation and Development, 2000 (<http://www.iea.org/textbase/nppdf/free/2000/label2000.pdf>)
- Jefferson, M. (2000):** "Energy policies for sustainable development", in Goldemberg, J. (ed.) *World Energy Assessment: Energy and the challenge of sustainability*, UNDP, New York.
- Johnston, Nick(1999):** *Environmental Policies and Industrial Competitiveness: The Choice of Instrument*. Gatekeeper Series, GK 99-01, International Institute for Environment and Development
- Keohane, Nathaniel O./Revesz, Richard L./Stavins Robert N. (1997):** *The Positive Political Economy of Instrument Choice in Environmental Policy*, Discussion Paper 1997-25, Resources for the Future (RFF) (<http://www.rff.org/documents/RFF-DP-97-25.pdf>)
- Kern, Christine; Kiessling-Näf, Ingrid; Landmann, Ute; Mauch, Corinne (2001):** *Ecolabelling and Forest Certification as New Environmental Policy Instruments – Factors which Impede and Support Diffusion*. Paper Prepared for the ECPR Workshop on „The Politics of New Environmental Policy Instruments“ Grenoble, April 2001.
- Kerr, Suzi (2001):** *Ecological Tax Reform*. Report prepared for the Ministry of Environment, New Zealand
- KfW Development Bank (1996):** *Environmental Finance – A new challenge for Financial Sector Development*, Orientation Paper, Frankfurt/Main, Germany
- KPMG Global Sustainability Services (2005)** *KPMG International Survey of Corporate Responsibility Reports 2005*, KPMG International, Amsterdam.
- Lefevere, Jürgen (2003):** *Interactions of the EU Environmental Liability Regime*, Foundation for International Environmental Law and Development (FIELD), Final Draft, January 2003
- Lovei, Magda (1999):** *Environmental Funds*, Discussion Note No.1, World Bank
- Markandya, A. (1998):** *The Cost of Environmental Regulation in Asia: Command and Control versus Market-based Instruments*, in: Asian Development Review 1998, Vol. 16, No. 1, P. 1-30 (<http://www.adb.org/documents/periodicals/adr/pdf/ADR-Vol16-1-Markandya.pdf>)
- Moor de, André, Calamai, Peter (1996):** *Subsidising Unsustainable Development: Undermining the Earth with public funds*. Commissioned by the Earth Council, San José, Costa Rica
- Müller, Edda (2002):** *Environmental Labelling, Innovation and the Toolbox of Environmental Policy: Lessons Learned from the German Blue Angel Program*. Berlin.
- National Treasury of South Africa (2006):** *A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa, Draft Policy paper*.
- OECD & EEA (2005):** *OECD/EEA database on environmentally related taxes, fees and charges, other economic instruments and voluntary approaches used in environmental policy and natural resources management*. <http://www2.oecd.org/econinst/queries/Main.htm>, accessed 2 February 2006
- OECD (1998):** *Best Practice Guidelines for User Charging for Government Services*. PUMA Policy Brief No. 3. Available at [www.oecd.org/dataoecd/19/38/1901769.pdf](http://www.oecd.org/dataoecd/19/38/1901769.pdf)
- OECD (2003):** *Voluntary approaches for Environmental Policy: Effectiveness, Efficiency and Usage in Policy Mixes*, Paris.

- OECD (2000):** *Behavioural responses to environmentally related taxes*. COM/ENV/EPOC/ DAFPE/CFA(99)111/FINAL, Organisation for Economic Co-operation and Development
- OECD (2001):** *Sustainable Development: Policies to Enhance Sustainable Development*, Organisation for Economic Co-operation and Development (OECD), General Secretariat, SG/SD (2001) 5/FINAL, 27. April 2001 (<http://www.bmu.de/files/pdfs/allgemein/application/pdf/pol-report-f.pdf>)
- OECD (2003):** *The use of tradable permits in combination with other environmental policy instruments*. Organisation for Economic Co-operation and Development, Working Party on National Environmental Policy, ENV/EPOC/WPNEP(2002)28/FINAL
- OECD (2004):** *Policy Brief: Science and innovation policy – key challenges and opportunities*, Paris.
- OECD DAC (2005):** *Environmental Fiscal Reform for Poverty Reduction*. DAC Guidelines and Reference Series, Organisation for Economic Co-operation and Development
- P3U (1998):** *Finanzinstrumente für Umweltinvestitionen von KMU in ausgewählten Entwicklungsländern*, Arbeitspapier Nr. 15
- Pearce, D. (1994):** *Measuring Sustainable Development*, Blue Print 3 Earthscan publications Ltd.
- Perman R., Ma Y., Mc Gilvray J., J., Common M (2003):** *Natural Resources and Environmental Economics*, Harrow, UK: Pearsan education 3rd edition.
- Pleon Kohtes Klewes GmbH (2005):** *Accounting for Good: the Global Stakeholder Report 2005*. The Second World-wide Survey on Stakeholder Attitudes to CSR Reporting. Download: [http://www.pleon.com/fileadmin/downloads/Pleon\\_GSR05\\_en.pdf](http://www.pleon.com/fileadmin/downloads/Pleon_GSR05_en.pdf)
- Porrini, Donatella (2005):** *Environmental policies choice as and issue of information efficiency*. Working Paper, Università degli Studi di Milano
- SAM, WRI (2003):** *Changing Drivers: The impact of climate change on competitiveness and value creation in the automotive industry*. Sustainable Asset Management, World Resources Institute, Zurich.
- Saur, P. et al. (2001):** *Voluntary Agreements in Environmental Policy*, Prague.
- Scott J. Callan and Janet M. Thomas (2006):** *Environmental Economics and Management: Theory, Policy and Applications*
- Seth von, Hauke/ Ott, Hermann E. (2000):** *EU Environmental Principles: Implementation in Germany*, Wuppertal Papers 105, July 2000, Wuppertal Inst. For Climate, Environment and Energy
- SustainAbility and UNEP (2004):** *Risk & Opportunity: Best practice in non-financial reporting*, SustainAbility, London. Tietenberg, T. 2003: *Environmental and Natural Resources Economics, 6th edition*, Boston: Addison Wesley.
- Tilbury, D, Crawley, C and Berry, F (2004):** *Education About and For Sustainability in Australian Business Schools*. Report prepared by the Australian Research Institute in Education for Sustainability (ARIES) and Arup Sustainability for the Australian Government Department of the Environment and Heritage.'
- Treasury Board of Canada:** *User Charging in the Federal Government- A Background Document*. Available online at [www.tbs-sct.gc.ca/pubs\\_pol/TB\\_H/dwnld/ucfg\\_e.rtf](http://www.tbs-sct.gc.ca/pubs_pol/TB_H/dwnld/ucfg_e.rtf)
- Turner, R. Kerry, D. Pearce, I. Bateman (1993):** *Environmental Economics: An Elementary Introduction*. The Johns Hopkins University Press
- Umweltkatalog (2001):** *Umweltaspekte bei der Förderung von Entwicklungsbanken*, Herausgeber BMZ, Entwicklung des UVP-Instrumentariums
- UN Millennium Project (2005):** *Innovation: Applying Knowledge in Development*, a report of the Task Force on Science, Technology and Innovation, Earthscan, London.
- UNDP (2001):** *Human Development Report 2001: Making new technologies work for human development*, UNDP, New York.



- UNEP (2000):** *Voluntary Initiatives: Current Status, Lessons Learnt and Next Steps*, UNEP Discussion Paper, Paris.
- UNEP (2006):** *Financing for the Environmental Conservation of the Red Sea and Gulf of Aden (PERSGA)*
- UNEP (2002):** *Governmental Policies and Strategies for Cleaner Production*, United Nations Environment Programme (UNEP), Production and Consumption Branch: Cleaner Production, 2002 ([http://www.uneptie.org/pc/cp/understanding\\_cp/cp\\_policies.htm#1](http://www.uneptie.org/pc/cp/understanding_cp/cp_policies.htm#1))
- UNEP (2004):** *The Use of Economic Instruments in Environmental Policy: Opportunities and Challenges*. United Nations Environment Programme
- UNEP (2005):** *International environmental governance: Bali Strategic Plan for Technology Support and Capacity-building*, Note by the Executive Director. Annex UNEP/GC.23/6/Add.1, United Nations Environment Programme
- UNEP (2005):** *The Trade and Environmental Effects of Ecolabels: Assessment and Response*. Available online at <http://www.unep.ch/etb/publications/Ecolabelpap141005f.pdf>
- UNEP-DTIE (1998):** *Voluntary Initiatives*, In: *Industry and Environment Review*, Volume 21, No. 1-2, Paris
- UNESCAP (2006):** *Virtual Conference on Integrating Environmental Considerations into Economic Policy Making Processes*. United Nations Economic and Social Commission for Asia and the Pacific. Website accessed 19th April 2006 ([http://www.unescap.org/drpap/vc/orientation/M5\\_2.htm](http://www.unescap.org/drpap/vc/orientation/M5_2.htm))
- UNESCO (2002):** *Education for Sustainability: From Rio to Johannesburg: Lessons learnt from a decade of commitment*. [http://portal.unesco.org/education/en/ev.php-URL\\_ID=34374&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/education/en/ev.php-URL_ID=34374&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- UNIDO/UNEP Guidance & Training Manual:** *How to establish and operate cleaner production centres* [www.unepie.org/pc/cp/library/training/howtoCPC/manual\\_cdrom/mainmenu.htm](http://www.unepie.org/pc/cp/library/training/howtoCPC/manual_cdrom/mainmenu.htm)
- US EPA (1994):** *A State and Local Government Guide to Environmental Program Funding Alternatives*. Available online at [www.epa.gov/owow/nps/MMG/funding.htm#7](http://www.epa.gov/owow/nps/MMG/funding.htm#7)
- US-EPA (2003):** *Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control*. United States Environmental Protection Agency, Office of Air and Radiation
- WBSCD/IIED (2002):** *Breaking New Ground – The MMSD Final Report*. International Institute for Environment and Development, World Business Council for Sustainable Development
- Wieandt, Paul (1992):** *Investitionen in den Umweltschutz – Herausforderung und Chance für Unternehmen und Kreditinstitute* aus: *Banken und Ökologie* (Herausgeber Henner Schierenbeck/Eberhard Seidel), Gabler Verlag
- WIR Issue Brief (2005):** *Multilateral Development Bank Lending through Financial Intermediaries: Environmental and Social Challenges*, June 2005
- World Bank (2005):** *Environmental and Natural Resources Law: Domestic Environmental Law*, World Bank 2005 (<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTLAWJUSTICE/EXTENVIRONMENTNTRESLAW/0,,contentMDK:20477657-menuPK:1736832-pagePK:148956-piPK:216618-theSitePK:1001743,00.html>)
- World Bank (2005):** *Environmental Fiscal Reform – What Should Be Done and How to Achieve It*. The International Bank for Reconstruction and Development / The World Bank

## Publisher

### **Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH**

Posfach 5180, 65726 Eschborn, Germany

Internet: <http://www.gtz.de>

## Authors & Editors

### **UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production (CSCP)**

Authors: Michael Kuhndt, Tomoo Machiba, Martin Herrndorf, Tomasz Muchorowski

Editing: Greg Tyson

### **Wuppertal Institute for Environment, Climate, Energy GmbH**

Authors: Andreas Villar, Christa Liedtke

Concept: Andreas Villar

### **Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ)**

Authors: Carsten Hellpap, Josef Gamperl, Maïke Hora, Peter Pluschke, Dörte Ziegler, Barbara Lang, Anja Wucke, Ulrike Killguss, Frauke Demuth, Astrid Denker, Karin Gauer, Detlef Schreiber

Concept: Dörte Ziegler, Carsten Hellpap, Edith Kürzinger, Guntram Glasbrenner

Editing and further inputs: Dieter Brulez, Astrid Denker, Mohamed El-Khawad, Johanna Klein, Stephan Paulus, Jan-Peter Schemmel, Otto Schmidt, Vera Scholz, Angelika Stöcklein, Anja Wucke, Dörte Ziegler, Guntram Glasbrenner, Carsten Hellpap, Edith Kürzinger

## Project Management

**CSCP:** Michael Kuhndt

**Wuppertal Institute:** Andreas Villar

**GTZ:** Dörte Ziegler

## Layout

Additiv. Visuelle Kommunikation

Berlin, 10405

August 2006





For further information:

Deutsche Gesellschaft für  
Technische Zusammenarbeit (GTZ) GmbH  
- German Technical Cooperation -

Dag-Hammarskjöld-Weg 1-5  
65760 Eschborn/Germany  
T +49 61 96 79-0  
F +49 61 96 79-11 15  
E [info@gtz.de](mailto:info@gtz.de)  
I [www.gtz.de](http://www.gtz.de)

